Does social class explain health inequalities? : a study of Great Britain and Spain

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Abstract:

La tesis analiza cómo la clase social influye en el estado de salud de los individuos así como la importancia que tienen la ocupación, la educación y los estilos de vida como variables explicativas de la asociación entre la clase y la salud. Las conclusiones que se derivan del análisis de estas preguntas empíricas aportan nueva evidencia para entender el aumento de las desigualdades en salud que se ha registrado en las últimas décadas en las sociedades desarrolladas. En particular, la investigación sugiere claramente que tanto la ocupación como el nivel educativo son variables que deben tomarse en cuenta en la planificación de políticas que tengan como objetivo la disminución de las diferencias en el estado de salud de los individuos. Los estilos de vida, en cambio, tienen muy poca importancia en la explicación de por qué aquellos individuos que conforman las clases sociales más privilegiadas no sólo viven más que los que componen otras clases sociales, sino que además disfrutan de un mejor estado de salud a lo largo de la vida. Para intentar entender la asociación que existe entre la clase social y la salud, la tesis desarrolla un marco teórico que especifica los mecanismos a través de los cuales la clase está relacionada con la salud. La estructura social de las sociedades desarrolladas influye en la salud a través de la distribución de los recursos materiales o ciertos comportamientos relacionados con la salud que tienen como consecuencia diferentes estilos de vida. El nivel educativo también afecta al uso que se hace de estos recursos y, por tanto, a los estilos de vida que tienen los individuos. Un elemento esencial de la clase social es la ocupación: las condiciones de trabajo y el tipo de trabajo que se desempeña tienen también por tanto un efecto en la salud. Más aún, la naturaleza de la estructura de clases tiene un efecto sobre la salud a un nivel agregado de análisis ya que las políticas de contenido social son en parte el resultado de la estructura de intereses de las clases sociales. La investigación especifica diversos mecanismos para poder examinar de forma sistemática la explicación teórica propuesta en la tesis. Los mecanismos que relacionan la clase y la salud a través de la educación y de los estilos de vida son el objeto principal de estudio del análisis empírico. El análisis emplea datos medidos a nivel individual extraídos de las encuestas nacionales de salud llevadas a cabo en Gran Bretaña y en España en la primera mitad de los años noventa. Estos países son tratados como contextos en los cuales se analiza la explicación teórica de la tesis. Los principales resultados de la tesis muestran la importancia que la clase social tiene para entender el estado de salud de cada individuo. La investigación confirma que las clases sociales disfrutan de estados de salud diferentes. Específicamente, los individuos de las clases sociales más privilegiadas tienen sistemáticamente una mejor salud que los individuos de otras clases sociales. Las diferencias existen tanto en la salud medida de forma objetiva como en la salud subjetiva o auto-percibida. Moviéndose de la descripción de las desigualdades en salud a su explicación, el análisis sugiere que la distribución de ciertos recursos a través de las clases explica parte de la variación en el estado de salud de las distintas clases sociales. Así, se identifica la educación como una variable significativa para comprender parte de las desigualdades en salud en las sociedades desarrolladas. Los estilos de vida, por otro lado, no parece que sean relevantes para entender las diferencias en salud. Las pequeñas diferencias que existen entre el Reino Unido y España en los mecanismos que explican la relación entre clase y salud sugieren que el proceso a través del cual la clase afecta a la salud es esencialmente similar en las sociedades desarrolladas.

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DOES SOCIAL CLASS EXPLAIN HEALTH INEQUALITIES? A STUDY OF GREAT BRITAIN AND SPAIN

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Esta obra se presentó como tesis doctoral en la Universidad de Oxford, el 24 de Febrero de 2004. El Tribunal estuvo compuesto por los profesores doctores Anthony Heath y Tarani Chandola.

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ABBREVIATIONS

ALOS	Acute Length of Stay
BMI	Body Mass Index
CASMIN	Comparative Analysis of Social Mobility in Industrial Nations
CIS	Centro de Investigaciones Sociológicas
COU	Curso de Orientación Universitaria
DHA	District Health Authority
EGB	Educación General Básica
EU	European Union
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GPs	General Practitioners
GNP	Gross National Product
GNPpc	Gross National Product per capita
HC	Health Care
HCR	Health Care Related
HMO	Health Maintenance Organisation
ICHA	International Classification for Health Accounts
IDB	Inter-American Development Bank
ISIC	International Standard Industrial Classification
LR test	Likelihood Ratio test
NHS	National Health Service
NS-SEC	National Statistics Socio-Economic Classification
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PYLL	Potential Years of Life Lost
RC	Reference Category
RGSC	Registrar General of Social Class
SC	Sheaf Coefficient
SHS	Subjective Health Status
SNS	Sistema Nacional de Salud
UK	United Kingdom
US	United States.
WHO	World Health Organisation

Abstract

The main research questions examined in this thesis concern the extent to which social class influences individuals' health, and how and whether individuals' occupation, education and lifestyles mediate between class and health. The conclusions drawn from the analysis of these empirical questions cast further light on the widening health inequalities seen in developed societies in recent decades. In particular, this research suggests that, employment conditions as well as educational levels are variables that need to be taken into account when planning policies aimed at tackling differences in health outcomes. Lifestyle variables, on the other hand, would appear to be almost irrelevant when explaining why the members of the more privileged social classes not only live longer than those in other classes, but also enjoy significantly better health over the course of their lives.

In trying to understand the association between class and health, I define a theoretical framework that specifies the mechanisms through which class is linked to health. Social structure influences health by distributing certain factors such as material resources or some health-related behaviour that ultimately result in individuals having different living conditions. Educational attainment also affects the way these resources are employed and, therefore, lifestyles. A fundamental element of a social class is occupation: individuals' employment and working conditions also affect their health. Furthermore, the nature of a social structure has an effect on health at the aggregate level of analysis since social policies are partly the result of the structure of class interests. Various mechanisms are specified in order to systematically test this theoretical framework. The mechanisms that relate class and health through education and lifestyle lie at the heart of the empirical analysis. This analysis employs individual-level data drawn from health surveys carried out during the first half of the 1990s in the two countries selected for the analysis, United Kingdom and Spain. These countries are treated as contexts in which to test the theoretical explanation.

The main results of the analysis reveal the importance of social class in determining health outcomes. Indeed, individuals from different classes enjoy distinct degrees of health.

Specifically, individuals in the most privileged class categories have persistently better health than those in the other class categories. Differences exist in terms of both objective and subjective or self-perceived health. Moving on from observation to explanation, the analysis suggests that the distribution of certain resources across classes accounts for some of the variance in health outcomes. Hence, education is identified as a significant variable to comprehend part of the health inequalities in developed societies. Lifestyle, on the other hand, does not appear relevant in accounting for health outcomes. The small differences found between the United Kingdom and Spain in the mechanisms that link class and health suggest that the process through which class affects health is essentially similar in developed societies.

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INTRODUCTION: AN OVERVIEW OF THE THESIS

Health outcomes, and more specifically, what causes health and ill-health, have been the focus of attention of a variety of academic disciplines from those focused on the study of the human body *per se* such as medicine or biology, to those centred on the analysis of the individual and her interaction with the society in which she lives such as economics, psychology or sociology. These research efforts have allowed transforming into common knowledge some findings. For instance, it is known that the genetic heritage of an individual has a specific effect on her condition, or that, in developed societies, the provision of health care has a limited effect on her health status. However, the potential influence of the social environment in which we live has only started to be examined recently, and there are more open question marks than firm and sound findings. It is very little what we know about the impact that a developed society has on health outcomes, both through mechanisms operating at an aggregate level such as the institutional or the educational systems or through its impact on the individual itself reflected in outcomes such as lifestyles, social class or educational achievements.

This thesis seeks to shed some light on these issues. Its aim is to do it through the analysis of two specific questions. First, does the social class of an individual matter for her health achievements? Second, if social class has a significant and tangible effect, how can we explain it? What are the mechanisms through which the social position ultimately defines health status in one way or another? The answer to these questions will provide evidence to allow a better understanding of the ways in which developed societies could be modified so that health outcomes would improve and possibly, health inequalities across the social structure would be diminished. Hence, the evidence presented in this thesis could be examined so as to have some guidance on how individuals' life chances could be transformed so that societies could improve their well-being.

The theoretical framework that the dissertation proposes is aimed to explain the links between a social structure and the health that an individual enjoys. The empirical part of the thesis makes use of this theoretical framework to analyse it in two European developed societies: Great Britain and Spain. The structure that the thesis has followed in order to fulfil these objectives is as follows.

The dissertation has two distinct parts. The first part is formed by Chapters 1, 2 and 3. In these chapters, I will present in detail the research questions, the analytical tools proposed to study them as well as the data and statistical methods employed to test the analytical framework. Hence, Chapter 1 introduces the research questions as well as their theoretical and empirical relevance. This chapter identifies the gaps presented by the literature on health, and more specifically, on health inequalities. The most salient one is the need to move from the description to the explanation of health inequalities. The exclusion of social class as an explanatory variable is also discussed highlighting the relevance of the analysis presented in the thesis. The chapter finishes with a discussion of the main justifications to select Great Britain and Spain as cases of study.

Chapter 2 discusses the theoretical argument of the thesis. It does so by critically reviewing first the different explanations of health inequalities that have been proposed by the literature. The theoretical contribution of the dissertation is found in the explanation given to the unequal health outcomes presented by social classes which is based on the relevance of certain resources that are distributed unequally among classes. The theoretical framework is operationalized in four specific mechanisms, two of which will be the basis of the analysis presented in the empirical part of the thesis.

The data necessary to conduct the empirical analysis in presented and discussed in Chapter 3. This chapter also includes a definition and operationalization of the research variables. The statistical tools that have been selected to do the empirical analysis are also included in this chapter. The chapter ends with a discussion of the main strengths and weaknesses of the methodological design of the thesis.

While the first part of the thesis deals with the aims of the dissertation, its relevance, its theoretical explanation and the tools necessary to answer the research questions; the second part is the empirical part itself. Chapters 4, 5 and 6 present and discuss the quantitative analysis designed to examine the mechanisms of explanation of the thesis. Thus, Chapter 4 presents a detailed analysis of the state of health of Great Britain and Spain taking as a unit of analysis first the country and second the individual. The health status of the two countries is analysed placing them in their political geographical context, the EU. This chapter fulfils the first aim of the thesis. Thus, it analyses whether social class matters in defining health outcomes. In other words, it analyses whether the health condition of an individual is influenced by the social position she happens to present.

As the first research question is clearly answered in Chapter 4, the rest of the empirical analysis is designed so as to provide an answer to the second research question. Thus, Chapters 5 and 6 analysing Spain and Britain, test whether the mechanisms of explanation that result from the theoretical framework are adequate. The relevance of the mechanisms to understand differences among social classes in their scores in both objective and subjective health are examined. Thus, the chapters study the importance of individuals' education and lifestyles in order to account for the variance among classes in health outcomes. The relevance of individuals' occupation is also considered. Finally, the chapters also direct attention on the potential effect that a social structure might have on the results in the outcomes of social policies.

Finally, Chapter 7 summarises the main findings of the empirical analysis of the thesis through a comparison of the results for Great Britain and Spain. The empirical findings are discussed making reference to the theoretical framework of the dissertation. The concluding chapter also includes some suggestions for future research that result from the issues exposed and discussed throughout the thesis. Specifically, it proposes designing a methodology that would allow examining the relevance of the social structure as a whole noting the potential interacting effect of the defining characteristics of the Welfare State. It also suggests further research on why the class effect appears to be stronger for women than for men and on why class has a stronger effect on how individuals perceive their health status than on their objective health outcomes.

CHAPTER 1: RESEARCH QUESTION, OBJECTIVES, THE RELEVANCE OF THE RESEARCH AND, SELECTION OF CASES

1.1. Introduction to the object of study

Health inequalities have been the object of considerable investigation in recent times. Indeed, since the 1980s, research related to individuals' state of health and to health inequalities in society has been one of the subjects which social scientists interested in health outcomes and individuals' welfare have devoted most attention. The pioneering work in this area was the report that the British cabinet commissioned from a research group chaired by Sir Douglas Black. The Black Report (1980) sparked similar initiatives in other European countries; research projects that analysed the evolution of populations' state of health using morbidity and mortality rates as health indicators.

International reports produced since the 1980s have focused on the analysis of the relationship existing between socio-economic variables (measured at two levels of aggregation: the individual and the community level) and mortality rates. In general, mortality rates have been used as the indicator of health status[1]. Since the 1990s, one line of enquiry has come to dominate

[1] As we will see in Chapter 3, this dissertation will measure health through the combination of a subjective dimension and an objective dimension. The definition and operationalization of health is one of the contributions that this dissertation makes to the health inequalities literature, as health is normally

the research agenda in this field. This thesis fits into this line of research, which is concerned with deepening our understanding of the factors that cause variations among individuals in terms of their health[2].

This literature has been seeking to analyse a number of different questions, including some of the following. Which factors determine individuals' health? Why is it that some individuals are healthier than others? Why do patterns of health inequality survive and even become more accentuated in developed societies that have achieved a remarkable increase in individuals' general standards of living? Although there is an ever-increasing body of research into health determinants, we are still a long way from achieving a consensus on these issues. Different explanations have been put forward to account for observed disparities in individuals' health. For some authors, differences in individuals' health are simply the result of measurement errors, or errors of definition of the variables involved (Bloor *et al.,* 1987; see also Cameron and McGoogan, 1981 and Rose and Marmot, 1981). Others argue that health is the outcome of behavioural patterns (Marmot *et al.,* 1984; Morgan *et al.*, 1989; Marmot *et al.*, 1991; Cox *et al.,* 1993; Longnecker, 1994; Kushi *et al.*, 1995). Yet another group of scholars considers that structural or material factors are responsible for health inequalities (Black *et al.*, 1982; Blane, 1985; McCarthy *et al.*, 1985; Whitehead, 1988; Goldblatt, 1990). Yet, some authors claim that differences in adult health are a consequence of biological programming *in utero* (Barker *et al.,* 1989, Barker, 1989; 1990; 1991; 1992; Barker *et al.,* 1993; Barker, 2000; Barker *et al.*, 2001; Barker, 2002; Barker *et al.*, 2002). Differences in people's health have also been explained

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measured through morbidity or mortality rates, whilst, in contrast, the subjective dimension of health has not been extensively studied. A definition of health as a multidimensional concept formed by an objective and a subjective dimension has, to the best of my knowledge, never been previously examined in the way it is in this thesis.

[2] Chapter 2 will address the different lines of research that have focused on the analysis of both health inequalities and their origins.

genetically (Bouchard, 1998; Koopmans *et al.*, 1999; Stallings *et al.*, 1999), while others have argued that psychosocial factors are the main determinants (Rosenman *et al.*, 1976; Hoffman *et al.*, 1995; Denollet *et al.*, 1996; Kawachi *et al.*, 1996; Bosma *et al.*, 1997; Hemingway and Marmot, 1999; Marmot and Wilkinson, 2001).

In this dissertation I would like to contribute to the body of research on health inequalities by examining the relationship between one specific variable that has received relatively little attention in this literature, namely social class[3], and health outcomes. In the following section I will present the main objectives of the thesis as well as the research questions. Section 3 includes a discussion of the relevance of the object of study, while the fourth section includes a discussion of the cases selected for analysis in this thesis. The empirical analysis will be based on the United Kingdom (UK) and Spain. The justification for the selection of these two countries lies in the desire to adopt the most appropriate methodological design for the thesis, which, in turn, is determined by the ultimate objectives of the research. Section 5 offers a summary of the main points made in this chapter.

1.2. The research question: Understanding the association between class and health

The principal objective of this thesis is to examine why some individuals are healthier than others and in particular, to analyse the role that socio-economic variables play in health outcomes. More specifically, the thesis analyses the social structure of two developed societies (Great Britain and Spain) and their state of

[3] As will be seen in Chapter 2, social class has only recently become the focus of part of the literature on health inequalities. Social class has been mainly understood as a measure of occupational position or as a classifying variable. An analysis of class theoretically defined has not been an objective of this literature, yet a theoretically grounded study of class is essential if we are to understand how and why class influences individuals' life chances.

health in order to answer the following research questions: **In a developed society, what role does social class play in determining individuals' health? What mechanisms mediate between class and health?** The objective of this thesis is therefore twofold. It will analyse, first, whether social class has a significant impact on individuals' health and, if so, what are the possible variables mediating this association, that is, what are the theoretical links between class and health outcomes. The thesis will therefore contribute to our understanding of the social determinants of health, that is, it aims to deepen our understanding of the significance that variables of a social nature (i.e. education or social class) have in shaping individual's health. Moreover, the thesis will make a movement towards explanation. It will provide information that will help identify and better understand the variables that mediate between the social structure of a developed society and its state of health.

The research takes as a point of departure the differences that exist in individuals' health, differences that exist both between these two developed countries and within each of these countries. In order to examine the research questions, the dissertation will address and, in some cases, empirically test issues related to the following questions. To what extent do economic and social factors influence health inequalities within developed economies? What is the specific relevance of socio-economic factors on individuals' state of health? What characterises the association between a society's class structure and its health? Does public expenditure and investment have any effect on health outcomes? Is medical care associated with health outcomes and more specifically, with differing health results among individuals? To what extent are individuals' educational achievement and social class related to health outcomes? Does education mediate between an individual's social position and her health condition? Are health-related behaviours useful for understanding differences in the health status of individuals in different social classes?

The research consists of two stages of analysis and studies the object of the investigation during the first half of 1990s. The first stage of empirical research of the project (Chapter 4) treats society as a whole as the unit of analysis, presenting the general health condition of Great Britain and Spain within a European context. The first stage of the empirical research has been designed in order to meet the first aim of the thesis, namely, to examine whether there are health inequalities among social classes. The second stage of the empirical research (Chapters 5 and 6) takes the individual as the unit of analysis and focuses on the study of the class structure of England and Spain and their health outcomes. This stage has been structured so that the second main aim of the thesis may be met. Hence, the design and organisation of the empirical analysis will allow us, first, to understand the specific effect that class has on health and, second, to analyse possible mediating mechanisms. The focus of this stage is to investigate the significance in health of socio-economic variables (education and class) as well as of health-related variables[4]. The thesis also explores the relevance that education or health-related behaviours have for class differences in health.

1.3. The relevance of the object of study: Why the analysis of the origin of health inequalities?

Over the last few decades, the scientific community, governments and international organisations have all shown increasing interest in analysing and better understanding social inequalities and, specifically, health inequalities. Both scholars and politicians have acknowledged the need to understand better health inequalities in order to be able to implement measures that would reduce such inequalities. Moreover, various international organisations whose work is related to individuals' health have highlighted the importance of implementing measures to correct

[4] Chapter 2 will include the theoretical framework of the thesis which includes the research variables. Chapter 3 will present the methodology employed throughout the thesis. It will contain a definition and operationalization of the research variables.

inequalities in individuals' health status. In this sense, in 1979 the World Health Organisation (WHO) called for a twenty-five percentage point reduction in health inequalities between countries and among different social groups within each country. This was the principal objective of the plan *Health for All by the year 2000* (Bryant, 1980; WHO, 1985 and 2000). In the *Meeting about Social Progress* held in Copenhagen in 1995 the United Nations reaffirmed the need to diminish inequalities in individuals' health status.

Why should research into health inequalities and, more specifically, into the association between social class and health be considered as a subject of academic enquiry? In my opinion, various reasons justify the need for research in this area. These can be broken down into five different types. The first group has a theoretical character, that is, it is formed by the justifications that diverse academic disciplines have proposed to argue in favour of the analysis of health inequalities. The second set of justifications is pragmatic in character, in the sense that it exposes the benefits that the proposed research would imply in terms of health achievements. The third justification is the lack of clear understanding of what causes the health gap. As we will see in Chapter 2, the literature on health inequalities has already made some interesting contributions to our understanding of why in developed societies, despite some factors that would lead us to expect the contrary, such as the establishment of universal health care systems or economic growth, some individuals are not only healthier than others but also are less likely to die at certain ages. The fourth justification on which this thesis is based is related to the third: an examination of the literature that specifically addresses the association between class and health clearly reveals the need for research aimed at specifying the relevant mechanisms of explanation. The final reason for this thesis is derived from the previous consideration, namely, it is based on the need to fill the research gaps that the literature on health inequalities presents. Specifically, there is a need to test the theoretical mechanisms that hypothesize the nature of the association between class and health.

The thesis has selected two countries, Great Britain and Spain, to conduct the empirical analysis[5]. Although Great Britain has been extensively analysed, only recently have scholars actually begun to try to explain the relation between social structure and health outcomes. The Spanish case, on the other hand and similarly to the other South European countries, has been the focus of very little research attention.

1.3.1. The study of health inequalities: Justifications from academic disciplines

Researchers working in numerous scientific disciplines have affirmed the need to deepen our understanding of variations in health status. Likewise, this doctoral research adopts a multidisciplinary approach, drawing on tools, concepts and knowledge from sciences as diverse as sociology, statistics and epidemiology. The decision to undertake this type of research is based on the fact that the object of study –the relationship between social class and health outcomes- is a complex phenomenon that may only be fully understood if it is analysed in the light of knowledge gathered by a variety of scientific disciplines. Each of these disciplines offers various justifications for studying health inequalities. For instance, from a social justice perspective, it is argued that it is not fair that individuals are not able to fully achieve their health potential due to circumstances that could be partly modified through, for example, political actions. From the point of view of epidemiology, that is, the discipline concerned with community health problems and public health in general, the study of these issues might contribute to the prevention of deaths, illnesses and disabilities, and the loss of human resources that these imply. Finally, from an economic perspective, societies have an interest in reducing the unnecessary loss of human and economic resources. If health inequalities favour more privileged

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[5] The justification for the selection of these two countries is provided in Section 4.

social groups, the implication is that such inequalities result in a loss of social, economic and human resources, premature and avoidable deaths, and hence a need for costly health and social services.

1.3.2. Understanding the health gap: A pragmatic justification

The results of this research are also relevant from a practical perspective. In order, first, to determine the variables that cause some individuals to have a better condition than others and, second to understand the link between these variables, thereby facilitating the design and implementation of public policies intended to diminish and correct these inequalities. The implementation of redistributive policies and measures designed to promote social integration, thereby reducing health inequalities, may result in a fall in the mortality rates currently found in developed societies.

In this sense, a number of interesting studies have analysed the impact of changes in poverty and income inequality on health achievements. For instance, the empirical evidence set out in Kennedy, Kawachi *et al.,* (1996) shows that in the case of the fifty states of the United States, if the other factors determining inequalities in mortality rates are kept constant, an increase of five points in the redistribution of income would bring about a reduction of seven points in total mortality and twenty-points in heart disease rates. Moreover, Wilkinson (1992b) shows that reductions in the levels of relative poverty in European countries between 1975 and 1985 showed a significant association with an even more rapid improvement in life expectancy[6]. Furthermore,

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[6] The correlation coefficient between both variables was -0.73 which was statistically significant ($p<0.01$). However, this finding should be treated with caution, as ideally it would be necessary to include in the analysis a control for other variables that might mediate the relationship between poverty rates and life expectancy. Similarly, the correlation coefficient only tells us about the sign and

the analysis of a few countries from the Organisation of Economic Cooperation and Development (OECD) during the 1980s showed that increases in the proportion of total disposable income received by the poorest 60% of households were associated with more rapid enhancements in life expectancy[7].

1.3.3. The need for further research into the causes of health inequalities

In relation to the level of information available on the subject examined in this thesis, a number of important questions still require further research. The literature still does not provide a clear understanding of any of the factors that determine health status, nor of the relationship between these variables. Consider, for example, the relationship between one group of explanatory variables (economic variables) and health status. The empirical evidence on the link between economic factors (e.g. growth of Gross National Product (GNP), individual incomes, characteristics of the distribution of income within a society) and indicators of individual health outcomes (mortality and morbidity rates) that this literature presents is ambiguous and inconclusive.

For instance, there is no clear understanding of the association between absolute levels of economic growth and health status at the aggregate level. Some authors (e.g. Wilkinson, 1992b; Daniels *et al.,* 2000; Kennedy *et al.,* 1996; Kawachi and Kennedy, 1999ab) maintain that the association is weak, as once countries have achieved a certain level of development, absolute economic growth or absolute wealth have a minor impact on morbidity or

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direction of the relationship between the two variables, so it would be wrong to draw any conclusions about the direction of cause and effect.

[7] The correlation coefficient between both variables was 0.8. It was statistically significant with a 95% confidence interval. This correlation should be treated with the same caution as the earlier one as no other control variables were included in the analysis.

mortality rates[8]. For instance, although for the last two decades the United States' GNP per capita (GNPpc) has been twice as high than that of Greece, life expectancy has been higher in Greece than in the United States[9]. According to these authors, this relationship is not an exception but rather the rule in developed countries. Hence, in 1986-1987, the correlation coefficient between life expectancy and GNPpc (converted to the parity of purchasing power) for the twenty-three richest OECD countries was weak ($r = 0.38$; $p<0.05$) (Wilkinson, 1992b: 166). Moreover, the relationship between long-term economic growth and variation in life expectancy is also weak: the correlation coefficient between increases in GNPpc and the rise in life expectancy for the same group of OECD countries for the period between 1970 and 1987 was only 0.07 (Wilkinson, 1992b: 166). These data seem to provide support for the argument that there is only a weak relation between economic growth and health indicators in developed countries.

However, the empirical evidence is neither unidirectional nor unambiguous. An increasing number of studies have documented strong positive associations between low levels of economic growth or deprivation and high mortality (Preston, 1975; Adler *et al.,* 1993; Pritchett and Summers*,* 1996; Bentham *et al.,* 1995; Benach, 1997). These studies have argued that in developed countries too, increasing economic growth is significantly and negatively associated with mortality rates.

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[8] This argument will be developed further below in the discussion of the relative income hypothesis. This clearly exemplifies one of the criticisms made of the relative income hypothesis, namely that it constitutes an example of the ecological fallacy. In this case the analysed link is between economic content variables measured at the aggregate level and aggregate measures of health outcomes. The relative income hypothesis, on the other hand, associates the relative socio-economic position of each individual with her health status. Therefore, these scholars are deriving conclusions at the individual level from associations tested at the aggregate level in what is considered to be an ecological fallacy.

[9] It should be noted that many other variables could be mediating between the dependent and the independent variable (e.g. educational system, social structure, type and amount of resources devoted to health care systems).

A significant part of this literature has focused on the analysis of the association between measures of deprivation (e.g. income, economic growth, unemployment, and educational achievement) and mortality rates in small geographic areas. Thus, the unit of analysis used in these studies has often been a small geographical area (e.g. cities, metropolitan areas, regions). Evaluating different indicators of deprivation, these studies have documented a clear pattern of poorer health outcomes in "worse-off" geographical areas in comparison to "better-off" areas (Curtis, 1990; Feinstein, 1993; Lee *et al*, 1995; Bentham *et al.,* 1995; Benach, 1997; Benach and Yasui, 1999; Benach, Yasui *et al.,* 2001; Benach, Yasui *et al.,* 2003). Some of these studies show that mortality rates within small geographic areas correlate perfectly with individuals' incomes, rates increasing linearly as the level of income decreases. In the Spanish case, Benach (1997: 145) showed that in the early 1990s standardized mortality ratio differences between the most and least deprived stood at around 16%. Hence, one body of literature suggests that there is a strong and significant association in limited geographic areas between economic variables measured in absolute terms and health outcomes. The sign of the association is the following: positive economic conditions are associated with better health indicators.

As we will see in Chapter 2, researchers have not only been interested in examining the links between economic variables in absolute levels, but also the association between economic variables in relative terms and health outcomes. For instance, a number of studies have focused on the link between the distribution of income and health outcomes. This area of research has also presented conflicting empirical findings. One group of authors, Le Grand (1987) and van Doorslaer *et al.,* (1997)[10] analysing the factors that determine the divergent health status

[10] This study includes the following countries: Finland, East Germany, West Germany, the Netherlands, Spain, Sweden, Switzerland, Great Britain and the United States and is based on data from the late 1980s and the early 1990s. This study represents the first serious empirical analysis of the association between economic variables and health outcomes.

between developed societies, showed that the unequal distribution of income among individuals accounted for part of the variation in health outcomes[11]. A clear association between income inequality and health inequality was shown[12]. Per capita health care expenditure and public expenditure on health care was found to have a positive but statistically non-significant relationship with individuals' health. These studies also analysed the relationship between cross-country differences in health status and variations in total expenditure on health care, a relationship that again appeared to be non-significant.

These studies show, therefore, that differences in the degree of income inequality are responsible for only part of the variation in individuals' health status among developed countries. Hence these authors conclude that part of the variability in individuals' health between developed societies is not related to the economic inequality within each country but is in fact determined by other factors that they do not analyse[13]. When analysing whether there are significant income-related inequalities in health *within*

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[11] A linear bivariate regression of the health measure (i.e. an ill-health concentration index) and the income inequality measure (i.e. Gini coefficient) resulted in an adjusted R^2 of 0.71.

[12] The correlation coefficient between the two variables is -0.87 and it is significant with a 95% confidence interval. It is interesting to note that "This is consistent with the hypothesis that high income inequality generates a high degree of health inequality, though it ought to be noted that it is also consistent with the direction of causality being in the opposite direction. It may be, for example, that income level depends on health, then a high degree of income inequality is attributable, in part at least, to a high degree of health inequality". (van Doorslaer *et al.,* 1997: 107-108).

[13] In relation to the situation in less developed countries, it is interesting to note that some research has demonstrated that a number of countries, including Cuba, China, Costa Rica, Sri Lanka and the state of Kerala in the south of India have achieved good results in terms of health status (Caldwell, 1986). This empirical evidence suggests that economic growth alone does not lead to an improvement in individual' health conditions, confirming the complex relationship existing between socio-economic factors and individuals' health.

developed societies, these studies show that they exist and, without exception, inequalities favour the higher income groups[14].

Another line of research on the relationship between economic development and a society's health adds further complexity to the findings presented by Le Grand and van Doorslaer *et al.* In this sense, the work by Wilkinson (1990, 1996, 2000ab) and Kawachi and Kennedy (1997ab, 1999ab, 2002) suggests that the relationship between income distribution and individuals' health is the most significant variable in explaining different health achievements *between* developed countries. These authors argue that once societies have reached a certain level of development the absolute level of income does not have an impact on individuals' health but it is their relative position in the income scale which influences their health outcome. This is what has come to be known as the relative income hypothesis[15]. The level of well-being of individuals depends, therefore, on how the economic resources are distributed among a society and on how individuals perceive their own position in terms of income. The more unequal the distribution of economic resources, the lower the life expectancy and the higher the mortality rate (Wilkinson, 1992b, 1994a and 1997b).

A number of studies support this argument, as they show that the more egalitarian the distribution of income the higher the life expectancy (Rodgers, 1979; Wilkinson, 1986a, 1992b, 1994a, 1996, 1997b; Wennemo, 1993). In a study of nine developed

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[14] The study (van Doorslaer *et al.,* 1997: 102) found substantial variation in the degree of inequality. The United States and Britain were the countries with the highest inequality; followed by a cluster of countries with a medium level of health inequality which was made up of Spain, Switzerland and the Netherlands; West Germany and Finland came next with a medium to low level of inequality, while Sweden and East Germany were the countries with the lowest levels of inequality. However, statistical tests show that most of these inequalities are not significant. The United States and Britain have a significantly higher degree of inequality than the rest of the countries; nevertheless, differences among the rest of the countries are not significant in most cases.

[15] Chapter 2 includes a more detailed discussion of this hypothesis and the criticism it has received.

societies[16] Wilkinson (1992b) showed that there was a significant and large correlation coefficient ($r=0.86$; $p<0.001$) between life expectancy and the proportion of income earned by the least well off 70% of the population[17]. When controlling for GNPpc, in 1981 over three quarters of the variation in life expectancy among countries were accounted for by the two variables (i.e. GNPpc and the proportion of income going to all those below the seventh decile). However, almost all the variance was explained by the proportion of the population below the seventh decile, as only 10% of the total variance is explained by GNPpc. Thus, differences in health outcomes among developed countries were mainly explained by the characteristics of the distribution of income, more egalitarian distributions being associated with a lower health gap.

In short, the review of the main strands of literature on the association between economic variables and health highlights the need for further research in order to clarify the association between health outcomes and these variables. As we will see in Chapter 2, this is a common gap in the health inequalities literature: further research will provide more empirical evidence that will shed some light on the sign and direction of the associations under analysis.

1.3.4. The need to fill in the gaps: Moving towards explanation

As will become clear in the following chapter, much of the health inequalities literature lacks theoretical content. The relations between health and other variables are often analysed without a theoretical base. Moreover, until the mid-1990s, the aim

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[16] Australia, Canada, the Netherlands, Norway, Sweden, Switzerland, West Germany, United Kingdom and the United States.

[17] The population was divided into deciles in relation to the total level of income received. Thus, the population was broken down in accordance with the share of total income going to successive tenths of the population, starting with the poorest and ending with the richest.

of most of the literature on health inequalities was to describe health inequalities among individuals, communities or countries. Only more recently have researchers begun to try to understand the causes of health inequalities. Some European countries (Britain, the Netherlands, Sweden and Finland) have initiated nationally funded research programmes focusing on socio-economic inequalities in health. The need to encourage research into the explanation has also been recognised by supranational institutions such as the European Commission and the European Science Foundation. Currently, there is a consensus around the need for a shift from description towards explanation (Vagerö, 1991; Acheson, 1998; Anderson, 1999; Forbes, 2000; Black, 2000; Mackenbach and Howden-Chapman, 2003).

The need for theoretically-driven research is clear. In order to gain a full understanding of the origins of social problems or conundrums we must first analyse the reasons for the observed links between the research variables. There is therefore a need to argue through the possible causes of the associations (i.e. to make hypotheses about the mechanisms of explanation of the phenomenon in question). In order to avoid misleading or erroneous conclusions, the object of study must first be understood in theoretical terms and then tested empirically. This thesis has adopted this methodological approach as it seeks both to hypothesize and then to test the association between social class and health outcomes.

Chapter 2 will show that the literature produced on health inequalities, especially during the last two decades, has extensively examined the association between health outcomes and many different types of variables (e.g. genetic factors, biological variables, behavioural factors, cultural variables, etc.). Although there is a long tradition of studying health inequalities in many disciplines (e.g. epidemiology, sociology, psychology, anthropology, social medicine, economics, demography), only recently has attention been focused on the role of social class. One of the first studies to introduce the role of social class into the analysis was the Black Report. Based on a detailed analysis of the health of the British population between World War II and the early 1980s, this work concluded that mortality rates were unequally distributed to the detriment of lower socio-economic groups and to the South and Southeast of the country. The definition of social class used in this study and in the vast majority of health inequalities research is based on the occupational categories in the Registrar General of Social Class. Only much more recently have some studies (Bartley *et al.,* 1999ab; Chandola, 1998; Donkin *et al.,* 2002; Sacker *et al.,* 2000; Östberg, 1997; Prandy, 1999; Scambler and Higgs*,* 1999) begun to define social class using measures based on a sociological theory such as the Cambridge Scale and the Goldthorpe schema. A number of authors have specifically referred to the benefits to be gained in terms of understanding from employing a theoretically-grounded class variable (Bartley *et al.*, 1999b; Scambler and Higgs, 1999; Regidor *et al.*, 2001). For example, in a review of the development of sociological theory with respect to explaining health inequalities, Scambler and Higgs (1999) highlight the need for further theoretical research in order to incorporate class into the health inequalities debate: "Self-evidently, the dominant publicly funded research programme on class and health inequalities in Britain fails to address the ontology of class and is largely reliant on nominal class schemas such as the Registrar General's. While it is not our wish or intention here to offer a critique of social epidemiology and its practitioners' class analyses, it is our contention that sociologists should be offering something different, and that they are only rarely doing so. It is not of course that there has been no return for sociology from the considerable investment in the prevailing – often statistically sophisticated, but essentially empiricist – research programme, but rather that alternative, more genuinely sociological and less undertheorised, research strategies promise a better sociological yield". (Scambler and Higgs, 1999: 285). In general, this line of research presents some evidence showing that class does have an impact on health. However, the aim of most of theses studies is to present a description of the relations between class and health, rather than to provide explanations for such relations. The role of class is, therefore, classificatory rather than explanatory. Or, to put it another way, they are concerned with studying whether different classes show divergent health status, not with the reasons for any such divergence.

Some research (Bartley *et al.,* 1996; Cavelaars *et al.,* 1998; Chandola, 1998, 1999, 2000ab; Geyer and Peter, 2000; Gregorio *et al.,* 1997, Rose and Pevalin, 2000) has also been undertaken comparing the different social class classifications (i.e. Registrar General social classification, Cambridge scale, Goldthorpe class schema, British National Statistics socio-economic classification). The aim of this literature has been to examine the explanatory value of the different measures of social class. The debate focuses on two main points. First, research has examined whether there are significant associations between these class measures and health outcomes. Second, it has analysed differences between classifications in measuring health outcomes of women and men and of different age groups.

The recent shift towards explanation of health divergence has concentrated on the examination of the link between one variable, income, and health inequalities. Psychosocial factors, social support or social capital and neo-material factors have been suggested as possible mediating factors between these two variables. Health inequalities have not been explained through social class. This does not mean that class has been absent from the debate on health inequalities. On the contrary, as explained above, class has been present; however, it has mainly been used as a classificatory rather than an explanatory variable. Abundant evidence has been put forward to show that there are health inequalities among social classes or among individuals in different socio-economic positions, but virtually no research has been done into why this is the case and the mechanisms linking class and health (e.g. Black *et al.,* 1982; Illsley and Svesson, 1984; Illsley, 1986; Wilkinson, 1986a, 1989, 1996, 2000b; Fox, 1989; Vagerö and Lundberg, 1993; Regidor *et al.,* 1994; Kaplan *et al.*, 1996; 1994; Navarro, Benach *et al.*, 1996; Marmot, 1994b; Arber and

Lahelma, 1993ab; Smaje, 1995; Marmot and Davey; Smith, 1997; Kunst, 1997; Cavelaars, 1998; Kawachi, Kennedy and Wilkinson, 1999b; Elstad, 2001; Mackenbach, 2000; Marmot and Wilkinson, 2000; Vagerö, 2000; Rahkonen *et al.,* 2000; Lahelma *et al.*, 2001; Whitehead, 1998; Mackenbach, 2003).

To sum up, this thesis aims to fill in the research gaps in two specific ways. First, it seeks to incorporate class into explanations of health inequalities. Until now, the literature has included class not for explanatory purposes but mainly as a way to measure the health divergence between different social groups. Although some research has pointed at the possible explanatory power of social class, this possibility has not been subject to rigorous empirical analysis. The second way in which the thesis aims to contribute to our knowledge of health inequalities is by forming part of the shift towards explanation, incorporating a theoretically solid conceptualisation of social class. The thesis offers, therefore, a theoretical framework that will help us understand possible mediating mechanisms between class and health. These mechanisms will then be empirically tested in order to evaluate their validity.

1.3.5. Previous work on Great Britain and Spain. Social class: The unexplained *variable*

Research into health outcomes in Britain and Spain is characterized by its unequal development in the two countries. The number of official studies carried out to provide a snapshot of the state of health of the population has been greater in Great Britain (e.g. The Black Report, 1980; The Health Divide, 1987, The Acheson Report, 1998) than in Spain (Navarro, Benach *et al.*, 1996). Equally, far more studies have been carried out by researchers in different disciplines in Britain than Spain. Nonetheless, in both countries research has tended to focus on the analysis of mortality and morbidity rates.

The Black Report showed the existence of persistent health inequalities in Great Britain since World War II. The report arrived at two main conclusions. First, that the lowest socio-economic groups enjoyed poorer health than the members of higher socio-economic groups. Hence, there were significant differences in mortality rates between different types of occupations for all ages and for both women and men. For instance, mortality rates for men and women from England and Wales belonging to the lowest socio-economic category were two and a half times higher than those of members of the highest socio-economic group. Second, there were also differences in mortality between the principal regions of Great Britain. Thus, mortality rates were higher in the South-Southeast regions than in the North-Northwest regions. As we will see in the next chapter, the Black Report has received numerous methodological and ideological criticisms; however, subsequent official reports like The Health Divide (1987) and The Acheson Report (1998) have confirmed the main conclusions of the first official report: broadly speaking, health outcomes in Britain as well as differences among British citizens are the same today as they were in the early 1980s.

In contrast, health outcomes in Spain have received little attention in official research. Only one report has made a significant contribution to the understanding of the Spanish health atlas: the report commissioned by the Ministry of Health and Consumption in 1993 from Navarro and Benach (Navarro, Benach *et al.*, 1996). This report shows, using small geographic areas as the unit of analysis, the existence of mortality inequalities between the North-Northeast and the South-Southwest regions of Spain. In a subsequent study Benach (1997) confirmed the two main results of the 1996 report. First, both mortality and deprivation indexes were greater in the South than in the North of Spain independently of the geographic unit analysed (regions, Autonomous Communities or zones). Second, variations in mortality between different areas tended to be associated with similar variations in material deprivation indexes.

In terms of the interest that different academic disciplines have taken in health inequalities, the British case has again received much greater attention. This is partly explained by the availability of better health-related data, as well as by the general concern that official institutions and researchers have had since the 1950s for health inequalities. The British case has not only been studied to determine the extent of health inequalities among individuals but also to analyse and test most of the explanations that are now being put forward for the health gap. As explained above, there has been a recent shift of focus towards the explanation of health inequalities. Great Britain has received attention from researchers focusing on economic factors (Wilkinson, 1992a, 2000ab; van Doorslaer *et al.*, 1997; Mclsaac and Wilkinson, 1997). The social support explanation has also taken Britain as a case study (Wilkinson, 1996, 1999e; Marmot and Wilkinson, 2001). Proponents of the psychosocial explanation have concentrated above all on Britain (Marmot *et al.* 1991; Marmot and Davey-Smith, 1997; Marmot, 1998; Marmot and Wilkinson, 2001). Research driven by the biological perspective has also been carried out with British data (Barker, 1991; Brunner, 1997; Brunner *et al.*, 1997). As noted above, the role assigned to social class in research in Britain has been more classificatory than explanatory. Neither class as an explanatory variable nor the mechanisms linking class and health have featured prominently on the empirical research agenda.

The Spanish case, on the other hand, has been the object of only a limited number of studies. These constitute important antecedents for this thesis. Research in Spain has mainly focused on the description of mortality patterns across time as well as across geographical regions (Regidor *et al.,* 1994; Benach *et al.*, 1996; Benach, 1997; Benach and Yasui, 1999; Benach *et al.*, 2001; Benach *et al.*, 2003; Regidor *et al.*, 1995; Regidor *et al.*, 2002). In contrast, little work has been carried out on the explanations of divergent health status among individuals. There has been some descriptive research into the association between some health outcomes and some socio-economic variables, notably income (e.g. Regidor *et al.*, 1997; Regidor *et al.*, 2001) and education (Regidor *et al.*, 1999). The study of the relation between social class and health has not, therefore, been one of the research objectives of scholars working on the Spanish case.

Studies of Great Britain and Spain, and above all the former, extensively and accurately document the nature of health inequalities. These studies conclude that health inequalities exist and that at both the individual and aggregate unit of analysis such inequalities appear to be greater in the UK than in Spain. The review of existing research in the two countries highlights the need for further analysis of the causes and origins of health inequalities. In particular, the link between social class and health status needs to be understood. This is the main objective of this thesis.

1.4. The selection of the cases of analysis: Why Great Britain and Spain?

The methodological design[18] of any research project should be planned so that the research aims are fulfilled. By the same reasoning, the selection of the cases, one of the crucial elements of any research design, should be derived from the object of analysis of the dissertation. In that sense, the cases selected[19] should contain the information required to provide an answer to the research question.

[18] By methodological design I understand the selection as well as organisation of all the elements necessary to carry out a research project. These elements include: the research question, the object of study, the cases of study and the tools necessary to carry out the empirical analysis.

[19] Another variable that should be taken into account when selecting cases for research is the unit of analysis being measured (countries, regions, cities, individuals,…). The selection of the unit of analysis should be simply based on the level of analysis that the research question poses. In other words, the unit of analysis of the research question and the cases selected to analyse it should be the same.

In this case, since the essential objective of the thesis is to identify the mechanisms through which the social structure of a developed society affects health, the rationale behind the selection of cases is the provision of adequate empirical evidence to test whether there is support for the theoretical arguments[20]. Following this line of reasoning, it would be sufficient to analyse just one case[21]. However, the rationale behind studying two cases is simply to present more evidence to examine the relevance of the theoretical arguments of the research. As King, Keohane and Verba have put it (1994: 46) "…more observations of the implications of a theory will only help in evaluating the theory in question. Since more information of this sort cannot hurt, such data are never discarded, and the process of research improves". Thus, Spain and Great Britain have been selected in order to test whether class and health are related through the theoretical mechanisms suggested in this thesis. This strategy has another significant consequence. By studying two countries, the implicit hypothesis that the thesis is testing is that despite possibly different levels of class inequality in health, nevertheless, the mechanisms that explain these class effects should be rather similar in both countries.

Melvin L. Kohn (1989ab) provides additional support for the selection of Great Britain and Spain on the grounds explained above. He has proposed an analytical mechanism to differentiate types of research that examine two or more countries. The analytical mechanism consists in differentiating research types by the purpose of the object of study. Specifically, he proposes four types of research. The first is that in which countries are the *object* of study. The second type is research that is *transnational* in character. The third type is research in which countries are the *unit of analysis*. Finally, the fourth type is the research in which

[20] Chapter 2 will present the theoretical framework of the thesis.

[21] Provided that it contains adequate data. Chapter 3 will discuss the data that is necessary to conduct the empirical analysis for this thesis.

countries are *contexts*[22]. The objectives and theoretical implications of these four types of research are different.

Research that takes nations as the object of study has as its main objective to study particular countries. The main goal of this research is to understand some specific countries, that is, to study countries for their own sake, rather than studying these countries because they might constitute an adequate setting for an analysis of a specific phenomenon. This type of research is interested in examining certain issues such as the health care system or the political system, of specific countries. Research that takes countries as elements of larger international systems could be characterised as being transnational. In this type of research, countries are treated as components of a larger group of countries based on some specific characteristics[23]. Research that takes countries as units of analysis has as its primary concern to examine how the object of study (e.g. social institutions or social processes) are systematically related to variations in national characteristics[24].

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[22] This classification proves useful in analytical terms for most cases. However, it should be noted that, as Kohn himself recognises, there are some occasions in which the distinction between research that treats countries as object of study and research that considers countries as contexts is not entirely clear. Kohn resolves this problem by including a further element that makes the distinction between the two types of research more convincing. He considers that the relevant factor is the *primary purpose* of the research. Hence, the relevant factor should be to analyse whether the primary purpose of the research is to learn more about the particular countries or whether the main objective is to use countries as the instruments to analyse the context in which the object of study can be placed.

[23] Political scientists and economists have especially developed research with a transnational nature. See for example: Wallerstein (1979) and, Cardoso and Faletto (1979).

[24] It is interesting to note that research that treats countries as the unit of analysis is only possible to do on issues that have been studied extensively. Research that considers countries as variables "…requires that one be able to discern which of the many differences between countries are the pertinent analytic variables, that one be able to formulate meaningful hypotheses at the appropriate level of abstraction, and –if one is ever to test such interpretations- that one have at hand or have the potential to collect data from a sizeable sample

Finally, research that treats countries as contexts generally seeks to examine whether certain findings are particular to a specific country[25]. As Kohn, himself, puts it (1989a: 21): "In such research, one is primarily interested in testing the generality of findings and interpretations about how certain social institutions operate or about how certain aspects of social structure impinge on personality". This is in fact the main reason for taking two countries as cases of analysis. This thesis analyses whether the relation between an individual's class and health is explained by similar mechanisms in different countries. In other words, two cases have been selected in order to test whether the association between the social structure of a developed society and its state of health is in fact independent of the national context.

The research design adopted here has been chosen in order to facilitate an examination of the theoretical questions at the heart of this thesis. The empirical analysis of Spain and Great Britain will make it possible to answer the research question and test the additional hypothesis that the mechanisms of explanation should be quite similar across developed societies. Nonetheless, it is still necessary to provide a justification for the selection of these two specific countries. Why Great Britain and Spain? An initial, partial, answer is that both countries are good representatives of developed societies, which is the first requirement derived from the object of study.

A second justification for the selection of these countries is that, as we will clearly see in Chapter 4, they present different values in the dependent variable (i.e. health status) and similar values in some of the independent variables. Hence, the selection of Spain and Great Britain implies variation in the dependent

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of countries" (Kohn, 1989: 23). The detailed review of the literature on health inequalities presented in Chapter 2 reveals that more research in which countries are treated as contexts is needed before we can formulate convincing hypotheses for research that would take countries as units of analysis.

[25] Some examples of this type of research are (cited in Kohn, 1989: 22): Treiman (1977) and Skocpol (1979).

variable and similar values in some of the explanatory and control variables. This point should be explained in rather more detail.

During the period analysed in this thesis, that is, the first half of the 1990s[26], the health condition of the British and Spanish population was in general good. Both countries figured among the best countries in the world in terms of their morbidity and mortality rates[27]. However, as we will see in Chapter 4, among the developed societies and irrespective of gender or age[28], Spain displays better health conditions than the United Kingdom. One of the most comprehensive studies of health status in Great Britain (The Acheson Report, 1998) found evidence of a decline in the state of health since the 1970s, a trend that has been developing since the post-war period. For instance, the proportion of people reporting a limiting long-standing illness rose from 15% in 1975 to 22% in the mid-1990s. The proportion reporting any illness in the two weeks prior to the interview nearly doubled from 9% to 16% in the same period. Navarro and Benach (1996) found a better general state of health in Spain than in Great Britain. Thus, the proportion of people reporting a limiting long-standing illness in 1993 was 15%. There is therefore variation in the dependent variable between the two countries[29].

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[26] See Chapter 3 for a discussion of the period under analysis.

[27] For a detailed description of the health position of both countries see the annual health reports from WHO. See for instance: WHO. 2000. *WHO Health Report.* Geneva: World Health Organisation.

[28] As we will see in Chapter 3, the definition of health used in this thesis has both and an objective and subjective dimension. Chapter 4 will show that Spain ranks in a better position in the indicators related to objective health. In relation to subjective health, Great Britain, in some instances, achieves a better position than Spain does.

[29] If we take the dependent variable one step further and we look specifically at health inequalities within each country, Spain presented a narrower health gap among individuals than Britain did. The Acheson report showed that in Britain inequalities in health exist, whether measured in terms of mortality, life expectancy or health status; whether categorised by socio-economic measures or by ethnic group or gender. These inequalities were larger than the ones registered for Spain during the same period. Chapter 5 and 6 will fully document this difference.

Regarding the independent research variables, some show similar values between both countries[30]. Confounding or control variables, that is, age and civil status[31], show a similar distribution in both countries. In relation to the explanatory variables, both countries have a social structure characteristic of post-industrial societies which means that differences that exist in the class system or in the levels of educational achievement are of relatively minor importance[32]. The remaining explanatory variable, lifestyles, is also rather similar in both countries although, as Appendix C shows, behaviour (such as smoking or drinking behaviour) that could be harmful for health are slightly more frequent in Britain than in Spain.

Britain and Spain present similarities in some other variables that although not included in the present research form part of the context of the object of study. Hence, during the 1980s and part of the 1990s, these two cases had comparable health care systems[33]

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[30] The methodological chapter, that is, Chapter 3, will include a detailed definition and operationalization of all the research variables.

[31] As we will see in Chapter 3 civil status is equivalent to the term marital status usually used in the literature published in English. Civil status is therefore giving us information on whether a person is single, married or cohabiting, separated or divorced or widowed. I am going to use the term civil status as I consider that it is more accurately reflecting what it is measuring.

[32] This statement will be analysed in detail in Appendix C in which a distribution of all the explanatory variables is studied. As we will see, the main difference between the British and the Spanish class system is that the former has higher percentages of individuals classified in the professional classes (i.e. classes I and II) and the latter has more individuals in the skilled manual class (i.e. class VI). Regarding education, as we will see, the level of achievement is generally higher in Britain than in Spain. Another difference in the social structure is that unemployment levels are higher in Spain than in Britain.

[33] Chapter 4 will present a detailed analysis of the origin and evolution of European health care systems, emphasizing that of Great Britain and Spain. However, it is interesting to note here the similarity in the ruling principles with which both systems were created. The Spanish *Sistema Nacional de Salud* (SNS) was created in 1986 with the approval of the General Act in Health. The ruling principles of the SNS –finance through taxation, universal and free coverage and, public provision with some complementary services provided by the private sector- are similar to those that characterised the British National Health Service

reflected in their similar organisation and functioning, but with different results in terms of health status[34].

I have, therefore, selected two cases which have different values in the dependent variable but that are similar in the content of some of the independent variables. The paradox increases when we consider that the level of economic development is much higher in Britain than in Spain, and also that the British health care system is much older than the Spanish one.

1.5. Summary and conclusion

The main aim of this chapter has been to introduce the research questions that are going to structure the analysis carried out in this thesis. We have seen that this is mainly concerned with the health gap that developed societies consistently present despite the gradual improvement in average living conditions. This thesis aims to contribute to the current debate on health inequalities focusing on the analysis of one specific variable: social class. It seeks to examine the position that social class has in the process of formation of the health gap among individuals.

This chapter has pursued two other main goals. Firstly, to argue why it is relevant to spend time and resources on research into health inequalities, and more specifically, to understand the links that connect a social structure to its health condition. Researchers working in different social sciences disciplines have argued that it is a fundamental right that individuals should be able to achieve their full health potential, and that avoidable illnesses and deaths should be prevented. Understanding the origins of health differences is essential if we are to be able to design and

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(NHS) since its creation in 1946 until the reforms implemented by the Thatcher government.

[34] A detailed and precise comparison of health status in both countries will be developed in Chapter 4. The data and analyses included in Chapter 4 will clearly show the relative worse health condition that Great Britain presents in comparison to that of Spain.

implement policies and measures from the public and private spheres that might diminish the health gap. It is therefore necessary to hypothesize and then test mechanisms that link class and health. Finally, the chapter has discussed the rationale behind the selection of the two cases to be studied here, a choice based on the methodological design capable of accomplishing the objectives of the research. Great Britain and Spain are taken as contexts in order to examine whether the mechanisms of explanation between class and health hold independently of the country.

To sum up, Chapter 1 has presented the aims, research questions, relevance of the object of study and the justification of the cases that are going to be studied. We now need to consider in detail what the main findings of the health inequalities literature are or, in other words, to understand the starting point for this thesis. We also need to present the explanatory framework that the thesis proposes to connect class and health. There are the two main tasks undertaken in Chapter 2.

CHAPTER 2: THE RELEVANCE OF SOCIAL CLASS FOR HEALTH OUTCOMES

2.1. Introduction

Chapter 1 introduced the research question, highlighted its empirical and theoretical relevance, and explained the decision to analyse the cases of Great Britain and Spain. We saw that over the last few decades health inequalities have gradually come to figure more prominently in both academic and political debates. As we will see in the discussion of the definition of health in Chapter 3, the importance of understanding the health gap has been growing as the importance of achieving a healthy society has increasingly figured on the social and political agenda[1]. As stated in the

[1] Health issues have increasingly figured on the political agenda of developed democracies since the end of the Second World War. An analysis of the political agenda of Western democracies shows not only that the relevance of health issues (together with other social issues such as education and unemployment provision) has increased during the second half of the twentieth century, but also that the emphasis has shifted from the universal provision of health care to more ambitious goals such as the achievement of excellent health for everyone or tackling health disparities between individuals. These goals have largely differed in degree and intensity in accordance with the colour of the government, left-wing parties being more inclined towards equality of outcome measures, while right-wing parties tend to be more in favour of equality of opportunity measures. The analysis of the social and political relevance of health issues is at the core of the literature on the development of the Welfare State. Fundamental works on the Welfare State include: Esping-Andersen (1990); Esping-Andersen (1999); Titmuss (1976); and Korpi (1993).

introduction, the aim of this thesis is twofold. Its first concern is to analyse whether individuals from different social classes show divergent heath conditions. Its second main purpose is to move towards explanation, that is, to try to account for unequal health among social classes. In this chapter I will present the theoretical framework that lies behind this second goal. First, I will critically review different explanations that different disciplines (above all epidemiology, biology, sociology, medicine and economics) have offered for health gaps. This will be a necessary prior step for presentation of the framework that I propose to use to identify the mechanisms that link class and health.

The chapter is structured as follows. In section 2, I will present a review of the main explanations for health inequalities. More specifically, I will discuss the artefactual explanation, the health selection explanation, the behavioural explanation, the materialist or structuralist explanation, the biological explanation, the psychosocial explanation and the neo-material explanation. Then in section 3 I will discuss the theoretical contribution that this thesis seeks to make to the literature on health inequalities and, more specifically, to the literature on health inequalities among social classes. It should be noted at this point that the explanation will be based on the distribution among social classes of certain resources that have an impact on individuals' health condition. The chapter will conclude with a recapitulation of the main arguments presented throughout the chapter.

2.2. Why are some individuals healthier than others?

In this section I will critically discuss the research on health inequalities, focusing above all on works that have tried to account for the health gap. I will start the review by discussing the explanations provided by the pioneer study, the Black Report, as this analysis has often been considered the stimulus for most subsequent research. Nonetheless, some of the explanations provided in the Black Report have already been proved inaccurate (e.g. the artefactual explanation), while some others have been developed further (e.g. the material explanation). The literature review will continue with a discussion of the research undertaken in the wake of the Black Report. Five main explanations have been provided. I will analyse their main findings as well as the role that social class is assigned within them.

Before entering this discussion it would be useful to present some evidence to see whether there are in fact health inequalities among classes. This will be fully addressed in Chapter 4 as one of its aims is to answer the first research question of the thesis, namely, is there a significant relation between an individual' class and her health status? However, the following figures and tables can start illustrating an answer to this question. Figure 2.1 and 2.2[2] show that in the mid-1990s health was not equally distributed among the Spanish or the British populations. We can see that different social classes[3] reported divergent health status. More individuals reported good as opposed to bad health. As we move from left to right in the social schema, that is from class I to class VIIab, we observe that within each class the percentage of individuals reporting bad health increases. This trend is particularly pronounced in the British case.

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[2] Figures 2.1 and 2.2 and Tables 2.1 and 2.2 have been computed from data from the health surveys used for the empirical analysis carried out in this thesis. A comprehensive analysis of the data sources as well as a definition of the research variables is provided in Chapter 3.

[3] I have operationalised the concept social class through the Erikson-Goldthorpe-Portocarero class schema. The choice of this schema is explained in Chapter 3.

Figure 2.1: Class and health. Distribution in Spain in the mid-1990s.

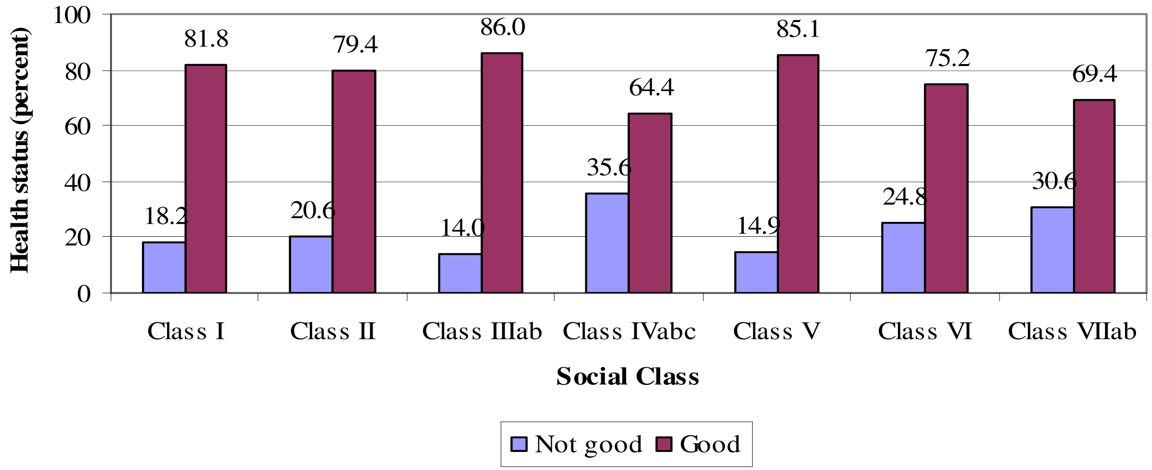
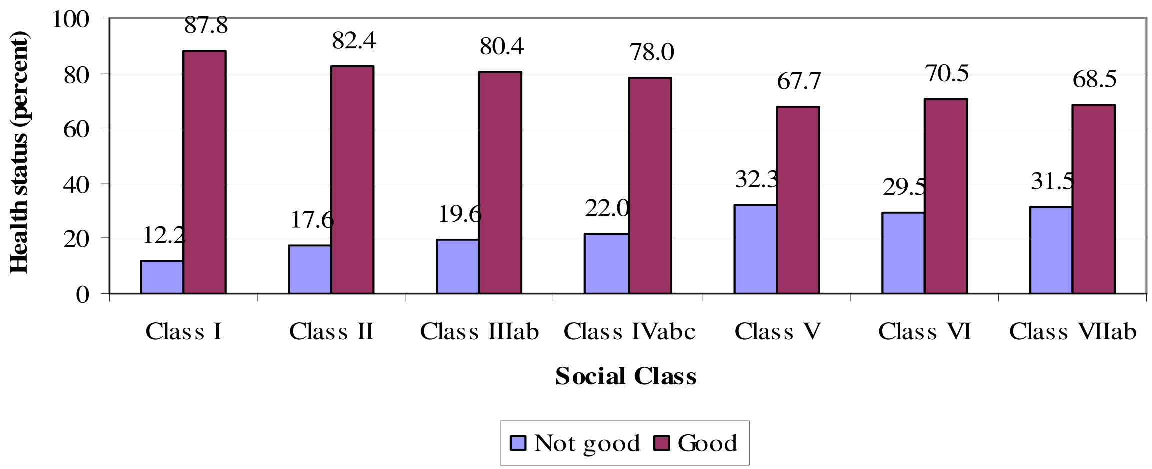


Figure 2.2: Class and Health. Distribution in Great Britain in the mid-1990s.



These graphs offer a merely descriptive measure of health status. They do not take into account the different numbers of individuals in each social class, nor do they provide any information about the nature of the relation between health status and social class. However, the results of the cross tabulation between the two variables reproduced in Tables 2.1 and 2.2 indicate the existence of a significant relation between social class and health status. The standardised residuals[4] show that there are more individuals from higher social classes affirming that their health is good than would be expected if class and health were not significantly related. In contrast, fewer individuals from the lower social classes perceive their health as good than we would expect if class and health were not related. The only social classes that seem to have a weaker relationship with health are class IV (small proprietors, small employers and the self-employed) for the British case and class VI (skilled manual workers) for Spain[5].

Hence, although this simple bivariate analysis does not test for an effect between social class and individuals' condition, it does show that there is somehow a pattern in the association between the two variables –i.e. the number of healthy individuals does diminish as we move from the most to the least privileged classes, especially in Great Britain-.

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[4] Residuals measure the difference between the observed and the expected number of individuals in each cell. Residuals are standardised by dividing them by the square root of the residual mean square. Standardised residuals are interpreted as follows: if they are greater than the critical value (i.e. 1.96) then the association between the two variables is statistically significant and should be interpreted taking its sign into account. Hence, in Table 2.1 the standardised residual for class I for the health category "not good" is equal to –4.4 meaning that we find fewer men in this category than what we should expect were class and health independent, that is, their relation is statistically significant.

[5] The aim of the straightforward empirical evidence presented here is simply to provide some information about the relation between class and health. Chapters 5 and 6 will present a detailed analysis of the relationship between class and health emphasising, differences and similarities between different class categories.

[SEE TABLE 2.1 AT THE END]

2.2.1. The Black Report

Since the 1980s researchers interested in the analysis of health have focused much of their work on the study of individuals' state of health and health inequalities. As noted above, the pioneer study in this area was the groundbreaking Black Report (Black *et al.*, 1982), which examined the health condition of the British population in considerable detail[6]. This study had a tremendous impact on work on health, inspiring similar research projects in other European countries to analyse the evolution of the population's state of health using mortality and morbidity rates as health indicators. The Black Report found persistent health inequalities in Great Britain since World War II. The information offered by the Report can be summarised in two points. First, it pointed to significant differences in mortality rates between social classes[7] for all ages and for both women and men. Second, there were also significant dissimilarities in mortality between regions, with much higher rates in the South-Southeast than in the North-Northwest. Thus, health inequalities were found between both occupations and regions.

The authors of the Black Report considered four main explanations for these inequalities: (1) the artefactual explanation,

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[6] Since the beginning of the nineteenth century there has been a strong tradition in Britain of analysing individuals' rates of mortality. This tradition focused principally on the study of mortality and occupational statistics. The Black Report can be seen, therefore, as part of that tradition. However, its innovative methodology and results did mark a turning point in the area. See Macintyre (1997) for a detailed analysis of the historical background to the Black Report.

[7] The definition of social class used in the Black Report and in most of the literature on health inequalities is based on the categories of occupations of the Registrar General of Social Class (RGSC). The use of the RGSC to measure social class only permits a limited knowledge of the existence of health inequalities between social classes and has not permitted an analysis of the causes of these inequalities. Following the literature on health inequalities, I use the term "social class" in the discussion of this literature. However, it should be emphasised that I am referring to occupational groups and not to social classes, a term that I will define in the next chapter.

(2) theories of natural and social selection, (3) the materialist or structuralist explanation and (4) a behavioural explanation. Subsequent debates on health inequalities have been heavily influenced by these four theoretical explanations. I will now introduce the argument behind each of these explanations as well as their implications for this thesis.

The *artefactual explanation* considers that health inequalities between social classes are not real, or at least that they are significantly smaller than they appear to be, as they are in fact the product of methodological problems. Both health and class are artificial variables that are often measured arbitrarily. Hence, apparent health inequalities may in fact be a result of the way researchers decide to organise and present their data. The implication of this argument is that health inequalities should not be taken too seriously as they may largely be the result of the methods used to quantify them. This type of argument has not been further developed since there is now a consensus in the literature that health inequalities do indeed exist. It has been convincingly shown that there are disparities in individuals' health status and that they are not the result of measurement or definitional errors.

Partly supporting the artefactual explanation, Bloor *et al.* (1987) argued that the Black Report may have overestimated health inequalities due to a number of serious methodological problems, including the demographic change in the occupational structure of the British population or the numerator/denominator bias[8]. However, as Chandola (1998: 31) has argued, there are

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[8] The numerator/denominator bias is a consequence of the calculation of mortality rates by occupational groups from the UK Registrar General with data from different sources (Chandola 1998: 29). The number of death certificates collected by the Registrar General provides the numerator whereas the denominator is based on data from the census data. These different sources could lead to an overrepresentation of people from lower skilled occupational groups because of the non-specific coding of occupation on death certificates, which turns the unskilled manual group into a residual category into which all deaths of individuals in non-specific manual occupational are assigned. This artificial inflation of the number of deaths in the unskilled non-manual group could

many other studies that, using measures of mortality and morbidity free of the methodological problems of the Black Report, have showed similar associations between social class and health. Moreover, Wilkinson (1986b: 3) has presented evidence to show the relatively limited importance of the numerator/denominator problem. Longitudinal studies carried out in Britain, which have the advantage of allowing the use of occupational measurements at the same points in time, have shown that mortality differences between occupational groups are very similar to the results which were thought to be distorted due to the numerator/denominator problem.

Furthermore, it is interesting to note the results of a study (Kunst *et al.*, 1998) that has analysed the consequences of methodological decisions for the resulting measurement of health inequalities. This work focuses on the analysis of the numerator/denominator problem, on the schema used to measure social class, and on the inclusion or exclusion of economically active people. The authors concluded that although methodological decisions are important, it is very difficult to prove that these decisions imply either the over- or under-estimation of the health gap.

The second main explanation for health inequalities considered in the Black Report was the health selection explanation. The *health selection explanation* includes two different types of selection: natural and social selection. However, the Black Report as well as most of the subsequent literature failed to draw this distinction. Vagerö and Illsley (1995: 223) attempted to clarify the difference between these two concepts, arguing that "social selection is a situation where health is associated with social mobility, either directly (and causally) or indirectly, in both instances without any assumption that genes play any part in the process. Natural selection, in contrast, presupposes a genetic basis". I will adopt these definitions as they clearly distinguish between the impact of social and genetic factors on health, a

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explain the high mortality rates in that particular social group compared to the others.

distinction that is essential for our understanding of the specific role of social and natural selection in health status.

The *social selection explanation* maintains that individuals' poor health is the factor that explains their higher mortality rates and their tendency to work in low-skilled occupations or to be economically inactive**.** In this explanation, the causal link between health and social class is as follows: ill health allocates people to social class rather than the other way around (i.e. class influences individuals' health). Health would therefore affect social mobility as healthy people move up and unhealthy people move down the social hierarchy. Ill individuals would therefore end up in lower social classes while healthy individuals would tend to rise to the top of the social structure. One of the problems with the social selection process in terms of its explanatory capacity is that it cannot offer an explanation for why individuals become ill in the first place.

The Black Report concluded that social selection was not very important in determining health differences among individuals. Nonetheless, some of the literature produced in the wake of the Report argued that the contribution of social selection might be substantial (West, 1991). However, most of the literature suggests that the social selection explanation has relatively scant importance in explaining health inequalities (Fox *et al.*, 1985; Lundberg, 1991b; Blane *et al.*, 1993; Davey Smith *et al.*, 1994; Power *et al.*, 1996; Chandola *et al.*, 2003). The social selection explanation has recently been developed further through studies focusing on a number of specific aspects of the selection process[9].

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[9] In particular, two very interesting lines of research have been developed extensively. The first analyses intergenerational class mobility. Although the Black Report focused on intragenerational class mobility (i.e. mobility of an individual compared to her own occupational class earlier in life), much of the recent debate on social selection refers to intergenerational class mobility (i.e. the mobility of an individual compared to the occupational class of her parents). For example, a recent study by van de Mheen *et al.* (1998a) has presented evidence challenging the social selection hypothesis (these authors call it health selection). The study shows that in the Dutch case there is no relation between health (measured as perceived general health, chronic condition and health complaints)

The *natural selection argument* stresses the relevance of individuals' genetic heritage in determining both health status and mortality rates. An optimal genetic inheritance would place individuals in the highest places of the social class ladder while a defective genetic legacy would irremediably allocate individuals to lowest position in the social structure. If this explanation holds, healthiest individuals would form part of higher social classes. Moreover, an individual's health condition would be a consequence of their genetic heritage.

The Black Report did not find any evidence for this pattern. However, the methodology used to analyse the relevance of genetics in health was not the most appropriate one. In a correct analysis, the relevance of genes should be evaluated isolating the effect of the genetic structure of each individual from all other possible health determinants in a dynamic process that would analyse the effect of the structure of genes on an individual's health status over the course of her life. Following this procedure, the influence of genes on health can be reliably evaluated. In contrast, the Black Report focuses on the analysis of the occurrence or otherwise of social selection. In this way it mixes, or at least not specifically distinguishing between, the meaning of social and natural selection. Thus, the report presents evidence

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and occupational mobility. Their results on intergenerational health selection indicated no significant effects of health problems on downward social mobility. Studies using longitudinal data from Britain (Goldblatt, 1989; Davey Smith *et al.*, 1994) have also shown that social selection has little impact on mortality differentials. The second interesting line of research analyses labour market exit, what has been called the "healthy worker" hypothesis (Arrow, 1996; Bartley and Owen, 1996, van de Mheen *et al.*, 1999). This literature examines the influence of health condition on the probability of entering or exiting the labour market. Some evidence seems to point to significant health effects on entering or exiting the economically active population. For instance, van de Mheen *et al.* (1999) using longitudinal data from the Netherlands show that neither upward nor downward mobility was affected by health problems. However, health problems at an early point in time (year 1991) were significantly associated with a higher risk of mobility out of employment and a lower possibility of mobility into employment at a later point in time (year 1995).

running against the social selection process[10], while also introducing concepts and arguments which would point towards the natural selection hypothesis, thereby confusing the entire argument. The following quotation, in my view, exemplifies this problem: "Those men and women who by virtue of innate physical characteristics are destined to live the shortest lives also reap the most meagre rewards" (Black *et al.*, 1982: 113, cited in Vagerö and Illsley, 1995: 223).

In sum, both the social and the natural selection explanations propose a similar mechanism for allocating individuals in the social structure, but they differ in the causal factor of allocation. It is important to emphasise this distinction, since both the Black Report and subsequent studies inspired by it seem to systematically obscure it. For example, the authors of the Black Report write: "while cultural and genetic explanations have some relevance -the latter is particularly important in childhood- more of the evidence is explained by what we call "materialist" or "structuralist" explanations than by any other" (Black *et al.*, 1982: 133, cited in Vagerö and Illsley 1995: 223). This analytical confusion, together with the lack of empirical evidence to support their argument, seriously damages the content of the health selection explanation.

The third explanation considered in the Black Report views class gradients in health as the result of social class differences in the behaviour of individuals. Lifestyles that individuals adopt become, therefore, the determinant factor of people's health status.

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[10] The Black Report presents data showing that for almost all major causes of death the class gradients were steepest in early adulthood and lowest in the decade before retirement (Chandola, 1998: 32). The argument in favour of the social selection process would be that if people were selected into their occupations on the basis of their health, then over time, the process of selection would result in a structure of more homogeneous groups of healthy and unhealthy people. Mortality differentials would therefore be higher at retirement age than in early adulthood, since unhealthy individuals would have had a lifetime to be excluded from the high positions of the social structure. Thus, the evidence presented in the Black Report is exactly the opposite of what would automatically follow from this argument.

The *behavioural explanation* argues that individuals from lower social classes will adopt less healthy habits, such as the excessive consumption of harmful substances (e.g. tobacco, alcohol, processed food), lack of physical exercise or the sub-optimal use of preventive health care services (e.g. immunization) (Hauck, 1999). The Black Report presented data showing that lower social classes did in fact have more harmful living habits (i.e. lower consumption of healthy food, less physical exercise and higher rates of smoking) and lower rates of healthy behaviour.

Following the Black Report, differences between social classes in terms of their propensity to lead healthy lifestyles have been widely documented in the UK and most other Western societies. Several studies report that the manual social classes smoke more, consume more alcohol, eat less fibre, fruit and vegetables and more fried food and processed food, and exercise less than the non-manual social classes. Therefore, it seems clear that the higher social classes engage in less risky health behaviour than those further down the social hierarchy, a factor which could explain part of the health gradient.

However, a number of studies (Marmot *et al.*, 1984; Berkman and Breslow, 1983; Kaplan, 1985; Lantz *et al.*, 2001; Sacker *et al.*, 2001; Birch *et al.*, 2000) prove that differences in behavioural patterns do not explain all of the observed variance between the health of the different social classes. Class differentials in health are not satisfactorily accounted for by the unhealthy behaviour of the manual classes and the healthy behaviour of professional social classes (Chandola, 1998: 39). The data presented in the Alameda County Study (Berkman and Breslow, 1983; Kaplan, 1985) suggested that even after adjusting for thirteen risk factors for mortality that included behavioural factors, a great difference in the probability of mortality risk still existed in favour of the higher social classes. The British Whitehall studies have found that the lowest category of employees in the civil service has a 2.7 higher age-adjusted risk of dying from heart disease during a 10-year period than the highest occupational category. These studies found that the risk associated with employment grade was reduced by less than 25% when known risk factors (i.e. smoking, consumption of alcohol and unhealthy food, lack of exercise) were controlled for (Marmot *et al.*, 1984; Marmot, 1994b; Syme, 1996; Macintyre, 1997). In a study of Norway, Thurmer (1993) also showed that behavioural risk factors only accounted for a small part of occupational class differences in coronary heart disease (Thurmer, 1993: 79, cited in Elstad, 2000: 68). Lantz *et al.* (2001) produced a longitudinal data study of the impact that individual health-risk behaviour has on the worse health of lower socio-economic groups in the United States. They found that the four types of health-risk behaviour considered in the study statistically accounted for only a small proportion of the socio-economic differences in health at follow-up.

In short, there is enough evidence suggesting that the higher prevalence of major health-risk behaviours among the less advantaged social groups can only account for a small part of the health gap.

Moreover, most of the studies on health behaviour have shown that most individuals adopt a mixture of healthy and unhealthy living habits. Only a minority of individuals can be allocated to the extremes of the axis measuring the degree of healthy lifestyle.

In addition, the evidence about the exact harm derived from unhealthy living habits is still unclear. For instance, the moderate consumption of alcohol helps prevent coronary health diseases. Nor is the impact of physical exercise beyond dispute, since some scholars (Morris *et al.,* 1980, cited in Chandola, 1998: 37) argue that intensive exercise is necessary to have a positive effect on health while others (Cox, 1987) consider that low levels of sports activity are sufficient to have a positive effect on health.

Finally, *the materialist or structuralist explanation* was the one favoured by the Black Report to account for health inequalities among social classes. The argument is as follows. The lower classes have to live in unhealthier living environments in which housing conditions are much worse, they have lower absolute levels of income, consumption opportunities are constrained by their low absolute incomes, and working conditions are poor. This unhealthy environment is responsible for bad health. The report drew a distinction between absolute levels of poverty and relative levels of deprivation. Material factors make it possible to meet minimum hygiene and nutrition requirements. However, linked to the epidemiological transition, the absolute level of income has lost relevance as a determinant factor to prevent degenerative diseases such as lung cancer or ischaemic heart diseases. Hence, material factors do not operate to the same extent as they did in the past. The most important causes of mortality today (i.e. accidents, cancer and heart disease) seem to be less closely tied to poverty, or at least the links are not as obvious as they were down to the middle of the 20th century, or as they are currently in the developing world where ill-health is linked to unhygienic living conditions, malnourishment and infectious diseases. Nowadays, sickness is above all associated with long-term, not immediately lethal, chronic diseases and by mental disorders and psychologically-related conditions. The Black Report argued that in today's developed societies, relative levels of poverty are an increasingly important factor in any explanation of health inequalities. However, although the authors provide some examples of how material deprivation can increase, and health inequalities persist or even rise, even in contexts of rising absolute income, this factor is not explored (i.e. it is not precisely defined and the mechanisms that link relative deprivation and health outcomes are not analysed).

Another problem with the materialist or structuralist explanation is that the meaning of these two concepts is not entirely clear. Nor is the content of the explanation comprehensible. Essentially it seems to refer to material factors such as housing conditions and level of income. However, it also refers to factors such as satisfaction with the work environment or physical or mental health, which are not really material factors. It is, therefore, not clear if they have to be taken as structuralist, meaning then by this term exactly what. The opportunity of being educated is also understood as a form of material deprivation. The report does include all these dimensions in arguing that structuralist factors do explain health inequality. However, the empirical evidence presented focuses on material deprivation. As Vagerö and Illsley (1995) have argued, in light of the type of evidence presented, the explanatory power of this interpretation would be more convincing, if the authors had defended a material explanation which only refers to poverty or material deprivation and left out all the other dimensions mentioned.

2.2.2. After the Black Report: Further explanations for the health gap

The Black Report has had a tremendous influence on the subsequent expansion of research into health inequalities. The lines of inquiry followed in the Report, as well as the reasoning adopted, have had an immense impact on policy development both in the United Kingdom and beyond. Since the 1980s, and above all since the early 1990s, the scientific community, international organizations and governments have been offering various justifications to further research into the determinants of health. They can be summarised as follows: health inequalities favour the more advantaged social groups, which imply a social and economic loss of human resources, premature and avoidable deaths as well as diseases and, the need for very expensive health and social services. Consequently, research has focused on the evolution of the populations' health and its connection with particular variables. New lines of research have basically focused on the role of biological factors, the importance of medical care or the further development of the materialist explanation. I will now consider some of the main strengths and weaknesses of these works.

Since the 1980s, *the natural selection hypothesis or biological hypothesis* has undergone remarkable development at the hands of Barker and a group of medical researchers working in Britain (Barker *et al.*, 1989; Barker, 1989; 1990; 1991; 1992; Barker *et al.*, 1993; Barker, 2000; Barker *et al.*, 2001; Barker, 2002; Barker *et al.*, 2002; Barker, 2003). In Spain there has also been some development of the biological explanation (e.g. Regidor *et al.,* 1994). These groups of researchers argue that individuals' health is mainly affected by biological planning in the uterus. The argument is as follows. Poor maternal physique and health (due to poverty either before or during pregnancy) creates an unfavourable climate in the uterus, which has a significant negative impact on the development of the foetus, its subsequent development and the adult life of the individual. Low birth weight is presented as a sign of negative conditions in the uterus and therefore, as an indicator of diseases with a high risk of death such as diabetes, respiratory disease, ischaemic heart disease, strokes and cancer of the ovary, prostate and breast.

However, the work of both Regidor and Barker presents great methodological problems that should be seriously considered. For instance, as Vagerö and Illsley have argued (1995), it is incorrect to conclude that an association found between a circumstance early in life (e.g. birth-weight) and a health result later in life (e.g. ischaemic heart disease or death) means that there is a causal relationship between the two factors, without including in the analysis any of the other factors that may influence health at a later stage. It is easy to think about other mechanisms, for instance prolonged social disadvantage, which may provoke both low birth-weight and ischaemic heart disease, without necessarily finding a causal association between the two. In order to draw such a strong conclusion (i.e. disadvantaged women give birth to low birth-weight babies mostly as a consequence of the effect of absolute poverty on the development of the foetus in the uterus, which in turn causes ischaemic heart disease in adulthood) the research should include the study of social class at both birth and adulthood for both the dead and survivors. We would not only need information about social class in childhood and adulthood for the dead (which is the information on which Barker and his colleagues base their conclusions) but also for the survivors as a control group.

Hence, methodological problems and the lack of the key information cast doubt on the strong argument that some serious adult diseases have a foetal origin as a consequence of absolute poverty. More research that incorporates possible control and intervening variables is necessary. The research by Baker and colleagues raises the debate about the links between social position of origin and coronary heart disease, as well as how these links operate. It shows the importance of understanding the connection between early conditions, adult conditions, and their interaction.

The role of *medical care* in the explanation of the health gap in developed countries has also been widely analysed (McKeown, 1979; Marmot *et al.*, 1987; Mackenbach *et al.*, 1989; Bunker *et al.*, 1994; Wilkinson, 1996; Fitzpatrick, 1997). Most of the research concludes that health differences among social classes are nowadays almost entirely unconnected to the medical care individuals receive. This argument is supported by the persistent health inequality in those countries with highly developed health care systems, in which all individuals are entitled to free access to treatment. The scant impact of medical care on health is also confirmed by studies showing that factors related to medical care, such as health insurance or the frequency of visits to the doctor, do not account for a significant part of the association between socio-economic position and health (Marmot *et al.,* 1987). Bunker *et al.* (1994) estimated the effect of health services (both preventive and curative) in explaining rising life expectancy in Western countries over the course of the 20th century. The increase in life expectancy has amounted to an average of 20 to 25 years; however, on average, health services only account for about a fourth of this change. The effect of health services decreases as the establishment of universal access to care expands. Moreover, according to van Doorslaer *et al.* (1997) per capita health care expenditure, public expenditure and total expenditure on health care had a positive but statistically non-significant relationship with individuals' health.

Yet, some literature has noted that it is difficult to isolate the specific impact that medical care has on individuals' state of health (López i Casanovas and Ortú, 1998). The provision of health care can be reflected in health care expenditure, which can be used to measure health care outputs. However, the successful treatment of degenerative diseases, which are now among the most important fatal conditions, is not reflected in the evolution of traditional indicators such as mortality rates, since the marginal contribution of a greater consumption of medical resources to the probability of death is limited. This is the reason why some authors (e.g. López i Casanovas and Ortú, 1998) have highlighted the need to find new health indicators that reflect health care output more accurately than mortality or life expectancy do. The assessment of the effectiveness of medical care should also be based on the examination of health measured through morbidity indicators, as well as with the subjective self-perception of health status. It is also necessary to refine the indicators of health care. For instance, care services should be added to the curative medical treatments since care treatments also help to improve individuals' quality of life.

From the above it could be concluded that it is not the total amount of economic resources allocated to health care that may influence individuals' health in one way or another, but rather the distribution of this expenditure on different health care programmes. For example, we should note the importance that resources devoted to programmes for the care of the elderly may have for the general well-being of a society. However, the absence of reliable data means that there are virtually no studies analysing the specific contribution of different health care programmes. It is, therefore, very difficult to draw solid conclusions in this respect.

In sum, in the wake of the epidemiological transition, which resulted in a change in the principal causes of death from infectious diseases to non-infectious degenerative diseases such as heart disease, the role of medical care in individuals' health has changed considerably. This is not to deny the importance that health care systems have had in reducing individuals' mortality rates. The establishment of health care systems was crucial in combating mortality from infectious diseases. In any case, there is a need for further research that would refine both health and health care indicators as the impact of health care may be difficult to isolate at a general and aggregate level.

The *materialist explanation* has been significantly developed by Wilkinson (1996, 1997a, 1997b, 1999a, 2000a). Wilkinson has argued that once societies have reached a certain level of development, health is influenced by the degree of equality of the distribution of income and not by the absolute level of income. Thus, relative income rather than absolute income is what is influencing individuals' health status. This is what has come to be known as the *relative income hypothesis*. Wilkinson reached this conclusion after showing that the relation between mortality and relative income within countries is stronger than the relation between mortality and absolute income between them. The relative income hypothesis is also derived from the empirical finding that those countries with lower income inequalities are also those with lower mortality differences. However, Wilkinson does not in fact examine the nature of the relationship between these two variables. Furthermore, his research does not include the effect of other explanatory variables or control variables. Another issue posed by Wilkinson' relative income hypothesis is the explanation of the causal mechanisms that connect income inequality and poor health. Little research had been done and no conclusive evidence presented on this issue. The following section considers the work done by Wilkinson in rather more detail, as it represents an important contribution to the literature that has begun to move from description to explanation of health inequalities.

2.2.3. Moving beyond description: The determinants of health outcomes

The movement towards the explanation of health inequalities is relatively recent. Until the early 1990s the literature focused more on describing societies' health outcomes than on explaining them. As noted above, the unexpected results from the Black Report inspired similar studies in other developed societies. Since the 1990s, a growing body of research has documented not only the persistence but also the intensification of health inequalities (e.g. Pappas *et al.*, 1993; Valkonen *et al.*, 1993; Dahl *et al.,* 1993; Shaw *et al.,* 1998; Shaw *et al.*, 1999; Shaw *et al.*, 2000). These findings have further confirmed the need for further research into health inequalities if these are to be reduced. Part of this body of research has moved away from the original approach adopted in the health inequalities literature, abandoning the initial emphasis on *description* for the *explanation* of health inequalities. Hence, the general argument is that if health inequalities are to be tackled, they must first be accurately identified, but most importantly there is a need for a further step: they also need to be understood. Policy initiatives must be underpinned by sound scientific findings that will make it possible to reduce health inequalities at origin (e.g. Anderson, 1999; Leon *et al.*, 2001). In an analysis of the role that sociological theory can play in explaining socio-economic differentials in chronic disease, Siegrist (1995) summarised the general state of the question: "Yet, if it is the intention of our research community to contribute to the *explanation* [emphasis in the original] of social differentials in chronic disease a definitive *move beyond description* [emphasis in the original] is needed. This is obvious as the success of social epidemiology as science depends on its ability to predict, explain and act through the use of *theory* [emphasis in the original]" (Siegrist, 1995: 1603). Similarly, Marmot *et al.* (1997) in a paper analysing the state of the research based on a review of the available empirical evidence, identified six questions that should guide future research. One of these questions was: "Can we start to fill in the links between social position and ill health? What are the mechanisms by which inequalities in health status are generated?" (Marmot *et al.*, 1997: 902).

The last five to ten years have seen, therefore, the development of a very interesting line of research focused on the understanding of inequalities in health outcomes[11]. A variety of explanations have been explored, most notably the *psychosocial explanation* and the *neo-materialist explanation*. These studies have mainly examined the explanation of health inequalities by income groups, i.e. they have mainly studied the mechanisms that link both income and income distribution to health outcomes. Social class has frequently been identified as an important influence on health. Nevertheless, social class has been taken as a variable to classify individuals but not as an explanatory variable itself. This body of literature constitutes an interesting precedent to the research questions that this thesis analyses as it addresses possible causes of the health gap. Hence the main arguments and findings of this literature merit further attention here.

From this line of research special mention should be made of the research produced by Richard Wilkinson (1992b; 1994a; 1996; 1997b; 1999a; 1999b; 2000b; Marmot and Wilkinson, 2000) and Michael Marmot and colleagues in Great Britain (Marmot, 1994a; Marmot, Bosma *et al.,* 1997; Marmot and Davey Smith, 1997; Marmot, Ryff *et al.,* 1997; Marmot, Furher *et al.,* 1998; Marmot and Wilkinson, 2001; Marmot and Rose, 2001), Ichiro Kawachi and Bruce Kennedy in the United States (Kennedy, Kawachi and Prothrow-Stith, 1996; Kawachi and Kennedy, 1997a, 1997b, 1997c; Kennedy, Kawachi, Glass and Prothrow-Stith, 1998; Kawachi and Kennedy, 1999a, 199b), and John W. Lynch and his colleagues (Lynch, Kaplan and Salonen, 1997; Lynch and Kaplan, 1997; Lynch and Kaplan, 1999; Lynch *et al.*, 2000; Lynch *et al.*, 2001). This body of research has made important contributions in one area related to the object of study of this thesis: the study of

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[11] Health outcomes are normally measured using three indicators: mortality rates, life expectancy rates and coronary heart disease, as the latter is one of the principal causes of mortality.

the relation between one variable of socio-economic content, income, and mortality rates.

Work by Wilkinson, Kawachi and Kennedy has argued that mortality inequalities favouring the highest income groups are largely determined by income inequalities. In other words, there is higher mortality in the less advantaged social groups that is mainly caused by wealth inequalities that favour high-income groups. This relationship holds independently of the absolute level of poverty experienced by those individuals that are in the least favoured socio-economic positions. We saw in the previous section that this argument is known as the relative income hypothesis. It should be remembered that this hypothesis states that in developed societies, once a certain level of economic and social development has been achieved, mortality inequalities are related to an individual's relative position in terms of income. The absolute position of individuals in the income axis does not matter, rather it is the relative position they have which influences their mortality. In other words, the higher the inequality in socio-economic variables such as income, the larger the inequalities in life expectancy that a society will have. Hence, health inequalities among socio-economic groups appear to consist of a phenomenon of relative rather than absolute deprivation.

Therefore, part of the literature on the influence of income inequalities on health has argued that there is an association between the distribution of income in developed societies and the state of health they enjoy. However, the evidence is still not very conclusive[12]. There are remaining questions over how to interpret

[12] It is interesting to note the recent evidence questioning the existence of any relation between income and health. For example, Deaton and Paxon (2001) in a time-series study of age-specific mortality since 1950 in the United States and Britain, show that neither income inequality nor income explained the mortality gap in adults and the older population although it did for children and young people. Jencks (2002) has also questioned the relevance of income in explaining mortality rates as Britain and the United States have presented similar patterns of mortality for adults and older people and a different pattern of income growth. Discrepancies in the findings from the income inequality literature make

these findings. For instance, there are discrepancies in relation to the level at which income influences health. A number of recent studies have shown that Wilkinson's relative income hypothesis is not conclusive, arguing that it is not clear whether the influence of income is at the absolute or at the relative level (Ross *et al.,* 2000; Lynch *et al.*, 2001; Osler *et al.,* 2002; Mackenbach, 2002a; Muller, 2002; Osler *et al.*, 2002; Shibuya *et al.*, 2002; Sturm and Gresenz, 2002). These works cast some doubt on the strength of the association between income inequality and individuals' health status as they show, for instance, that in sixteen developed countries income inequality had no association with the population's health. When analysing simultaneously individual income and income inequality, an individual's resources have a far greater impact on health than the distribution of income across a society (Lynch *et al.*, 2001).

One radical critique of the relative income hypothesis comes from Judge (e.g. Judge, 1995; Judge *et al.*, 1998a; Benzeval and Judge, 2001). Judge (1995) replicated the analysis of the relative income hypothesis presented in Wilkinson's work (1986a; 1989; 1990; 1992b; 1994a; 1994b; 1994c; 1994d) with more recent data on income distribution in the OECD countries in the mid-1980s and for Great Britain from 1961 to 1991, and found no significant association between income inequality and health outcomes. No statistically significant correlations between life expectancy and Gini coefficients (computed for both income per head and family income) were found. The test of the income inequality hypothesis for the United Kingdom also proved inconclusive: "The example which has been computed here to test the income inequality hypothesis is the relation between annual percentage changes in the Gini coefficient (after adjusting for housing costs) and yearly improvements in life expectancy, using data supplied by the Government Actuary. The relation is not statistically significant (r = -0.2022; p = 0.284)" (Judge, 1995: 1284).

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further research necessary. It is clear that our understanding of the association between economic variables and health outcomes is still limited.

The relative income hypothesis has also been criticised on the grounds that the association between relative income and health outcomes is mainly a statistical artefact (Gravelle, 1998). The statistical artefact results from the use of aggregate rather than individual data in what constitutes a clear example of the "ecological fallacy". The empirical evidence on which the relative income hypothesis is derived from inferring relations at the individual level from associations between variables measured at the aggregate level (Robinson, 1950; Beaglehole *et al.*, 1993). As Gravelle argues: "Because studies using population data cannot distinguish between the absolute and relative income hypotheses, the effects of income redistribution policies on population health can only be judged from individual data, interpreted by models of behaviours that affect health. The spurious or artefactual correlation at population level between population mortality and income dispersion will always occur if the effect of individual income on the individual risk of mortality is smaller at higher incomes than at lower incomes. This will be so even if there is no underlying relation between the distribution of income and the risk of mortality at the level of the individual" (Gravelle, 1998: 383). Hence, it is necessary to analyse whether the association between income and health is linear or non-linear, since if it is non-linear (as most evidence suggests) at least part of the correlation between income and health (measured at the population level) will be artefactual.

Some studies also reveal that there is no consensus on a fundamental issue: how to define, measure, and interpret income inequality. Wilkinson (1996) showed that inequality is not unidimensional as both the magnitude and significance of the inequality-health association are sensitive to the measure of inequality employed. An extensive body of literature[13] has demonstrated that income inequality can increase in different ways and for different reasons which could have distinct effects on individuals' health and mortality. For instance, "it is possible that

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[13] For a thorough review of this literature see Wolfson (1994).

increases in inequality resulting from improvements in the middle and upper portion of the income distribution may produce different health and mortality outcomes than those associated with a deterioration of living standards in the lower tail of the income distribution. Thus, empirical work requires experimentation with a variety of inequality measures that distinguish among the kinds of inequality changes" (Daly, M.C. *et al.,* 1998: 316-317).

The income inequalities literature also needs to explore the links between income inequalities and health more deeply, that is, by developing a theoretical understanding of how income and health are related. The mechanisms of association between these variables are still unclear and are only now beginning to be analysed in depth. This body of literature proposes two main interpretations of the links between income inequality and health: one strand of psychosocial literature[14] has advanced the *social*

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[14] The psychosocial explanation essentially argues that *psychosocial factors* are a key determinant of health. Psychosocial factors (e.g. personality traits such as hostility, depression and anxiety, work characteristics and social supports) are defined as "a measurement that potentially relates psychological phenomena to the social environment and to pathophysiological changes" (Hemingway and Marmot, 1999: 1460). This explanation understands health status to be a reaction to the environment in which an individual lives. Hence, an unhealthy status would be the consequence of a reaction to stress and strains. Health variations are mainly products of the social interactions individuals have. "Individuals are social beings who perceive, reflect on, and react to, their social environments. They communicate and interact within such environments, and the resultant psychological reactions are a main reason for health and ill health" (Elstad, 2000: 69). Psychosocial interpretations do not, however, deny that the physical environment has an effect on health. On the contrary, they attach considerable importance to the effects of poor nutrition, poor housing and, especially, unhealthy working conditions.

The psychosocial literature has principally centred on the study of the effect of psychosocial factors on one specific illness: coronary heart disease (Marmot and Wilkinson, 2001; Hemingway and Marmot, 1999; Kawachi *et al*., 1996; Barefoot *et al*., 1995; Rosenman *et al*., 1976; Denollet *et a*l., 1996; Everson *et al*., 1996; Kawachi *et al.*, 1994; Haines *et al.*, 1987; Haan, 1988; Bosma *et al.*, 1997; Lynch, Krause *et al.*, 1997; Steenland *et al.,* 1997, Hoffman *et al.*, 1995; Orth-Gomer *et al.*, 1993; Hedblad *et al.*, 1992; Williams, 1992; Friedman and Thomas, 1995). They sustain that psychosocial factors might influence the risk of suffering coronary heart diseases through the effect they have on health related *cohesion* or *psychosocial environment* interpretation, while those working from a neo-materialist perspective have developed the *neo-material* explanation[15]. These interpretations present interesting arguments and findings; nevertheless, as we will see, they suffer from various methodological problems. Moreover, they sometimes mix distinct levels of analysis. As this line of research presents the most relevant findings for the approach adopted in this dissertation, I will now consider these interpretations in a little more detail.

A number of authors maintain that *social cohesion* is a mediating factor between income inequality and the health gap (Kawachi, Kennedy *et al.*, 1997; Kawachi and Kennedy 1999b; Wilkinson, 1996; Wilkinson, 2000b). Lynch *et al.* (2000) have provided a detailed description of the psychosocial environment interpretation of health inequalities by income groups: "The psychosocial environment interpretation proposes that psychosocial factors are paramount in understanding the health effects of income inequality. Wilkinson has argued that income inequality affects health through perceptions of place in the social hierarchy based on relative position according to income. Such perceptions produce negative emotions such as shame and distrust that are translated "inside" the body into poorer health via psycho-neuro-endocrine mechanisms and stress induced behaviours such

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behaviour such as smoking, drinking, exercise and diet. A second indirect effect of psychosocial factors on coronary heart disease operates through the access to and content of medical care that might plausibly be influenced by social supports. Psychosocial factors might also have a direct effect on health through their influence on acute or chronic pathophysiological changes.

[15] The starting point for these studies is that health inequalities are partly explained by the unequal distribution of income (some authors consider that it is the absolute position on the income axis what influences health; others consider that the important factor is the relative position on the income axis) and try to analyse possible mediating links. Hence, the object of study of this literature is very specific, and these interpretations generally do not incorporate into their analysis other characteristics of the individual such as education. When education or class are included in these studies, it is not in order to explain differences in health achievement but rather to examine whether different educational groups or social classes present divergent health statuses (normally mortality rates).

as smoking. Simultaneously, perceptions of relative position and the negative emotions they foster are translated "outside" the individual into antisocial behaviour, reduced civic participation, and less social capital and cohesion within the community. In this way, perceptions of social rank -indexed by relative income- have negative biological consequences for individuals and negative social consequences for how individuals interact. Perceptions of relative income thus link individual and social pathology" (Lynch *et al.*, 2000: 1201). The main argument of the social cohesion interpretation is that an increase in the gap between high- and low-income individuals may result in damage to the social fabric. As Kawachi and Kennedy put it in relation to the mechanisms underlying the association between income inequality and health: "Some hypothesized pathways include psychologically harmful effects of relative deprivation and the lack of investment in human capital that is frequently evident in societies that tolerate large income differentials. It is also possible that some other exogenous factor, such as racial discrimination in the United States, accounts for both income inequality and excess mortality" (Kawachi and Kennedy, 1999b: 196). As we will see below, the link between income inequality and health that this literature presents is similar to the link that they consider connects social cohesion and health. If the harmful effects of relative deprivation explain the connection between both pairs of variables then taking social cohesion out of the explanation would result in a more parsimonious explanation as it does not add new information. Moreover, the theoretical argument and the empirical analysis do not always fit together coherently; since the indicators employed in the empirical analysis not always capture the meaning of the theoretical terms (i.e. the operationalization of the variables should be further discussed and justified to show that it adequately captures the meaning of the research variables).

Some authors have focused on the study of the *direct* relation between social cohesion and health status (House *et al.,* 1988; Berkman, 1995; Kawachi, Colditz *et al.*, 1999; Kawachi and Kennedy, 1999b; Lynch and Kaplan, 1999; Kawachi, Kennedy and Glass, 1999; Kennedy, Kawachi and Brainerd, 1999; Wilkinson, 1999c). Thus, research has been directed towards understanding the impact that a community's social cohesion has on individuals' health and, more specifically, on the health gap among individuals. Social cohesion is seen as one of the possible explanations for health inequalities given that mutual support and the benefits of better communication and cooperation enable individuals to achieve better health[16]. Social support is seen as

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[16] The most relevant challenge facing proponents of this type of explanation is to refine the definition and operationalization of social cohesion, as well as to provide consistent empirical evidence analysing it. Social cohesion (also referred to as social support or social networks) is mainly understood as social capital following the work developed by Robert Putnam (e.g. Putnam, 2000). According to Putnam, "the central premise of social capital is that social networks have value. Social capital refers to the collective value of all "social networks" [who people know] and the inclinations that arise from these networks to do things for each other ["norms of reciprocity"]" (see www.bowlingalone.com). According to Putnam, some examples of social capital are "When a group of neighbors informally keep an eye on one another's homes, that's social capital in action. When a tightly knit community of Hassidic Jews trade diamonds without having to test each gem for purity, that's social capital in action. Barn-raising on the frontier was social capital in action, and so too are e-mail exchanges among members of a cancer support group. Social capital can be found in friendship networks, neighborhoods, churches, schools, bridge clubs, civic associations, and even bars. The motto in Cheers "where everybody knows your name" captures one important aspect of social capital" (see www.bowlingalone.com).

The definition of social capital provided in Putnam's work has been subject to some criticism based on its lack of precision and on the lack of coherence between the definition and its operationalization (see for instance: Brehm, 1997; Uslaner, 1999). Putnam's work has received other more substantive criticisms. Some critics have challenged the idea of a connection between social trust and reciprocity and associational membership which are the basis of social capital. As Jackman and Miller point out: "Superficially the argument might appear plausible: Societies with low levels of trust would have fewer groups than those with high levels of trust. But this fails to consider the incentives to which individuals may respond" (Jackman and Miller, 1998: 58). Therefore, the assumption about a strong positive association between trust and associational membership on the individual level is drawn on the basis of the aggregate dependencies, which could be characterised as an example of the ecological fallacy (see also Seligson, 2002). Another line of criticism (Stolle, 1998) shows that the individual-level link between trust and associational membership is a having two other main links with health. Social support is characterised by buffering or moderating the negative effects of stress or other health hazards. However, the evidence showing this effect is not very robust and the research designs used to test for it are problematic, as they are cross-sectional and do not control for many other variables that may affect the association between social cohesion and health (Lynch *et al.*, 2000). The other mechanism through which social cohesion is connected to health outcomes is the impact that social networks[17] have on behavioural practices (Suarez *et al.*, 1994; Kang and Bloom, 1993) such as smoking or alcohol consumption or participation in tests of the type offered by preventive medicine[18] (e.g. cancer screening or regular general check-ups). A number of studies (Kawachi, Colditz *et al.*, 1999) have shown that individuals who are less socially isolated are more likely to receive preventive medicine in comparison to those that with only restricted social networks. These studies suggest that the provision of information and advice, which is more frequent and informative the stronger the social network of an individual, might make individuals more likely to seek medical care or adopt healthy behaviour.

There are, nonetheless, some problems with the methodological design and the conclusions derived from the empirical evidence presented by these studies. For instance, one

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result of a self-selection effect. Thus, it is not, as Putnam would claim, that causation flows from joining the associations to trusting, but the other way around: people that trust are more likely to join associations. A third line of criticism questions the effects that Putnam argues social capital has on political and economic processes and cast some doubts on the direction of causality (Muller and Seligson, 1994; van Deth, 2000). A final interesting criticism analyses whether social capital is always a good thing or whether trust is a moral virtue or not (Levi, 1996).

[17] Again, social networks are used in this literature as an alternative term for social support or social cohesion. These three terms are used interchangeably in many studies.

[18] The extent of this effect diminishes in developed societies with universal access to care and with preventive medicine programmes. These programmes are designed for the population as a whole as well as for specific and identified vulnerable groups or those with special needs.

problem is the lack of a theoretical argument supporting the operationalization of social cohesion, which is generally equated with the levels of civic trust and the density of associational membership[19]. Yet there is a need for explanations as to why indicators of civic trust or the measurement of the number of civic organisations to which an individual belongs are the most adequate operationalizations of social cohesion. The empirical results also suffer from certain limitations. First, it is not possible to deduce a causal relation from the identified association between social cohesion and health. Second, the still scarce evidence on the relation between these two variables is derived from cross-sectional data. It would be interesting to complement the findings in this literature with the use of longitudinal data. Finally, it should be noted that social cohesion is measured at the individual level, which implies that the aggregate level of analysis is not considered. This point emphasises the need to justify the indicators selected for each research variable.

The evaluation of the social cohesion interpretation would appear to reveal the need for further inquiry into two main areas: the theoretical understanding of the link between social cohesion and health and the justification of the research methodology used. Indeed, as Wilkinson has stated in a review of the findings of this literature: “Thus we have a fundamental area of doubt at the center of what appear to be some of the most important determinants of population health. We do not really know why social affiliation matters to health; we do not know why social cohesion is associated with health, and we have not yet identified what is inherently stressful about low social status” (Wilkinson, 1999d: 52).

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[19] As argued above, if social cohesion is to be operationalised appropriately, we must first refine our definition of the concept itself. In most of these studies, social cohesion is taken as being similar to Putnam’s definition of social capital, although the definition is simplified significantly as it is mainly understood as social networks, which constitute just one element of Putnam’s concept of social capital.

Some other authors explain the association between health inequalities and income inequalities in terms of material conditions. This line of argument is known as the *neo-material explanation* (Davey Smith, 1996; Kaplan, 1996; Lynch and Kaplan, 1997; Lynch *et al.*, 1997; Lynch *et al.*, 1998; Lynch *et al.*, 2000; Lynch *et al.*, 2001). Hence, the link between income inequalities and unequal health status among individuals can partly be understood in the light of the material conditions individuals enjoy. As Lynch *et al.* explain it: "The neo-material interpretation says that health inequalities result from the differential accumulation of exposures and experiences that have their sources in the material world. Under a neo-material interpretation, the effect of income inequality on health reflects a combination of negative exposures and lack of resources held by individuals, along with systematic underinvestment across a wide range of human, physical and social infrastructure" (Lynch *et al.,* 2000: 1202).

The analysis and use of neo-material conditions might be considered problematic as it is used in two different levels of analysis, thereby making the understanding of the argument difficult. On the one hand, it is argued that income inequalities are the result of material conditions. The distribution of income is the result of historical, political and economic processes. These processes influence the amount and type of private resources individuals have as well as the characteristics of the public infrastructure (i.e. provision of education and health care, pension system, transport system) that form, according to these authors, "the neo-material matrix of contemporary life" (Lynch *et al.*, 2000: 1202). But on the other hand, it is argued that neo-material conditions constitute a significant link between income inequalities and health inequalities. The understanding of neo-material conditions as both cause of income inequalities and mediator between income inequalities and health outcomes needs to be clarified further. The use of a single concept as both the cause as well as the mediator needs to be reconsidered. The policy implications derived from the neo-materialist explanation are very powerful and interesting: "it is strategic investments in neo-material conditions via a more equitable distribution of public and private resources that are likely to have the most impact on reducing health inequalities and improving public health in both rich and poor countries in the 21st century" (Lynch *et al.*, 2000: 1203). However, the empirical analyses on which these conclusions are based should be further refined. In particular, the operationalization of neo-material conditions needs to be reconsidered if it is to convincingly capture the meaning of the concept. There is also a need for analyses that combine variables measured at the individual and aggregate level.

2.2.4. Summing up: What do we know about the health gap?

In short, individuals' health has been the focus of scholars pursuing different lines of enquiry. I have presented the main strengths and weaknesses of most of these works. Inequalities in health have existed over the course of human history and have persisted during the 20th century and even increased over the last couple of decades. Most developed societies, for example, have experienced widening health inequalities. It is difficult to know precisely why health inequalities exist. Some explanations have been given. However, as I have shown here, the evidence is not always unidirectional or conclusive and in some cases is in fact contradictory. Moreover, the literature has not paid sufficient attention to the measures of social class used in this type of analysis.

We have also seen that part of the literature has recently moved from description of health inequalities towards explanation. The move beyond description has mainly been focused on the analysis of income and health. We have seen that the results of the empirical analyses do not all point in the same direction. The divergent empirical evidence shows the complexity involved in the understanding of the association between economic variables and health results. Some authors have argued that in developed societies, once a certain level of economic and social development has been reached, mortality inequalities are the result of the relative income position of individuals and not of their absolute level of income. Some other authors maintain, however, that it is the absolute level of income which affects individuals' health outcomes. Nonetheless, others have argued that income and health are in fact not related at all.

We have also seen that the understanding of the theoretical mechanisms that link income and health is still unclear. Part of the psychosocial explanation lies in the importance attached to social cohesion. Thus, the perception of relative deprivation produces psychologically damaging effects and stress-induced behaviour that results in poor health. The perception of relative deprivation is also translated into behaviour outside the individual such as antisocial behaviour and less social capital and cohesion among the community. Perceptions of social inequality promote, therefore, ill health and disease. Some other scholars, nevertheless, have provided a neo-materialist explanation for the link between income and health. Thus, the association between the two variables can partly be understood by the material conditions individuals enjoy. Health differentials are therefore the consequence of a series of experiences rooted in the material world. Individuals' lack of material resources and underinvestment in human and social infrastructure leads to health differentials. We have also discussed the main drawbacks of these two explanations, which may be summarised by the need for further development of the theoretical links and the justification of the methodology, especially the operationalization of research variables as well as of the empirical design.

All in all, a review of the literature on the explanation of health inequalities uncovers interesting arguments and significant empirical evidence. It clearly reveals the complexity of the subject, as well as highlighting the need for further research, which must necessarily have a rigorous theoretical framework as well as a more solid and coherent empirical design.

In the next section I will present an explanation of why health inequalities between social classes exist and persist based on the relevance of class. If our goal is to contribute to the reduction of differences between individuals' health, we must not only understand which variables determine health but also disentangle the causal mechanisms that mediate the connection between these factors and health status[20]. This is the fundamental objective of the next section: to introduce a theoretical framework that will make it possible to understand the impact of class on health outcomes.

2.3. Social class and health status: The nature of the relationship

In a nutshell, the argument that I will develop below is the following: the structure of social classes influences health since it involves the distribution of factors that imply a risk for individuals' physical condition. Analysis of the class structure is necessary for a full understanding of the distribution of resources that have an impact on health. The relevant factors include variables related to aspects of material resources, working conditions, housing and individual behaviour. The examination of the distribution of such factors in the social structure of a society will help us understand the distribution of health among individuals since these factors have, as I will argue below, an impact on them. If the unequal distribution and exposure to these factors influences our health, then this analysis will allow us to partly explain the distribution of health conditions among individuals, and consequently health inequalities.

How does social stratification determine health? Which are the causal mechanisms involved in this linkage? Before answering these questions, it is necessary to provide a definition as well as an

[20] As will be discussed in Chapter 3, I define health as "a state of physical, mental and social well-being with functioning capacity and not only the lack of illness". I operationalise this concept through two objective health indicators plus a subjective measure of health.

operationalization of social stratification[21]. Social stratification, or the structure of inequality of a society, is the situation within a society resulting from the unequal distribution of the resources required for daily activities. A social structure is defined by the distribution of individuals in different social positions. Those individuals that form a social class share some common characteristics or unifying class criteria. Members of a class share comparable circumstances in the dimensions that have an effect on life chances. Hence, individuals in a given class share similar life chances. As we shall see in Chapter 3, life chances are largely determined by the relationships that individuals have within the labour market.

The social stratification of a society is reflected in its class structure. Thus, we need to operationalise the concept of social classes if we are to evaluate the structure of inequality in any society. Given that my goal is to study the influence of the class structure on individuals' health, gradational class schemas such as occupation or prestige hierarchies do not constitute an adequate operationalization of social class since they describe but do not explain individuals' situations. Gradational schemas are the outcome of class relations, but do not provide information about the configuration of classes.

In order to study the nature of the social class structure, it is necessary to employ a class schema capable of reflecting the constitution of class relations. The schema developed by Goldthorpe, Erikson and Portocarero accurately captures this (Erikson and Goldthorpe, 1992). It makes it possible to analyse classes relationally, i.e., to understand the relations developed between social classes, which is a factor that might influence health since they are based on the unequal distribution of resources that may be risky for health[22].

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[21] Although this will be done in detail in Chapter 3 where the research variables will be defined and operationalised.

[22] A full discussion of the choice, definition and operationalization of this class schema is included in Chapter 3.

Let me now return to answer in more detail the main question posed in this section, namely how social class determines health? Are all the inequalities encompassed in social classes responsible for differences in health condition? Or, in other words, which inequality-generating factors give rise to social class differences in the risk of being ill or even of dying?

It could be argued that inequalities in health result from differences between social classes with respect to access to medical care (Blane, 1986). However, this possibility does not seem plausible since, as I have argued above, in the wake of the epidemiological transition the relevance of medical care has decreased as a result of the change in the characteristics of the most significant fatal diseases. Moreover, the importance of this factor vanishes in developed societies with universal health care systems, since access is free for everyone[23].

Another plausible causal mechanism is individuals' different exposure to those factors that may cause illness, as well as the unequal access that individuals have to factors that immunise the human body from disease. This is, I argue, the theoretical mechanism that links social class and health condition. More advantaged social classes benefit from a favourable distribution, in terms of health outcomes, of those resources that influence health, whereas individuals at the lower ranks of the social structure are in the opposite position. These factors are basically *health-related behaviour* -diet, smoking, physical exercise, and consumption of alcohol- *housing conditions, material resources or atmospheric pollution*. *Knowledge or education* about the nature and characteristics of diseases and of health promoting behaviour is also distributed unequally among the social classes, to the benefit

[23] Although this may simplify reality because it is one thing is to have the right to free access to the system and quite another for individuals actually to enjoy this, that is, for them to have the necessary conditions – easy and inexpensive transport, work permits…- for access. It is probable that there are differences in this respect between social classes. However, little research has been carried out on this question due to the lack of data to test it. Hence it is difficult to draw any conclusions.

of the higher social classes. All these factors determine individuals' *lifestyle*. Differences in lifestyles together with *working conditions* are what ultimately determine health differences. Whereas lower social classes have limited opportunities to obtain adequate amounts and quality of certain factors that do affect health, resulting in a lifestyle that has a negative impact on their health condition[24], the professional classes enjoy easier access to the factors that favour a good health condition as well as the knowledge or information to make adequate use of these factors.

Moreover, social structure influences individuals' health both at the individual and the aggregate level. It could be argued that the characteristics of the class structure of any given society not only influence the level of private resources an individual has access to, but can also have an impact on the amount of public investment in public resources the community addresses. The literature on the origins and development of the Welfare State maintains that the growth and improvement of the public provision of different goods and services was to a great extent the result of the involvement in the process of large sectors of society, especially the middle class. In this respect, the history of the Scandinavian countries, and above all Sweden, over the course of much of the twentieth century is paradigmatic, since they have seen explicit support for the development of the Welfare State through, among other factors, fiscal policies[25]. The Welfare State

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[24] Kunst *et al.* (1998) have found evidence supporting the relevance of social inequality in determining health or as in this case, lack of it. In a comparison of the cause of death in manual and non-manual classes they found that mortality from ischaemic heart disease was strongly related to occupational class in Northern European countries. Ischaemic heart disease is strongly influenced by factors such as bad diet, lack of exercise, drinking and smoking in excess, the distribution of which is embedded in the class structure in favour of the higher social classes. However, it should be noted that the class measure employed is the dichotomy manual versus non-manual workers.

[25] Walter Korpi has extensively studied the origin and development of the Welfare State and, more specifically, the characteristics and evolution of the coalition of institutions and actors supporting it. The decisive role that the middle class, favoured to a great extent by its growth, played in the definition of the

literature has also shown that the political and institutional system of a developed society reflects to a certain extent the interests of both the different elements of its class structure and of the coalitions between the different classes. One could argue, therefore, that the characteristics and interests of the different social classes will in part shape a society's or community's outcomes in the sense of its achievement in terms of the provision of certain services and public goods. Taking the argument one step further, we can expect a positive relation between social structures with an extensive middle class and public resources devoted to the development of services and goods for the community. Thus, a larger, long-standing and well-established middle class would mean a higher probability of adequate public investment in assets such as schooling, social welfare services, health care or public transport. These goods and services are beneficial to individuals' health outcomes[26]. However, this argument should be modified slightly as there are other variables apart from the characteristics of the social structure that might interact between this variable and the outcomes of social policies[27]. Take, for example, the case of the United States, a country with a well-established middle class

public provision of goods and services with a significant impact on individuals' daily lives and, moreover, on their life chances, is apparent from Korpi's work. His work includes: Korpi, 1990; 1993; 2000a; 2000b; 2001a; Esping Andersen and Korpi (1984).

[26] This argument could be taken further, whereby the nature of the formation and perpetuation of the class structure is concurrent to the distribution of those resources that significantly determine health. This argument is clearly supported, for instance, by the theoretical link that exists between income, health and the structure of social classes. On the one hand, income is one of the dimensions that determine the class structure since it influences many aspects of living conditions. On the other hand, an individual's level of economic resources also has an impact on the quality of the environment in which she lives or in the healthy components of her diet. Thus, it could be argued that the very logic of class formation reproduces the unequal distribution of those variables that determine how healthy or unhealthy a person is. Although this argument could be further examined and empirically tested, it falls beyond the scope of this thesis.

[27] I am grateful to Javier Garcia de Polavieja for suggesting this nuance in the argument.

but also with great inequalities in access to public goods and services, including health care. Here it is probably the interaction between the characteristics of the social structure and the institutions of the Welfare State which have an influence on the outcome of social policies. The argument would therefore be that the interaction between the class structure and the characteristics of the Welfare State might influence the provision of services and goods with an impact on health. Hence, the class structure is one possible factor determining provision but it depends on other things such as historical events that help shape the institutional framework of the Welfare State (e.g. the historical alliance of the middle and the working class in Sweden for a large part of the second half of the twentieth century).

In sum, the picture presented above shows that the social structure has an influence on health through a combination of complex processes taking place at the individual level –i.e. all factors that determine a person's lifestyle – as well as at the community level –i.e. public investment in factors important for health status[28]. The reproduction of the distribution of risk factors for health among individuals and, the production of health inequalities if the distribution of these factors is unequal, can be explained in terms of health inequalities being embedded in the class structure. Figure 2.3 reproduces graphically the theoretical links discussed here, and the connections between the structure of inequality in a society and its health status[29].

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[28] If we were to follow the argument presented in footnote 26, the combination of these factors simultaneously determines the logic of the construction and reproduction of social classes.

[29] I would like to stress that the mechanisms that I argue link social stratification and health are not meant to account for all health inequalities. In other words, my object of analysis here is not all the variables that account for the divergent health status among individuals, but rather the relationship between a society's social structure and health. In an analysis of all the determinants of health inequalities many other variables should be included in the analysis, including, for example, the institutional design or the economic growth of a society.

[SEE FIGURE 2.3 AT THE END]

The figure shows that health is the result of four main mechanisms. Three of these have an effect on health at the individual level, while the fourth affects health at a more aggregate level (i.e. the community level, which could be measured at, for instance, the neighbourhood level, the city level, the region level or the country level). The first mechanism (i.e. M1) measures the impact that working conditions have on an individual's condition. The second mechanism (i.e. M2) is equal to the influence that education has on health. Mechanism 3 (i.e. M3) links both class and education with health status through lifestyles. Finally, mechanism 4 (i.e. M4) connects the aggregation of social classes, i.e. the social structure, and health through the effect of variables that influence all individuals living in the community such as the transport system and the educational system. Figure 2.4 captures graphically the analytical meaning of the four mechanisms. These mechanisms will be operationalised and tested in the empirical chapters of the dissertation (mainly in Chapters 5 and 6). In the following paragraphs, I would like to discuss these mechanisms in more detail.

2.3.1. Mechanism 1: The link between working conditions and health

M1 argues that working conditions have a significant effect on health outcomes. As will be argued in the next chapter, the Goldthorpe class schema allocates occupations to classes by taking into account the characteristics of the employment relationship as well as the ownership of the means of production. Part of the effect that an individual's class has on her health occurs, therefore, through her occupation, since classes are combinations of occupations. Much of the psychosocial literature analyses the relation between working conditions and health results (Bosma *et al.*, 1997; Lynch, Krause *et al.*, 1997; Marmot *et al.*, 1997; Stronks *et al.*, 1997; Bosma *et al.*, 1998; Schrijvers *et al.*, 1997; Chandola and Jenkinson, 1999; Stansfeld, North *et al.*,

[SEE FIGURE 2.4 AT THE END]

1995; Stansfeld *et al.*, 1995; Stansfeld, *et al.*, 1997; Stansfeld *et al.*, 1999; Borg and Kristensen, 2000; Levi *et. al.,* 2000, Siegrist, 2000; Griffin *et al.*, 2002; Kivimäki *et al.*, 2002; Stansfeld *et al.*, 2002; Vahtera *et al.*, 2000; Kuper and Marmot, 2003; Steenland *et al.*, 2003). This literature argues that there are certain occupations that are intrinsically unhealthier than others. The argument is that working conditions have a significant impact on health outcomes because the characteristics of a job together with the characteristics of the workplace have a significant influence on an individual's health. This line of research has analysed the negative effects that work-related stress might have on health. Two models in particular have been developed in this respect: the *job strain model* and the *effort-reward imbalance model*. Let us now consider each of these two models.

The job strain model has its origin in the Karasek-Theorell job strain model (see Karasek and Theorell, 1990). The central components of this model are high job demands (the need to work hard and fast) and low-decision latitude (lack of control over skill use, time allocation and organisational decisions). The model argues that workers who experience intensive demands and low decision latitude suffer stress due to the problems they face learning new skills or managing their time. These individuals' work-related stress results in a higher risk of illness. As Kuper and Marmot (2003) have defined it: "The theory purports that workers who have concurrent low decision latitude and high demands cannot moderate the stress caused by the high demands through time management or learning new skills, and so become subject to high stress at work and are at increased risk of disease. It is therefore constraints on decision making, together with high demands, which produce the unhealthy condition of stress at work, or "job strain"" (Kuper and Marmot, 2003: 147).

The job strain model has been supported in various studies examining the risk of having different illnesses. The Whitehall II research team[30] has made a significant contribution to the analysis

[30] The Whitehall II Study is a longitudinal data set that was designed in order to analyse the impact that the social environment has on health. Whitehall

of the relation between the job strain model and different health outcomes. One of the initial Whitehall II studies that analysed the association between work characteristics and health by testing the Karasek job strain model was conducted by Stansfeld, North, White and Marmot in 1995. They studied the link between work characteristics and one specific health outcome: psychiatric disorder. The study tested the two main dimensions of the Karasek model: decision latitude and psychological workload. Decision latitude is made up of skill discretion, breadth of skills and decision authority. These three characteristics measure the degree of control the individual has over her job. As discussed earlier, the Karasek model argues that what is relevant for health is the combined effect of decision latitude and job demand. Accordingly, high demand jobs with low decision latitude result in higher probabilities of ill health. Using strictly defined Karasek work indices, Stansfeld *et al*. found some evidence to support this theory. For men, there is a statistically significant interaction between psychological demands (i.e. work pace and conflicting demands) and decision latitude (i.e. job control and variety and skill use) which explains differences in mental health scores. Moreover, as the job strain model would predict, there was no multiplicative interaction between job demand and job control as the effect was found to be additive.

The contribution of the Whitehall II studies to the analysis of the job strain model is especially important for the study of coronary heart disease (e.g. North *et al.,* 1993; Stansfeld *et al.*,

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II is a longitudinal study of 10,308 male and female civil servants aged 35-55 on entry to the study. The civil servants were drawn from 20 London-based government departments. The first wave of the study was carried out between 1985 and 1988. Since then, five additional waves of data collection have been completed and the seventh is currently being undertaken. In all phases, participants have completed self-report questionnaires containing information on personal characteristics, family, work environment, health behaviour, social support and self-reported health. In the first phase individuals had a screening examination that included an electrocardiogram, measurement of blood pressure and a blood sample. Phases 3, 5 and 7 have also included clinical examinations of the cohort. Participation rates have been around 80% across phases.

1995; Stansfeld *et al.*, 1999; North *et al.,* 1996; Bosma *et al.*, 1997; Bosma *et al.*, 1998; Stansfeld *et al.*, 2002; Kuper and Marmot, 2003). The evidence presented in these studies provides support for the job strain model, or at least for some parts of it. These studies have shown that low decision latitude significantly predicts self reported incident coronary heart disease as well as higher rates of short-term and long-term absence from work due to ill health. Kuper and Marmot (2003) summarised their findings as follows: "In fact, adjusting for low decision latitude reduced the odds of development of any coronary heart disease in the lowest compared with the highest grade from 1.5 to 1.2. Moreover, both high psychological demands and low decision latitude predicted higher rates of psychiatric disorder, and in women high demands predicted poor health functioning" (Kuper and Marmot, 2003: 147).

The link between coronary heart disease (measured through angina pectoris or doctor-diagnosed ischemia) and the Karasek job strain model has also been analysed by Bosma, Peter, Siegrist and Marmot (1998). The statistical analysis tested whether job strain at phase 1 of the Whitehall II study was related to new reports of coronary heart disease in either phases 2 or 3 of the longitudinal study. The analysis excluded coronary heart disease in phase 1 and controlled for age and length of time before follow-up. The analysis also controlled for employment grade level, negative affectivity and coronary risk factors (i.e. smoking, cholesterol, hypertension, and body mass index) at phase 1. The findings from the empirical analysis were largely consistent with the previous literature. The job strain model was supported in its weak version, as low job control was consistently significantly related to new coronary heart disease. The analysis did not find significant differences between men and women.

A recent study by Kuper and Marmot (2003) has extended earlier Whitehall studies on the relation between the Karasek model and health by analysing the role of the full job strain model. The study examines low decision latitude and high psychological job demands simultaneously, analysing their association with coronary heart outcomes. This study found empirical support for the full Karasek model. Hence, men and women with concurrent low decision latitude and high demands are at higher risk of coronary heart disease than their counterparts. The analysis shows that high job demands consistently predict coronary heart disease. Low decision latitude also predicts heart problems, albeit less consistently. The analysis also controlled for social support at work and employment grade, which did not prove to change the sign and strength of the association. Age, however, did have an effect on the analysis, younger workers being those showing the strongest effect of job strain on coronary problems.

There is, therefore, sound evidence to support the job strain model[31]. The other model that has recently been put forward to explain how occupations have a significant impact on health is the effort-reward imbalance model (Siegrist, 1996; Siegrist, 2000). This model, similarly to the job strain model, examines the effects of job conditions on health but it also adds the impact on health of labour market conditions (Siegrist, 2000). This model argues that the probability of developing a disease increases as the mismatch

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[31] It should be noted, however, that the relevance of the Karasek model is still being analysed, since some studies have found that some components of the job strain model rather than the full model have a stronger explanatory power. In a study examining the link between low job control and risk of coronary heart disease, for instance, Bosma *et al.* (1997) found that low control in the work environment is associated with an increased risk of future coronary heart disease among both men and women. Moreover, the effect of low control of work tasks is cumulative. Hence, having low job control over time is linked to a higher probability of suffering from heart disease. On the other hand, individuals with high job control across time increasingly have lower risks of suffering heart problems. Individuals that change occupations from low to high job control or vice versa or individuals with intermediate job control generally presented intermediate risks of coronary heart disease. This study found that low control rather than the full job strain model is more strongly related to coronary heart disease. The paper shows that multiplicative interactions between job demands and social support did not add to the prediction of new coronary heart disease. Thus, low job control proved to have the strongest and most significant predictive capacity. Evidence such as that presented in this paper shows the complexity involved in the analysis of the effect that specific characteristics of an occupation have on health.

between high efforts at work and low reward in turn rises. Rewards are defined and operationalised not only as monetary returns but also as social approval, job security and career opportunities. As Siegrist *et al.* define it: "In the workplace reciprocity depends on a balance between perceived efforts spent (extrinsic effort), in term of psychological and physical demands, and rewards received in turn. This social contract operates with three types of reward: money, esteem, and career opportunities including job security. Following from this, when people believe that they have expended high effort, but perceive they have reaped few rewards, a condition of emotional distress will be produced. As a result of this failed reciprocity, the risk of stress related mental and physical illness would increase. The cardiovascular system is vulnerable to continuously enhanced activation of the automatic nervous system following exposure to high cost/low gain conditions. Therefore, effort-reward imbalance at work is expected to increase the risk of coronary heart disease" (Kuper *et al.*, 2002: 777). In other words, this model associates ill health with the stress that is generated in a situation when an individual perceives that the reward she is getting as an exchange for the effort she is putting in her job is unbalanced. The model incorporates, therefore, individuals' perceptions and satisfaction with their job into the discussion of work-related stress.

Stansfeld, Fuhrer *et al.* (1999) analysed the impact of working conditions on psychiatric disorders. The paper shows that when an occupation presents an imbalance, there is an increased risk of psychiatric disorder. The longitudinal analysis shows that the association between work characteristics and psychiatric morbidity might be causal. Findings rely on self-reported data that is adjusted for baseline psychiatric disorder to control for the effect of individuals' current mood when reporting working conditions, negative affectivity and personality characteristics.

The influence between effort-reward imbalance and coronary heart disease has also been extensively examined in the Whitehall studies. For instance, Bosma, Peter *et al.* (1998) showed that, for both men and women, having an occupation in the initial

Whitehall phase which was not providing adequate rewards in comparison to its demands was associated with suffering from a heart condition in the follow-up period. More specifically, the study shows that competitive, aggressive and over-committed individuals with poor promotion prospects and blocked careers were most likely to experience heart problems. Results are maintained after controlling for negative affectivity, employment grade level and coronary risk factors. Research has also shown significant relationships between effort-reward imbalance and some factors associated with cardiovascular disease such as hypertension and high concentrations of low-density lipoprotein cholesterol (Peter *et al.*, 1998; Vrijkotte *et al.*, 2000, cited in Kivimäki *et al.,* 2002: 857).

A recent study by Kuper, Singh-Manoux, Siegrist and Marmot (2002) has enhanced the understanding of the relation that exists between effort-reward imbalance and coronary heart disease. The paper found an association between a high ratio of effort to rewards and the risk of coronary heart disease. The statistical analysis also shows that high intrinsic effort, high efforts, and low rewards predict risk of coronary heart disease. These findings apply to both men and women. It was also found that the level of social support at work and the employment grade level matters as the effect of effort-reward imbalance on coronary heart disease is stronger for individuals reporting low levels of social support at work or individuals occupying positions at lower employment grades. The paper proposes two hypotheses to understand the causal mechanisms that link the effort-reward imbalance model and health outcomes. The first one argues that there is a direct biological effect between effort-reward imbalance and the development of coronary heart disease. Some epidemiological cross-sectional evidence supports this argument, since effort reward imbalance is associated with some of the symptoms that might lead to coronary heart disease (e.g. high blood pressure, increased LDL cholesterol, higher heart rate, increased fibrinogen and, lower 24 hour vagal tone). The second causal mechanism would be the role of health behaviour as the explanatory variable between effort-reward imbalance and coronary heart disease. A stressful situation that could be characterised as being one of effort-reward imbalance may induce some individuals to some unhealthy behaviour such as smoking or heavy drinking. The study presents some evidence to support the second mechanism, as the association between effort-reward imbalance and coronary heart disease is reduced after including in the models health behaviour. It is hypothesised that part of the remaining association could be the result of a direct confounding effect of biological variables.

A recent study has evaluated the adequacy of both the job strain model and the effort-reward imbalance model (Kivimäki *et al.,* 2002). This interesting cohort study examines the association between the two models and the risk of death from cardiovascular disease. The study argues that individuals in occupations that imply high job strain (defined as high work demands and low job control) and effort-reward imbalance (defined as the mismatch between high efforts at work and low reward received in return) have a higher probability of a bad health status compared with people in occupations characterised by low job strain and low-effort reward imbalance. The evidence from the paper is conclusive and interesting: individuals in occupations with high job strain and high effort-reward imbalance were twice more likely to die prematurely than individuals in occupations with low job strain and low-effort reward imbalance.

All in all, there is considerable evidence to support the first mechanism of explanation defended in the theoretical framework of this thesis. We have seen that a large body of research on occupational risks factors presents sound evidence showing that certain occupations have inherent characteristics that affect an individual's health. More specifically, occupations with a high job strain, occupations with a high effort-reward imbalance, or occupations with both high job strain and high effort-reward imbalance, have a significant higher probability of death due to coronary heart disease as well as a higher probability of stress and mental disorders.

2.3.2. Mechanism 2: The association between education and health

Education affects health via two mechanisms. First, the knowledge and information individuals have about different issues might help improve or worsen their health condition. Hence, education has an effect on health via its effect on lifestyles that form part of mechanism 3 which is discussed below. In other words, individuals' education and information on different health-related issues will have an impact on their health-related behaviour and lifestyles, which will ultimately affect health outcomes. The second mechanism through which education influences health is via its indirect effect on health outcomes through its mediating effect between class and health. This is the impact that mechanism 2 is capturing. Since education is unequally distributed among social classes and this, in turn, is one of the factors that determine individuals' allocation to social classes, the very formation of classes has therefore an effect on health outcomes. Like the other factors that determine an individual's social position, education mediates part of the class effect on health, that is, it has an effect on the probability of being healthy or, on the contrary, unhealthy. Hence, education helps to account for part of the class effect as it is a cause of class. Education is also a prior cause to health status. Thus, education accounts for part of the gross effect of class on health as it is a common prior cause of both class and health.

2.3.3. Mechanism 3: Lifestyles as an intervening factor between both education and class on health

Individuals' lifestyles appear to have some effect on their health status as the behavioural literature has shown. However, this research is not concerned with examining the impact of lifestyles on health *per se*, but rather seeks to relate lifestyles to individual's class and education, since the argument defended above is that class and education influence lifestyles and not vice versa. Hence, an individual's class has an impact on her access to certain resources, which have an influence on the type of life habits that individuals may have. The amount and type of material resources (e.g. income level) an individual has will influence, for instance, the housing conditions and the environmental conditions in which she lives, which in turn will have an effect on how she perceives her health as well as on her objective health.

Moreover, an individual's educational achievements will also affect her lifestyle. The impact of education is not only through its mediating effect between class and health but also through its influence on individuals' lifestyles. Having information about the harmful effects of some habits (e.g. drinking in excess, smoking, a poor and unbalanced diet, a sedentary life) may prevent ill health. Hence, the less educated will be less aware of the risks that a polluted environment or certain health-related behaviour may pose for their health. Moreover, information about the functioning and structure of health services and health care in general might also be useful in order to avoid unhealthy conditions. The use of preventive health care services, especially for children and women, for instance, is a clear example of the positive impact that education may have on health outcomes. Lifestyles, therefore, will vary in accordance with educational achievement, as highly educated individuals will have higher probabilities of using the information they have in pursuing a lifestyle with positive effects on their health.

In relation to the impact of education on health, we should also note the residual effect, that is, the education effect that might remain once all the research variables have been included. In other words, we need to account for an education effect on health that might not be explained when controlling for lifestyles. A residual impact of education on health could arise as the result of two related factors. First, the fact that empirical models do not include all living habits. Due to data restrictions, the empirical analysis only examines certain types of health-related behaviour such as smoking and drinking, the practise of physical exercise, and the relation between an individual's height and weight. Therefore many other lifestyle-related factors could be influencing health, such as housing conditions or the environmental conditions and they are left out of the empirical analysis. The second factor that could help explain the residual educational effect is the measurement error as the way lifestyles are measured could be improved[32]. For instance, the practise of physical activity included in the models refers to exercise done during an individual's principal activity, ignoring physical exercise taken during the respondent's spare time. Drinking behaviour, on the other hand, could also be measured more adequately if a distinction were drawn between different beverages. Thus, the empirical models are not able to capture all the educational effect on health, so the residual effect captures the effect left unexplained.

2.3.4. Mechanism 4: Public resources as an explanatory factor of the health gap

Class influences health outcomes through the three mechanisms that I have discussed which all operate at the individual level (i.e. working conditions, education and lifestyles). I have also argued that class affects health results at a different level of aggregation: the community level. Thus, the aggregation of classes forms the structure of classes and the characteristics of the latter together with the interaction of some variables such as certain institutions of the Welfare State will in turn influence, through the design of public policies, the type of public resources a community can count on.

This argument has not been widely analysed although it has received some attention from the literature on urbanism, and specifically the literature on urban economic development (e.g. Easterly, 2001a; 2001b; Sellers, 1999; Boschken, 1998; 2003; Florida, 2003; Burns, 1994; Lamont, 1992; Feiock and Clingermayer, 1986; Vogel, 1990). This literature has mainly

[32] Chapter 3 will present a detailed definition and operationalization of the research variables.

centred on two major lines of enquiry. The first focuses on the role played by political actors in the design of policies that shape the services provided in urban units. The second has focused on the institutional structure and its effect on policy outcomes. Some of the findings from this literature are interesting, although it should be noted that they require further empirical testing and confirmation. For instance, Boschken (1998) in a study on the influence of the upper classes on developmental policy outcomes focusing on transport infrastructure in the United States found an association between scant concentrations of rail development -and most of the collateral investments it implies- with cities characterised by having higher proportions of upper class residents. This lack of investment was identified as one of the causes of unequal economic growth, to the disadvantage of the lower social classes. In a paper examining the determinants of the provision of urban environmental amenities in nine medium-size cities in France, Germany and the United States, Sellers (1999) found that managerial and professional workers had brought public policies providing higher levels of environmental goods. In a study examining the effects of class and ethnic divisions on economic development, Easterly (2001) found that a higher share of income for the middle class and lower ethnic divisions are associated with higher growth, as well as with more education, better health and better infrastructure.

There exists, therefore, some literature which has considered the argument included in mechanism 4. This literature presents some evidence regarding the implications of this mechanism. However, the fact that this type of research is still in its early days, combined with the lack of robust quantitative evidence, implies that we should refrain from drawing any hard conclusions in this respect.

2.4. Summary, discussion and conclusion

The main purpose of Chapter 2 has been to examine in detail the determinants of health outcomes. In order to do so, it has fulfilled two related aims. First, to critically assess the contributions that different disciplines have made to the understanding of health outcomes and, more specifically, to the origins of health inequalities. Second, to provide an explanation for the role that social class has on individuals' health.

In relation to the first aim, we have seen that the Black Report paved the way for a whole wave of research into health inequalities in developed societies. In most such countries, this line of research has expanded considerably in recent years. The Black Report provided four explanations (i.e. the artefactual, the behavioural, the health selection and, the structuralist or materialist) for the increasing health inequalities both among regions and among occupational groups in Britain from the 1950s to the end of the 1970s. Subsequent research further developed the materialist explanation in what has been called the relative income hypothesis, which analyses the influence of income on health, basically arguing that beyond a certain level of development, health outcomes are not influenced by absolute levels of economic resources but rather by the relative position of individuals on the income scale.

This chapter has discussed the revisions and critiques of this hypothesis, which has centred the debate on health inequalities during the last decade. We have seen that although some studies present interesting and revealing evidence, we still have no conclusive analysis on the nature of the relation between income and health. The chapter has also discussed other explanations for the health gap. Biological factors, medical care and psychosocial variables have been also extensively examined as health determinants.

In sum, a critical analysis of the literature allows us to conclude that although the association between some variables (e.g. medical care, health-related behaviours) and health is to a certain extent clear[33], there is a lot of uncertainty in relation to the nature of the effect of most health determinants such as economic and social variables. The picture becomes more complicated when we add simultaneously different levels of analysis (e.g. the individual and the aggregate level) or when the analysis is, on the one hand, within a country or, on the other hand, comparing different countries. We have also seen the need, in some cases, for further refinement of the research design and methodology.

The second aim of the chapter has been addressed through the discussion of a theoretical framework that relates class and health. This explanation is not presented as an alternative to the arguments found in the existing literature on health inequalities, but rather as complementary to them. Social class as an explanatory variable has almost been excluded from the literature and the theoretical framework presented here is intended to help fill this gap. It has been argued that health outcomes are the result of a distribution of certain resources such as material resources, individual's behaviour, and housing conditions that influence health. The knowledge about how to adequately employ these resources is also distributed unequally across social classes. All these factors have an impact on individuals' lifestyles. Divergent lifestyles together with different working conditions are what ultimately determine partly health outcomes. Social class also has an effect on health through its more aggregated form: the structure of social classes. The characteristics defining a class structure (i.e. the pattern of the distribution of individuals among classes or the degree of development and the relevance of a middle class) can influence health through, for instance, public investment in certain resources (e.g. education or public transport).

In order for the theoretical framework to be tested, I have identified four mechanisms that capture the argument and can be tested empirically. Three mechanisms operate at the individual level and one at the aggregate level. Mechanism 1 captures the relation between class and health through working conditions. The

[33] The sign of the direction of the effect might be clear; however, its exact measure remains largely unknown.

second mechanism specifies the association between education and health outcomes via education's impact on social class. Mechanism 3 relates class and education with health outcomes through individuals' lifestyles. The fourth mechanism connects the class structure and individuals' health through community investment in certain resources.

This chapter has presented, therefore, a combination of theoretical arguments that can help explain how an individuals' class affects her health status. I have argued that health is the result of a combination of complicated processes that occur at both the individual and the community level. The empirical part of the thesis will test if these mechanisms hold. The results of the empirical test will provide further understanding of health outcomes. However, the thesis will only test two of these mechanisms: mechanisms 2 and 3. The reasons for not testing mechanisms 1 and 4 are as follows.

Mechanism 1 involves the analysis of occupations. As discussed earlier, classes are combinations of occupations so it is not possible to examine simultaneously both variables. A quantitative analysis cannot include two variables that are measuring the same thing. The methodological design necessary to answer the two research questions of the thesis does not allow the direct inclusion of occupations in the quantitative model of explanation. However, mechanism 1 has been analysed in this chapter through a discussion of the literature on occupational risks. Through the review of this literature I have identified two models (i.e. the job strain model and the effort-reward imbalance model) that examine the effects that occupations have on health. We have seen that there is rigorous and sound empirical evidence supporting these models. In any case, in Chapters 5 and 6 I will come back to the analysis of mechanism 1. Although the quantitative analysis will not be able to include occupations directly, the results will provide a further test of the models relating occupation and health results.

Mechanism 4 will not be tested in the quantitative part of the thesis as it is beyond the methodological scope of the analysis. It is a hypothesis at the aggregate or societal level which would, therefore, require a large sample of societies in order to test it. The thesis analyses Great Britain and Spain: the use of data from only two countries does not provide sufficient variation between individuals in the relevant variables to permit the testing of mechanism 4. This point will be fully addressed in the next chapter where I present the methodological design of the thesis.

Figure 2.5 shows a further specification of the three mechanisms operating at the individual level of analysis. As stated above, the thesis will concentrate on the empirical testing of mechanisms (2) and (3). Hence, the statistical models from Chapters 5 and 6 will specifically address the association between class and health specified in arrow *a* for mechanism (2) and arrows *c, b* and *f* for mechanism (3). Arrows *g* and *h* are the residual effect of class and education respectively, that is, the effect that these two variables have on health and that the specified models are not able to account for. The residual values might be the result of some other variables that may link both class and education with health, and which have not been considered in other models. The residual values can also be the result of an error in operationalizing the research variables, that is, it might be that better measures of, for instance, lifestyles, would further reduce the residual values that we will identify with the remaining value of the coefficients for class and education on the final model. The residual value of class, that is, arrow *g,* can also be partly the result of not operationalizing and testing mechanism (1). Hence, what would be in paths *d* and *e* will appear together as part of the residual *g* in the model.

To conclude, Chapter 2 has introduced the theoretical framework that the thesis argues links the structure of classes and health outcomes. Before presenting the empirical part of the thesis in Chapters 4, 5 and 6, we need to know the research variables as well as the specific tools with which the mechanisms of explanation are going to be tested. These are the aims of Chapter 3, which includes a discussion of the research design necessary to fulfil the aims of the thesis.

[SEE FIGURE 2.5 AT THE END]

Table 2.1: Health status and Social class: Spain in the mid-nineties (crosstabulation)*								
		Social Class						
Health Status		Class I	Class II	Class IIIab	Class IVabc	Class V	Class VI	Class VIIab
Not good	Count	242.0	359.0	164.0	271.0	59.0	860.0	890.0
	Expected Count	321.0	421.5	283.3	184.0	95.6	836.4	703.1
	% within Class Schema	18.2	20.6	14.0	35.6	14.9	24.8	30.6
	Std. Residual	-4.4	-3.0	-7.1	6.4	-3.7	0.8	7.0
Good	Count	1087.0	1386.0	1009.0	491.0	337.0	2603.0	2021.0
	Expected Count	1008.0	1323.5	889.7	578.0	300.4	2626.6	2207.9
	% within Class Schema	81.8	79.4	86.0	64.4	85.1	75.2	69.4
	Std. Residual	2.5	1.7	4.0	-3.6	2.1	-0.5	-4.0

*: The asociation between the two variables is statistically significant (p< 0.001)

Table 2.2: Health status and Social class: Great Britain in the mid-nineties (crosstabulation)*								
		Social Class						
Health Status		Class I	Class II	Class IIIab	Class IVabc	Class V	Class VI	Class VIIab
Not good	Count	414.0	860.0	1047.0	511.0	370.0	768.0	1639.0
	Expected Count	764.0	1101.8	1203.1	524.0	258.3	586.1	1171.6
	% within Class schema	12.2	17.6	19.6	22.0	32.3	29.5	31.5
	Std. Residual	-12.7	-7.3	-4.5	-0.6	7.0	7.5	13.7
Good	Count	2979.0	4033.0	4296.0	1816.0	777.0	1835.0	3564.0
	Expected Count	2629.0	3791.2	4139.9	1803.0	888.7	2016.9	4031.4
	% within Class schema	87.8	82.4	80.4	78.0	67.7	70.5	68.5
	Std. Residual	6.8	3.9	2.4	0.3	-3.7	-4.0	-7.4

*: The asociation between the two variables is statistically significant (p< 0.001)

Figure 2.3: The relationship between the structure of social classes and health both at the individual and the aggregate levels of analysis

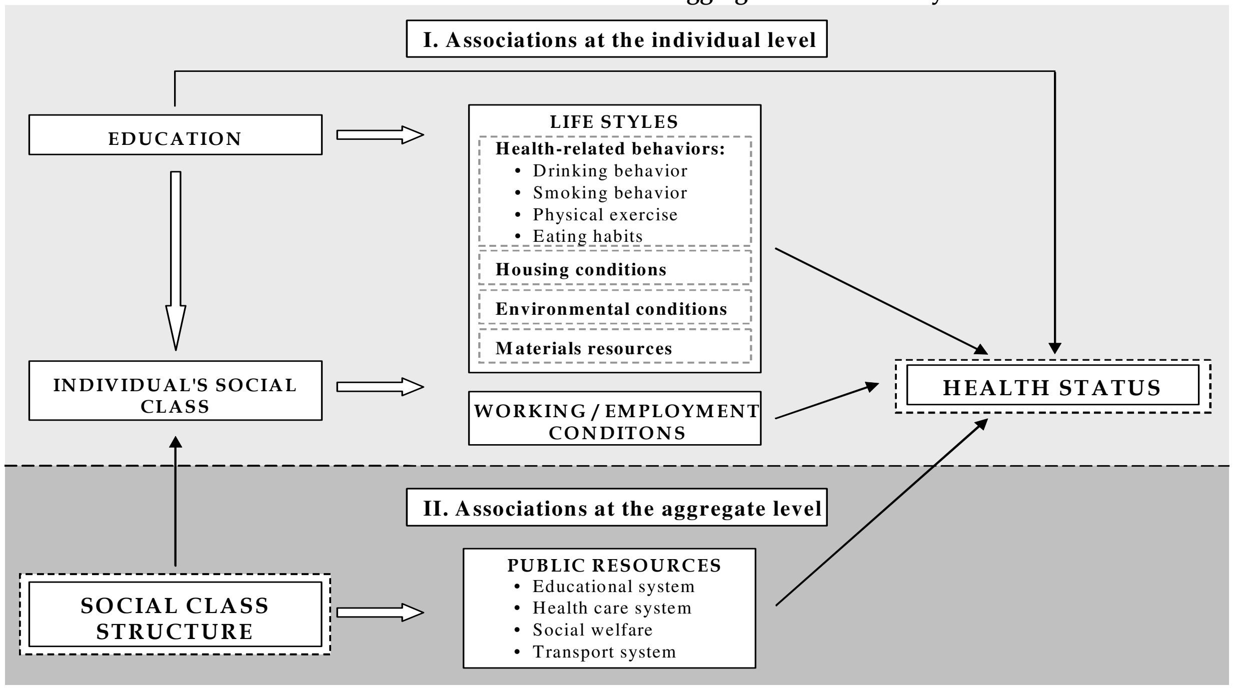


Figure 2.4: Understanding the analytical meaning of the mechanisms of explanation

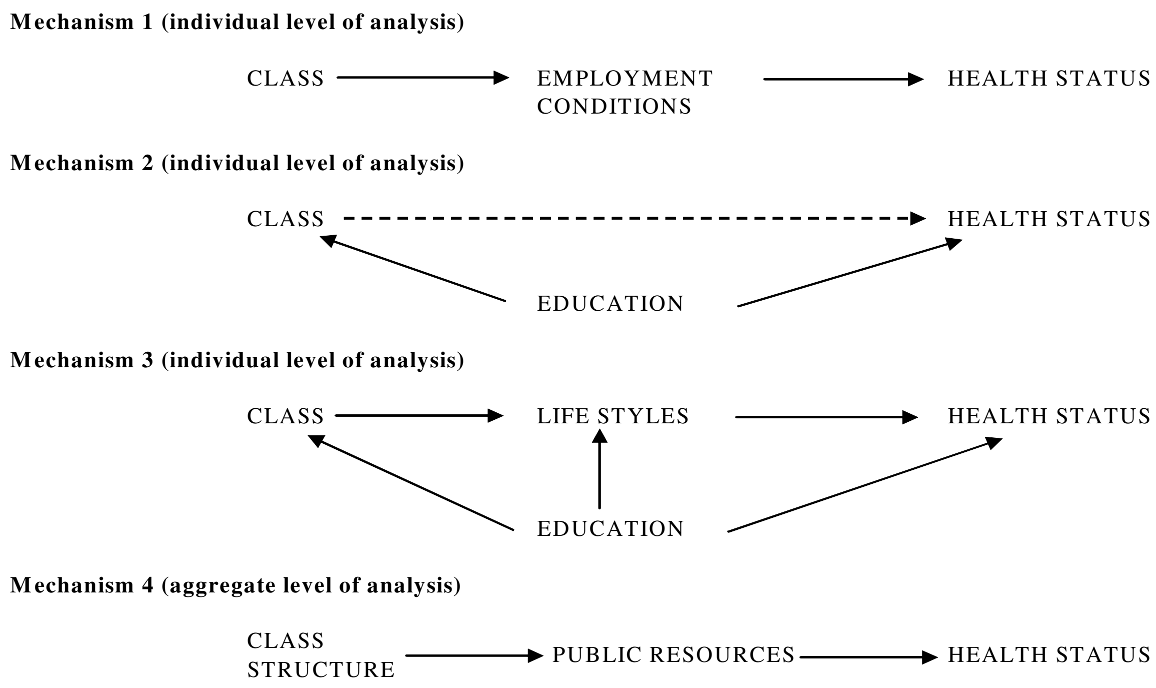
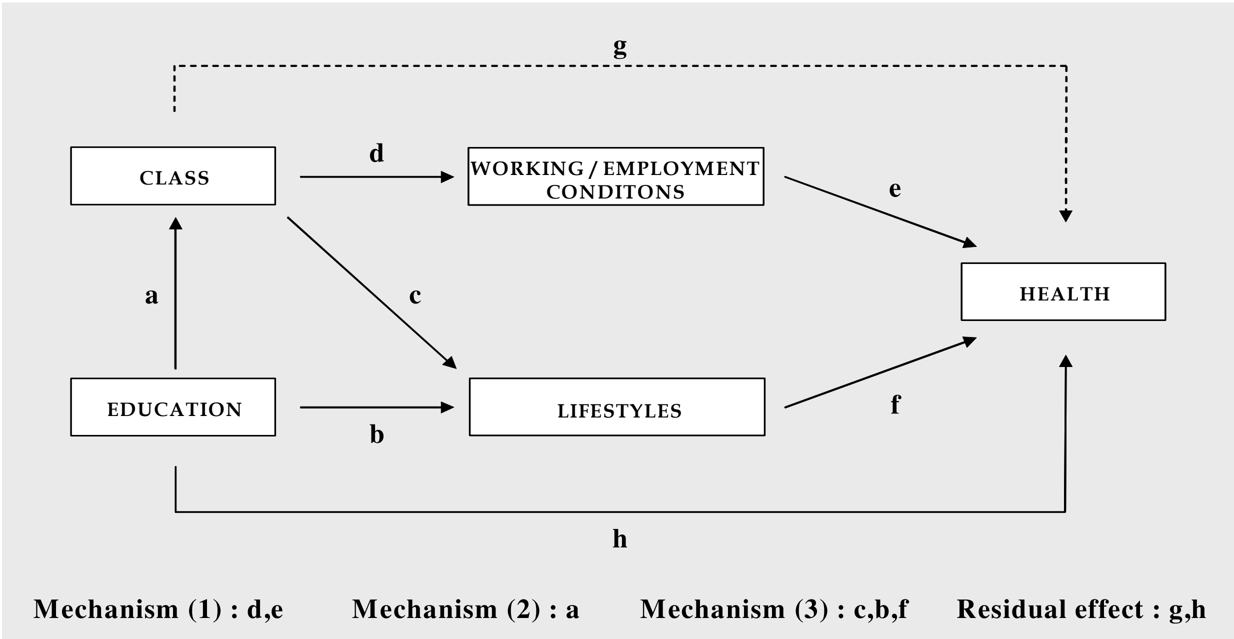


Figure 2.5: The association between class and health at the individual level: The empirical model



CHAPTER 3: DATA AND METHODOLOGY

3.1. Introduction

This chapter introduces the data and statistical methods that will be used to research the questions posed in this thesis, and hence to generate the empirical evidence discussed in Chapters 4, 5 and 6. The next section provides a description of the surveys that have been used as the basis for the empirical analysis. It also includes a sub-section in which I present and discuss the limitations of the data. Section 3 focuses on the definition and operationalization of the research variables. I first present a precise definition of each variable followed by the reasons for the selected operationalization. In Section 4 I turn to the description of the statistical tools that have been used to conduct the empirical analysis. I will discuss above all two types of statistical techniques: multivariate linear regression and the ordered probit model. These are the two methods that I have employed to analyse the relationship between (i) class and health and (ii) the explanatory variables and class. The chapter will conclude with a recapitulation of the methodological design of the thesis that will stress its main strengths and weaknesses.

3.2. Description of the data

The empirical analysis of the thesis is based on two types of data. The first consists of data collected at the aggregate level, and more specifically at the country level. This data constitutes the basis for the empirical analysis in Chapter 4. The second type of data is collected at the individual level of analysis and is examined in Chapters 4, 5 and 6. I will now describe in detail the technical specifications as well as the content of each of these data sets.

3.2.1. The aggregate level data: Source, indicators and type of analysis

The dataset that I have used to analyse the state of health of Great Britain and Spain at the country level is the following: OECD, 2002. *OECD Health Data 2002. A comparative analysis of 30 countries.* OECD: Paris. This is a database systematically compiled by the OECD from data since 1960 on a large number of key dimensions of health care systems in the 30 OECD member countries within their general demographic, economic and social contexts. The database includes information on, among other topics, health status, health care resources, health care utilisation, expenditure on health, non-medical determinants of health and demographic references.

As we will see in Chapter 4, this dataset makes it possible to analyse two main issues. First, to examine the evolution of the structure and functioning of the EU health care systems during the 1980s and the 1990s. Second, to study the general state of health of Spain and Britain in comparison to that of the other EU countries.

The evolution of European health care systems will be traced through the analysis of two types of indicators: health care inputs or resources (i.e. the amount and type of people employed in the system; availability of in-patient beds; and total expenditure on health) and rates of utilisation of the system (i.e. rates of in-patient utilisation and rates of acute length of stay in care). I have selected these two types of indicators as they offer an appropriate way of operationalizing the functioning of health care systems[1]. The analysis of the evolution of health care systems is one of the objectives of Chapter 4[2].

The second main focus of Chapter 4, that is, the general health status of Spain and Great Britain in the European context, has been studied through the data on health status contained in the OECD dataset. More specifically, this chapter analyses the evolution over time of (i) morbidity indicators that measure both subjective health (i.e. self-perceived health status) and objective health (i.e. life expectancy at birth, life expectancy at age 65) and (ii) mortality indicators (i.e. infant mortality, maternal mortality, perinatal mortality and mortality for all individuals for all causes).

The empirical analysis presented in Chapter 4 on these two questions is very simple. It is based on figures that plot the indicators across time for all the EU countries. The European mean for each of the indicators for each year under analysis is also computed and plotted together with the evolution of each indicator for each country. The character of this analysis is therefore merely informative and descriptive as its purpose is simply to observe how these indicators have changed over time.

3.2.2. The individual level data: The health surveys

Chapters 4, 5 and 6 analyse four health surveys conducted both in the United Kingdom[3] and in Spain. These health surveys

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[1] These indicators are able to capture the type and level of activity that health care systems develop. Hence, traced over time they provide a good indication of the process of change undertaken by health care systems. For this reason, they are widely used in comparative analyses. See for example: OECD, 2001; and OECD, 2002.

[2] Chapter 4 has two main aims. First, to present an accurate description of the aggregate state of health of Great Britain and Spain in the mid-1990s. Second, to analyse the state of health of the two countries at the individual level examining its association with social class. The OECD data allows for an analysis of the first aim, which is presented in section 2 of Chapter 4. The analysis of the general health status of Spain and Britain is preceded by a detailed analysis of the evolution across time of European health care systems.

are cross-sectional and were carried out during 1993 and 1995 in both countries. These surveys have been used to examine the association between class and health at the individual level. Two criteria were used to select these surveys. First, I selected the surveys that included all the variables required to examine the research question for the two countries[4]. Second, from all surveys that fulfilled criterion 1, I selected those that had been conducted in the UK and Spain in the same years during the first half of the 1990s. Hence, the thesis has examined the health surveys conducted in both countries in 1993 and 1995.

The object of study of the thesis could be analysed through two types of data. The first type is panel data in which a group of individuals are tracked over a given period to examine how their health and socio-economic situation change over time. The other type of data is cross-sectional, that is, derived from surveys taken at different points in time for different individuals. Panel data is still very scarce, as huge resources are required to generate them. The available panel data (i.e. the British Household Panel Study[5]) would not have enabled me to examine health as I have defined it theoretically because it does not include sufficiently detailed questions on individuals' health status[6]. That is the reason why I have opted for the second type of data, that is, cross-sectional surveys, to conduct the empirical analysis for the thesis.

The possibility of using a detailed definition of health status and of analysing two countries, the UK and Spain, are therefore, two of the advantages of using cross-sectional surveys for the empirical analysis. However, one disadvantage is that cross-

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[3] It should be noted that health surveys used in the British case in fact only cover England and not for all the countries and regions in the United Kingdom.

[4] The variables that are necessary to examine the association between class and health are described in Section 3 below.

[5] For a complete description of this data set please see: UK Data Archive (http://www.data-archive.ac.uk). It should be noted that there is no equivalent dataset for the Spanish case.

[6] Examining the British Household Panel Study would not only have meant adopting a narrower definition of health, but also implied not studying Spain, since there is no comparable panel dataset.

sectional data cannot be used to test for causality. Hence, the thesis will not be able to prove that the relation between class and health are *determined* or *caused* by the explanatory mechanisms proposed in this thesis. The dissertation, on the other hand, will show that the association between class and health is partly *explained* by the three mechanisms discussed in the theoretical framework[7].

I have pooled the data from 1993 and 1995 with the aim of getting larger samples for the analysis[8]. If there are no differences between 1993 and 1995 with respect, first, to the explanatory capacity of the models and, second, between the associations among the variables, then pooling the data is an adequate strategy to get larger samples[9]. Since both surveys are very close in time it would be highly improbable to find significant differences in the relation between the research variables between 1993 and 1995. I have therefore conducted the empirical analysis pooling the data from 1993 and 1995 for each country.

Table 3.1 summarises all the data sources used in the empirical analysis in Chapters 4, 5 and 6. The table contains, therefore, the sources of data that I have used at both the country and the individual level. In relation to the analysis of health at the individual level, the table provides information about the dates

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[7] There is a growing literature on life-course analysis that examines whether there are causal associations between health and particular determinants. See for instance: Frank *et al*. (2003); Hertzman and Power (2003); Wight *et al*. (2003); Lynch (2003); Kuh and Hardy (2003); Kotelchuck (2003); and Ferraro *et al.* (2003).

[8] The section on methodology in Chapter 5 will explain the strategy followed to pool the data. This is based on the likelihood ratio test. This test makes it possible to study if there are significant differences in the associations between variables across time.

[9] Even if differences were significant, which is highly unlikely given the proximity in time of the two surveys, it would be adequate to pool the data as the objective is to get larger samples and not to test whether time has an effect on the relation between the variables as I am not concerned with temporal change. This could only be done with panel data as the same individuals would be tracked overtime.

when the surveys were carried out as well as the number of cases they contain[10].

3.3. The research variables: Definition and operationalization

3.3.1. The dependent variable

Health status is a complex notion, the definition of which has varied over time. To determine when an individual is healthy or, on the contrary, when she is sick, is often difficult. Some individuals with poor physical health nonetheless consider themselves to be in good shape and declare that they are very satisfied with their state of health. In contrast, others feel that they are in bad shape and poor health when in reality they are in very good physical condition but suffer psychosomatic or mental disorders. This sub-section is devoted to the analysis of the concept of health status. The structure of the sub-section is the following. First, I present a brief historical description of the concept of health. Second, I outline the definition of health status used in this thesis. Finally, I discuss the operationalization of the concept.

The concept of health has varied over time, the factors used to define it evolving parallel to the development of society. As Frank and Mustard (1994) have shown, the concept of both health and the determinants of health change periodically. Prior to the Industrial Revolution, there was no widely accepted concept of health. The technological innovations of the Industrial Revolution profoundly affected the socio-economic development and living

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[10] More information about the sample construction and the technical details of each survey can be found in the individual technical reports. For the British surveys please see: Department of Health (http://www.dog.gov.uk). For the Spanish surveys please see: *Centro de Investigaciones Sociológicas* (http://www.cis.es).

[See Table 3.1 at the end]

conditions of the population[11]. Health started to be understood as the state individuals enjoyed when they were properly fed and watered, were able to have a minimum standard of personal hygiene and were not sick or disabled. Thus, health was defined in negative terms: an individual was healthy when he did not suffer any illness or disability. However, I sustain that this understanding of health does not correspond to the current concept of health essentially for two reasons. First, in order to define health in negative terms, it is necessary first to clearly distinguish the dividing line between a normal condition and a pathological condition, which is not always technically possible. Second, the conception of a normal condition is not static. Thus, some symptoms that nowadays are considered manifestations of an illness were not considered pathological in the past.

The general economic and social development that occurred during the 20th- century in developed societies had two fundamental consequences for the conception of health. The first consequence was the significant role that the State began to play in the provision and funding of health care. In this respect, there were two main reasons for the increasing intervention of the State in this area. First, after World War II, some countries created a type of welfare state that gave individuals equal access to some areas which if left to the free interaction of demand and supply forces could create inequalities among individuals. The State became responsible for the establishment of minimum standards (varying in accordance with the ideology of different governments) of equality in access to the following areas: public transfers (basically unemployment and retirement pensions), education, health care and social services. Apart from this political reason,

[11] McKeown and Brown (1955) concluded that mortality rates decreased and health improved significantly in the United Kingdom during the nineteenth century as a response to improved prosperity and nutrition. Their major finding was that health conditions improved not because medical techniques developed – for most of the century there were no effective treatments for the major causes of death- but because of improvements in water and sanitation systems, diet, and the economic and social conditions of much of the population.

there was an economic argument in favour of intervention of the State in health care. Empirical studies proved that investment in health –i.e. in the determinants of health- helped to increase the global productivity of the economy. This was a further justification for the introduction, at that time, of National Health Services in some countries. State intervention came, therefore, to be understood and perceived as part of the conception of health.

The second relevant consequence of economic and social development regarding the definition of health was the awareness of the importance that mental factors had for individuals' well being. This fact made it necessary to introduce mental variables into the definition of health. Consequently, the World Health Organisation (WHO) in its Constitutional Act in 1946 defined health in the following terms**:** *"health is the complete state of physical, mental and social well-being and not the mere lack of illnesses or afflictions"* (Bryant, 1980). This definition had a significant impact in different research disciplines as a consequence of its innovative character. It was the first time that health had been defined in positive terms. Thus, health was considered not just as the absence of illness or afflictions, but as a positive and optimal state summarised in the idea of "complete well-being". This definition not only refers to the physical state of human beings but also mental and social aspects. For the first time, it is considered that, in order to be healthy, individuals not only require good physical condition but also complete mental and social well-being.

However, this definition of health, despite its positive innovations, also has some caveats. First, it equates well-being with a healthy status, which is not always true. For instance, consider a person who has an addiction to some type of drug. After taking the dose of drug, this individual will enjoy a sense of well-being, but he is not healthy in medical terms. Second, it is an "all or nothing" definition in the sense that there are no possible degrees of health. Yet in practice individuals usually enjoy different conditions in the three dimensions of health. Following this definition, an individual is healthy only if he enjoys *complete* physical, mental and social well-being. Finally, it is a subjective definition of health since it does not include the objective aspect of health, that is, the functional capacity.

Some scholars consider that the definition given by the WHO loses significant explanatory power due to both its absolutist character and its subjective perspective. Terris (1980) proposed an alternative definition of health that corrects the weaknesses that I have argued the WHO definition has. According to this author health is **"a state of physical, mental and social well-being with functioning capacity and not only the lack of illnesses or afflictions"**. Thus, this definition does not contain the word "complete" since health, like illness, is not an absolute state. There are different degrees of healthiness as well as diverse degrees of illness. Terris includes the subjective dimension of health (well-being, i.e. feeling well to different degrees) and the objective aspect of health (i.e. the capacity to function correctly to different degrees). Thus, an individual is healthy not only when he feels himself to be in good physical, mental and social state –although this may be to different degrees- but also when he is able to carry out his daily activities (i.e. to function correctly). One disadvantage of this definition, however, is that there might be situations in which an individual may, at one and the same time, have a healthy status and some illnesses at an early stage, which do not show symptoms (do not provoke suffering) or do not restrict functioning capacity.

However, I will adopt this concept of health for the reasons outlined above as well as two additional motives. First, it is an accurate reflection of the common and current understanding of health. Second, like the definition used by the WHO and contrary to the negative definition still maintained by some scholars, it defines health as a multidimensional variable that includes social aspects, which I believe, are necessary to be healthy since they promote equality among individuals. I consider that mental and social well-being of individuals are requirements of being healthy, because individuals live their everyday lives in a reality that is composed of these three dimensions –physical, mental and social-which are all necessary for personal development. This positive definition of health status considers health as a necessary resource to fulfil daily activities and not as an objective to which individuals should devote part of their resources. Thus, I define health as a positive concept that emphasises personal and social resources as well as physical capacities. When an individual is healthy he is "able to, on the one hand, realise his aspirations and fulfil his necessities and, on the other hand, to change or to be able to adapt to the changing environment" (Whitehead, 1988: 223, cited in Benach, 1997: 43).

In order to conduct an empirical analysis of individuals' health status, first we need to define health and then to operationalise the concept. Here, I will present the operationalization to be employed in Chapter 4, which studies health at the aggregate level. Second, I will outline the indicators of health that will be used in the second stage of the empirical analysis, that is, Chapters 5 and 6, in which the cases of Britain and Spain are studied at the individual level.

In the first stage of the research, I will study health at the aggregate level, that is, *the state of health of society as a whole*. I will study the general health status of Spain and the United Kingdom during the first half of the 1990s. The chapter will also examine the state of health of the other members of the EU in order to put Britain and Spain in a European context. Society's health status is reflected in its capacity to live. If a society is in, on average, a healthy condition, it will be able to live more and in better circumstances than a society which, on the contrary, is sunken in a state of illnesses. *Individuals' rate of expectancy of life at birth* is an accurate indicator of the state of health of a society since it reflects the probabilities of life that society as a whole has. Another way to measure the degree of well-being of a society is by examining the life expectancy of individuals at a later stage in life. The healthier a society is, the greater the *life expectancy at age 65* will be. These two indicators of health measure objective and subjective health since individuals normally live longer when they have a balanced health, that is, a healthy status that comprises both an objective and a subjective dimension.

The degree of healthiness of a society can also be measured through the health status that certain vulnerable groups of the population have. The argument is that the healthier a society is, the healthier the groups that are at greater risk should be. Thus, we would expect that as a society achieves a healthier objective status, pregnant women and newborns will also present lower levels of risk. Chapter 4 will therefore also analyse *infant, maternal and perinatal mortality rates*[12] as indicators of a society's objective health status at an aggregate level.

Health status at the individual level is analysed in Chapters 5 and 6. As I argued in the paragraphs devoted to the definition of health, health has both an *objective* and a *subjective* dimension. The *objective dimension* refers to the real state of health that an individual enjoys. Individuals' health status has also a *subjective dimension* that reflects individuals' opinion about their own state of health. The objective dimension is reflected in the degree of achievement of individuals' everyday activities. Difficulties in the normal course of daily life increase significantly if individuals are not in a healthy condition. This is the reason why I consider that *the frequency of chronic illnesses* and *the limitation of everyday*

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[12] The rationale for including these mortality indicators despite the positive definition of health that the research adopts is that they very usefully complement the analysis of the degree of objective health a society enjoys. As argued here, we can measure the degree of objective healthiness a society has through the measurement of the number of years its individuals are expected to live but also through the vulnerability that groups at greatest risk have. These indicators have been used extensively as targets for health policies as they measure the rate of healthy growth of a population. In any case, it should be noted, that the character that both the definition of a concept and its operationalization have do not necessarily need to coincide. In other words, the most adequate operationalization of a positive concept (i.e. health) can be through a series of indicators that have a negative nuance in the way they are measured. The relevant issue is not whether they are positive or negative but that the definition of the concept is adequately operationalised through the indicators. In other words, the important thing is that the indicators are able to measure the content of the definition accurately.

activities are adequate indicators for measuring the objective dimension of health. Another rationale behind the use of these two indicators is that the combination of both measures incorporates a temporal dimension into the analysis, as the rate of chronic illnesses is the result of a long-term process and the limitation of daily activities is the consequence of the health status in the short-term. Both indicators have an impact on how individuals are able to cope with their daily life. By studying these two indicators we can gain a complete picture of an individuals' health in both the short and the long term. The analysis of these dimensions, therefore, enables us to measure the degree of objective health and its consequence on how individuals are capable of developing their lives through time.

The rate of frequency of chronic diseases is a negative indicator of health status because it refers to a lack of health[13]. This indicator allows us to know the health problems individuals suffer in the long run. In the health surveys analysed for Britain and Spain this indicator is measured through the following question: "Have you been told by a physician that you suffer from any of the following long-standing illnesses, disability or infirmity?[14]" The answer offers six possible chronic illnesses[15]. I have computed a variable that sums up the information provided by the answer to the question on chronic illnesses. This variable takes value 0 if the individual has no chronic illnesses, 1 if she has 1, 2 if she has 2, etc. Thus, a positive number is equal to the number of chronic illnesses an individual suffers.

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[13] See footnote 12 for the limited importance of the coincidence or otherwise of positive or negative meanings between a concept and the indicators used to operationalise it. Another way of arguing this point is the following. A concept can be operationalised through indicators that measure the concept itself or, alternatively, through indicators that measure the opposite to the concept. The important thing in the analysis is to interpret the results accordingly.

[14] The Health Surveys for England also include a definition of long-standing illness which is: "By long-standing illness I mean anything that has troubled you over a period of time or that is likely to affect you over a period of time".

[15] Specifically, these illnesses are: high blood pressure, high cholesterol, diabetes, asthma or chronic bronchitis, heart problems, ulcers and allergies.

The limitation of ordinary activities has been selected as an indicator of disability, which is considered to be the worst consequence of illness. This indicator measures the load of illness that an individual has to bare. The burden that a population suffers is measured through the functional limitation that disabilities cause for the normal development of everyday activities. The information about this indicator should be obtained through surveys, since individuals themselves are those best able to give accurate information about their capacities. Hence, illness as a phenomenon that limits individuals' capacity to carry out their ordinary activities is a fact that can be best judged by individuals themselves rather than by physicians[16]. Limitation of ordinary activities is more precise than morbidity rates because the information that an individual stays in bed, is sick, or does not go to work or to school, is subject to less variability, both in time and space, than the different criteria and medical diagnostic techniques (Regidor *et al.,* 1994: 66). Therefore, disability measures are very useful for analysing the trends of the frequency of a sickness since, irrespective of the factors that provoke them; they are an accurate summary of individuals' health problems.

The health surveys that are the basis of the empirical analysis contain different questions that measure different aspects of individuals' ability to develop daily activities. The methodological strategy I have pursued to determine the most adequate operationalization of this concept is to run a factor analysis with the variables that measure the dimension of objective health in the short term[17]. Factor analysis[18] is a statistical technique that

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[16] The character of this indicator is objective because it evaluates the possibilities an individual has to realise his usual activities. But we should remember that the information about this indicator is obtained through surveys so it could contain a subjective dimension. However, this possible subjective dimension is counterbalanced by the clarity and specificity of the question used in the surveys, as this clearly asks about the real limitations of ordinary activities and not about subjective limitations.

[17] Specifically, these variables are: days with limitations on principal activity due to any health related problem during the last two weeks; days in bed during the last two weeks due to health problems; and total number of pains or

combines variables that can be classified on the basis of their meaning into a smaller number of underlying dimensions. It does this through the analysis of the existence of clusters of large correlation coefficients between subsets of variables. If such clusters exist, then the variables may be measuring aspects of the same underlying dimension. These underlying dimensions are known as factors. One of the advantages of this technique is that it achieves parsimony by explaining the maximum amount of common variance in a correlation matrix using the minimum number of explanatory variables. I have run factor analyses using varimax rotation[19] for women and men separately, as well as for four different age groups[20]. I have run the analysis separately for these groups as it is very reasonable to expect that women and men from different age groups will show significant different behaviour with respect to the variables measuring ability to conduct daily activities[21]. For all the cases, the three variables loaded in one factor, implying that they identify a common theme that is some real-world construct. After examining the content of the questions it is reasonable to argue that the factor represents the

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symptoms affecting activities developed during spare time during the last two weeks. The variables are interval and are normally distributed. If we examine the meaning of these questions we can see that they provide information on the ability individuals have to conduct their daily lives in the short-term. It should be noted that in any case these variables might have some subjective content as it is information given by individuals themselves and not by an external agent such as a doctor or a nurse.

[18] For an excellent definition of factor analysis as well as for examples of its application see the following references: Child (1990); Loehlin (1987); Schilderinck (1977); Lawley (1971); Jackson and Borgatta *eds*. (1981); Lewis-Beck *ed*. (1994); and Gorsuch (1983).

[19] Varimax rotation makes it possible to calculate the degree to which variables load onto the factors. It is performed through rotating factor axes so that variables are loaded maximally to only one factor (for a detailed explanation see Field, 2000: 438-445).

[20] The four age groups are the following: 25-35 years old, 36-45 years old, 46-55 years old and 56-65 years old. A more complete description of the operationalization of age is included in the following sub-section.

[21] Chapter 4 reveals that the distribution of short-term objective health differs between men and women as well as between the different age groups.

degree to which individuals can develop their daily activities. Once the factor is identified it is necessary to examine how reliable it is. Reliability analysis makes it possible to test the internal consistency of the factor. For almost all the cases, the alpha Cronbach presents values that support the use of the factor (i.e. ≥0.7, see Appendix A for the Cronbach values).

The short-term dimension of health is therefore operationalised as a factor that has a continuous nature. To interpret the results from Chapters 5 and 6, given the composition of the factor, a negative coefficient would imply a positive association between the variable and having a healthy short-term dimension of health. A positive coefficient would imply the contrary. In other words, lower scores for the dependent variable imply good short-term health.

The subjective dimension of health status is reflected in individuals' declared *self-perception of health*. Since this measure is based on the way the individual himself perceives his own health status, it acknowledges physical, psychological and social factors. Hence it can be seen as a global indicator of a populations' general condition. To improve the perceptions of individuals' health is finally the aim of the measures adopted to achieve greater social well-being. As an indicator that predicts the results of the actions in terms of health more accurately than many other measures –including mortality- (Regidor *et al.,* 1994: 67). Spanish and British health surveys include this variable through the following question: "During the last twelve months, would you say that your health status has been very good, good, fairly good, bad or very bad?" The empirical analysis will therefore measure subjective health through an indicator of self-perception that has five possible answers. To facilitate interpretation, I have recoded this variable to reverse the order of the categories so that it goes from a very poor status (value 1) to an excellent health status (value 5).

To sum up, the definition and operationalization of the dependent variable, health status, has been defined as a positive concept that considers that an individual is healthy when she has a physical, psychological and social state that allows her to function normally and to carry out her daily activities. This definition of health has two advantages. First, it allows for different degrees of healthiness, that is, it is a continuum. Second, it captures both an objective and a subjective dimension of health. Moreover, the objective dimension is operationalised both in the short-term and in the long-term, thereby incorporating a temporal dimension.

3.3.2. The independent variables of the research: control and explanatory variables

In this sub-section I will describe the independent variables of the model I use to try to explain the existence of health inequalities among social classes. It should be remembered that the explanatory objective of the thesis is at the individual level only. Hence, the models constructed to explain health inequalities are run with data measured at the individual level. These models are analysed in Chapters 5 and 6. Chapter 4, on the other hand, focuses on the examination of the existence of health inequalities both at the aggregate level (i.e. the country level) and the individual level. The variables described in this section will therefore, be included in the models discussed in Chapters 5 and 6, which are measured at the individual level.

The variables described in this sub-section, that is, the independent variables, are of two types: control variables and explanatory variables. The control variables consist of the socio-demographic variables, that is, age and civil status. The explanatory variables comprise those variables that I have argued in Chapter 2 explain part of the association between class and health. This group of variables are education and living habits. In the remaining of the sub-section, I will define and describe the operationalization of these two groups of variables.

Age and *civil status* are included in the model as control or confounding variables. This type of variables does not directly[22] explain the association between class and health; however, they may have an impact on the dependent variable. It is for this reason that they must be incorporated into the explanatory model. Hence, individuals from different age groups or with different civil status may show divergent health statuses. I am including these variables in order to account for the differences that individuals show in terms of health as a result, for instance, of being older or younger or of being single or divorced. However, it should be emphasized that control variables are not included to examine the mechanisms of explanation that link class and health. In other words, the theoretical explanation of the thesis does not argue, for instance, that the more privileged social classes have a better health status than the remaining class categories as a result of their age or civil status. Age and civil status, therefore, are not included in the theoretical explanation as explanatory variables but as control or confounding variables.

In any event, as noted above, it is necessary to control for these variables as they may affect individuals' health. For instance, it is clear that, *certeris paribus*, the older an individual is, the poorer her health will be. Some research[23] also suggests that

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[22] However, it should be noted that the link between class and health could also be indirectly affected by age and civil status. For example, classes may have different mean ages since people may experience upward intergenerational mobility over their life span. Since age is related to health, this means that in a formal statistical interpretation age may help explain part of the class inequalities in health. However, it would be wrong to interpret the possible indirect age effect in a similar way as the mediating effect that, for instance, education or living habits have on the association linking class and health. I tested for interaction effects between age and class to see whether there was a stronger age effect on health for any class category; however, interactions were statistically non-significant.

[23] Research has begun to appear on the association between civil status and health. For some references on this literature please see: Korenman, Goldman and Haishan (2000); Wilson (2001); and Taubman and Sherwin (2001). Other related references are: Bartley, Sacker, Firth and Fitzpatrick (1999a); and Bartley, Sacker, Firth and Fitzpatrick (1999b).

civil status has an impact on individuals' health. Married men, for instance, are healthier than men in any other civil status whereas single women tend to be healthier than women in any other category.

The age range that is examined here runs from 25 to 65 years-old. The rationale for the lower limit is that I am interested in studying individuals who are already part of the occupational system. It could be argued that some of those aged 16 to 25 are already in the labour market. However, including this age group would imply a selection bias, as part of this age group, specifically those in full-time education, would be left out of the analysis. The justification for the upper limit, that is, 65 years of age, is also related to the aim of only examining individuals within the occupational structure and, individuals over 65 are, in most of the cases, retired.

Civil status is included in the model as a categorical variable with the following categories: single, married or cohabiting, separated or divorced and, widowed. Age is included in the model as an ordinal variable with four categories: 25 to 34 years old, 35 to 44 years old, 45 to 54 years old and, 55 to 65 years old.

The group of independent variables is compounded by *class*, *education* and *living habits*. Class is included as the first aim of the research is to examine whether class has a significant effect on health. If classes have different health status then the models in Chapters 5 and 6 will show that the relation between class and health will be significant. As we will see, the class effect on health is existent and significant. The statistical models will then shift towards the task of explanation. Education and living habits are therefore included as explanatory variables in order to test the mechanisms of explanation presented in Chapter 2. The models that analyse the subjective dimension of health will also include *objective health* as an explanatory variable. The rationale behind the inclusion of this variable is that it would be interesting to know whether differences in the subjective state of health among classes are partly related to differences in the objective health status that classes have. As the methodological section of Chapter 5 will explain, the statistical modelling of Chapters 5 and 6 will first examine whether education and lifestyles explain part of the class inequalities in health. It will then consider whether the remaining class effect is related to classes' objective health. Subjective health status will be operationalised through the five category variable described in the previous sub-section.

Social class is included in the model to evaluate the extent of the net class effect on health. Given the complexity of its meaning, class is a difficult concept to measure. However, if must be defined in theoretical terms before it can be operationalised correctly. I will therefore provide a definition of social class before outlining the most adequate operationalization of the concept.

I understand *class* in a Weberian sense. In Weber's own words: "We may speak of a "class" when (1) a number of people have in common a specific causal component of their life chances, in so far as (2) this component is represented exclusively by economic interests in the possession of goods and opportunities for income, and (3) is represented under the conditions of the commodity or labour markets" (cited in Crompton, 1993: 50). Therefore, market-determined life chances are reflected in an individual's class position. Life chances are determined by property (giving rise to owners and non-owners) as well as by skills and education (giving rise to positively or negatively privileged "commercial" classes). Class is therefore defined as sharing a "specific component of … life chances" (Weber, 1978: 927)[24]. Individuals are then grouped together in a class when they

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[24] When defining class, it is necessary to refer to the work of Karl Marx and its relation with Weber's work. Karl Marx and Max Weber have made the most significant contributions to the definition and analysis of social classes. Class occupied a central position in Marx's work; however, he did not provide a precise definition of this concept. Nevertheless, Marx argued that social classes are determined by the relationship between individuals and the means of production at any moment in time. In other words, class relationships are embedded in the patterns of ownership and control, which characterise production relationships.

have similar assets, which determine individuals' life chances. A class groups together individuals who share some common characteristics or unifying class criteria. Hence, Erikson and Goldthorpe define classes as combined social positions "that are identified in terms of relationships within labour markets and production units" (Erikson and Goldthorpe, 1992: 29, cited in Breen and Rottman, 1995: 14).

A crucial element of this definition of class is that individuals within a class or strata share similar life chances. As argued in Chapter 2, life chances are an essential element in understanding individuals' health outcomes. Since this definition understands class as a factor that influences individuals' life chances I consider it appropriate for this research[25]. Classes are understood as sets of

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Before the 1970s and 1980s, the analysis of class conducted by Weberians and Marxists was characterised by significant theoretical differences (i.e. structure vs. action; one-dimension vs. multi-dimensional class concept; exploitation vs. domination; and production relationship vs. market relationships). However, recent developments in Marxism–neo-Marxism have resulted in an increasing theoretical similarity between neo-Marxists and neo-Weberians. Neo-Marxists have incorporated into their class analysis some concepts and perspectives traditionally associated with the Weberian analysis. For instance, with respect to the relationship between workers and capitalists, structural variables play an important role because they constrain classes' interests and capacity for collective action. But at the same time, some characteristics of the class structure such as the emergence and transformation of the middle classes or the fractional divisions within classes are understood as a contingent result of conflicts between classes, which have to be analysed from the theory of social action. Similarly, social change is explained by class relations, which are still conceived as the result of economic exploitation but in a much weaker sense than traditionally understood. The notion of exploitative relations is being replaced by one of relations of domination and subordination, which do not necessarily entail opposite interests. Finally, class relations are generally understood as a consequence of social relations of production; however, market relations acquire greater significance especially in the analysis of the middle classes and the divisions within classes. Thus, Marxist and Weberian theories remain of relevance when limiting and differentiating the framework in which classes should be analysed; now, however, it cannot be argued that they are in significant disagreement (Burris, 1991).

[25] The Goldthorpe class schema could also be useful to analyse whether there is an association between the two types of contract the schema presents (i.e.

positions rather than as the individuals who just happen to occupy the position at a specific moment in time: "classes are sets of structural positions. Social relationships within markets, especially within labour markets, and within firms define these positions" (Sorensen, 1991: 72).

Class is therefore defined following a theory on how relationships in markets and firms influence individuals' life chances. A *class structure* is constituted by the aggregation of different social classes, each of which is formed according to the criteria grouping individuals in a class. In Breen's and Rottman's words: "Strata are, then, groups of actors who share, to a significant degree, a common position on one of the structural bases of social power, and thus have at least a partial commonality of social power" (Breen and Rottman, 1995: 14). The class system or the structure of inequality is then defined by the distribution of individuals in different social positions.

The *operationalization of social classes* has been the focus of intense empirical research on class over the last hundred years. Post -war developments of the concept of social class have moved in different directions. While some scholars have emphasised the analysis of the class structure, others have focused on the analysis of the processes of class structuring and on class relationships (Crompton, 1993: 73). I am interested in the work centred on the *structure of classes* as the aim of this research is to analyse the influence of the *class structure on individuals' state of health* and not the impact on health of other class-related concepts such as the process of class formation.

As stated above, a class structure is the structure that divides the population into unequally rewarded groups. In contemporary

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the service relationship and the labour contract) and the models that analyse the relation between job characteristics and health outcomes (i.e. the Karasek job strain model and the effort reward imbalance model). It could be that those occupations that are characterised by a labour contract are also having bad outcomes in terms of job strain or have an imbalance between effort and reward. To examine the association between mechanism (1) of the thesis and health outcomes, the Goldthorpe schema would be very interesting. However, it is out of both the aims of this thesis and its methodological scope.

developed societies this implies focusing on the analysis of the employment structure. From a class structure perspective, three main class schemas have been developed: common sense descriptive measures, subjective scales of occupational prestige or social ranking and, theoretical occupational class schemas based on Marx and Weber (Grusky *ed*., 2001). The research will adopt the class schema developed by John Goldthorpe for the reasons to be given below. Gradational class schemas, such as occupation or prestige hierarchies, describe individuals' situations but do not explain them. Hence, gradational schemas are the outcomes of class relations but do not provide information about the structure of classes[26]. These weaknesses for the study of class analysis have

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[26] Common sense descriptive measures and scales of occupational prestige or status have been used in official studies as well as by researchers. They are not adequate for the purposes of this research for the following reasons.

Common sense descriptive measures such as individuals' occupations have been widely used by social researchers. This has been justified on the grounds that occupation is the most powerful single indicator of levels of material reward, social standing and life chances. Researchers have divided the occupational structure into different categories that correspond to different levels of social and economic rewards, which have been defined as different social classes. However, the use of occupation as an indicator of social class poses some problems (Abercrombie and Urry, 1983). First, occupations do not incorporate many important dimensions of inequality in modern societies, such as the possession of capital or wealth. Moreover, occupations do not reflect the differences associated with gender or race that have a significant impact in structuring the division of labour or the social position of economically inactive individuals. The second problematic area in the use of occupation as a social indicator is the lack of capacity of occupational class schemas to describe relations in a theoretical sense. For example, Abercrombie and Urry (1983) argue that occupation is not able to incorporate the "technical" and "social" divisions of labour that Marx distinguished and which were essential components of his concept of social class. According to these authors, occupation refers only to positions within the technical division of labour. Weber too argued that social classes were not only occupational aggregates. Other dimensions like status or power also compound social classes.

Despite these widely accepted weaknesses, occupation has often been used as an indicator of social classes. This has been the case of many medical sociologists who have employed the British Registrar General to study the distribution of mortality among individuals.

led to the development of theoretical class schemas that attempt to group the population in social classes that correspond to the groupings delineated by Marx and Weber. Among this group of relational class schemas the works of Wright and Goldthorpe have been highly influential.

Wright has concentrated on constructing a Marxist class schema in which individuals' jobs are assigned to classes. He has produced two class schemas in a bid to maintain the essence of the Marxist approach while also attempting to respond to the more complex understanding of class structures that has developed since Marx's time. Classes are originally defined on the basis of exploitation and domination in Wright's early work, but on the basis of exploitation alone in his more recent analyses[27].

Scales of occupational prestige or status have also been used in the analysis of the structure of social classes. They have been described as subjectivist since they reflect a subjective assessment of the relative prestige of occupations. The main weakness of these scales is that "they are not able to render any account of class conflicts. Such scales measure social status rather than class...The relative distribution of reward described in hierarchical schemas reflected the outcome of class processes rather than giving any account of the underlying structure of class relations which had brought them about". Crompton (1993: 80-83).

[27] Wright's methodological strategy has been to work with survey data in order to locate individuals within his two successive class schemas. Class relations are embodied in specific jobs, since jobs are the essential "empty places" filled by individuals within the system of production. In the first version of his class schema, Wright argued that three different dimensions compound social relations of production: social relations of control over money capital, social relations of control over physical capital and, social relations of authority. He developed the concept of "contradictory class locations" to solve the paradox of employees such as supervisors or lower managerial or administrative workers who realised functions associated from a Marxist perspective with both the bourgeoisie and the proletariat. Wright's first class schema had six positions – bourgeoisie, small employers, petty bourgeoisie, semi-autonomous wage earners, proletariat and, managers and supervisors- in which individuals are located according to the extent to which they posses economic ownership, control and autonomy within the process of production.

This class schema received theoretical criticisms, which lead to a redefinition of the original class map. Wright's schema had not considered extensively the fundamental Marxist concept of exploitation within relations of production, being more concerned with the concept of domination. This

Goldthorpe, in turn, has developed an alternative theoretical class schema. His initial approach was based on the allocation of occupations to classes considering their market and work situation, incorporating, hence, employment status. Occupations are aggregated in seven categories. As he himself puts it "we combine occupational categories whose members would appear ...to be typically comparable, on the one hand, in terms of their sources

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theoretical problem is solved through the development of Roemer's work (e.g. 1981, 1982, 1986a, 1986b, 1994) applying a game-theoretic approach that accounts for exploitation. Wright's more recent class schema included twelve classes in which individuals were located according to their ownership or control of four types of assets (labour-power assets, capital assets, organisation assets and, skill assets) which form the basis of different types of exploitation (feudal exploitation, capitalist exploitation, statist exploitation and, socialist exploitation). Thus, the major difference between Wright's earlier and later approach is that the presence or absence of work autonomy, which was central in his first schema, is absent in his later work in which individuals are identified through their possession of organisational assets, expertise and credentials (Wright 1976, 1985, 1998).

The major critique made of Wright's new class schema is that the theory blurs the distinctions between neo-Weberian and Marxist analyses of class structure. This point is stated clearly by Rose and Marshall (1986: 451) "Wright has effectively rejected a wholly structural account of class. The aim of his class analysis is not simply that of identifying class locations, as these are determined by relations of production, but to raise issues concerning class formation, and hence of agency and process". The criticism is that this change is incoherent with some of the theoretical arguments. For example, the definitions of class structure and class formation lose coherence in this new approach. Wright defines *class structure* in terms of people's real interests, disregarding the dimensions that he now considers determinant of class relations. Wright's definition of *class formation* is incoherent with his arguments related to the relative openness of social processes. Classes are organised collectives that are formed based on the interests shaped by the class structure, which is not consistent with his preference for a trajectory view of class. Moreover, Wright argues, contradicting himself that class formation is also shaped by a variety of institutional mechanisms that are relatively autonomous from the class structure. Thus, class interests are not determined by the class structure alone.

These contradictions, which challenge the concept of class structure, itself fundamental to my research, together with the shift in the focus of analysis from class structure to class formation, imply that Wright's class schema is not the best suited when attempting to study the influence of class on individuals' health.

and levels of income and other conditions of employment, in their degree of economic security, and in their chances of economic advancement; and, on the other hand, in their location within systems of authority and control governing the processes of production in which they are engaged" (Goldthorpe, 1987: 40). Classes are then formed by occupations that share the same market and work situations and therefore the same life chances.

In his later work, Goldthorpe has introduced a slightly different criterion on which the same class schema is based[28]. Classes now capture the distinction between those who own the means of production and those who do not and, among the latter according to the nature of the relationship with the employer. The nature of the relationship with the employer introduces the division between those occupations organised through a labour contract and those occupations regulated by a service relationship with the employer (Breen, forthcoming: 8-10).

Occupations with a labour contract and occupations based on a service relationship differ depending on the degree of both the difficulty of monitoring the works tasks and the specificity of human assets. Monitoring difficulties arise when the employer cannot reasonably assess the degree to which the employee is working in the interests of the firm. This is the classical problem of accordance of interests between the agent and the principle. Certain occupations have a high degree of autonomy when fulfilling tasks. Hence, the agent (i.e. the employee) has a considerable degree of discretion and is the only one who can adequately assess whether she is working in the full interest of the employer. The principal (i.e. the employer) has to assure some compensation that gives the agent incentives to work in her interest. Asset specificity refers to the extent to which an occupation requires specific skills, expertise or knowledge as opposed to jobs that call for general and non-specific skills. When a job requires specific knowledge, the employee has to invest in

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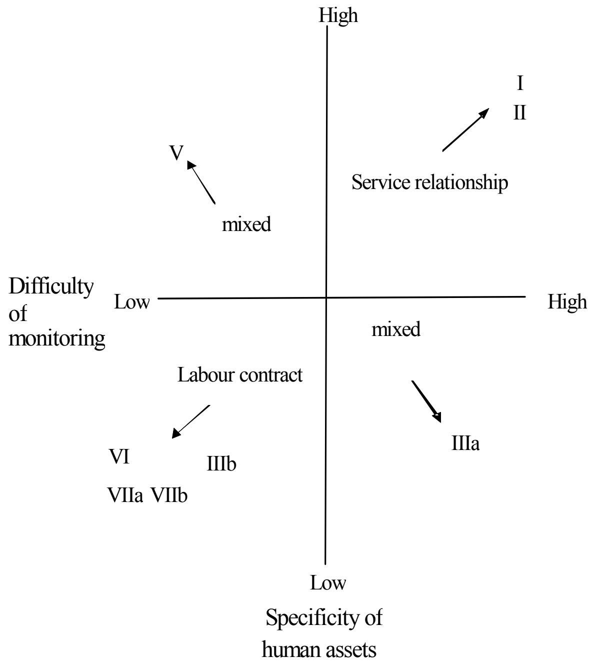
[28] The variation from the early to the later specification of the Goldthorpe class schema does not have any operational consequences as occupations are assigned to classes in a similar way.

expertise that may be of no use in another context; but once she has received it, the employer needs to retain the employee.

Occupations characterised by a service relationship show high degrees of both monitoring difficulties and asset specificity. Employers need to find strategies to minimise the potentially negative consequences of this relationship by providing incentives to the employees. These can take the form of job security (i.e. ensuring a long-term labour relationship) and career prospects (i.e. salary increments, pension rights, career opportunities) (Goldthorpe, 2000: 220). Occupations characterised by a labour contract are in the opposite situation, that is, the skills required are non-specific and therefore available in the labour market and it is easy to monitor the progress of the work as the result of the work is easily observable (Breen, forthcoming: 12). Hence, this type of occupation does not present the problem of incentives that the service relationship does. This implies that it is not necessary to ensure a long-term employment relationship and payment is made on the basis of discrete amounts of work (Goldthorpe and McKinght, 2003: 1-5).

It is interesting to observe in Figure 3.1 what the class schema looks like in terms of the degree to which classes are affected by both difficulties in monitoring job performance and the specificity of human assets. A first distinction is drawn between those who own the means of production (i.e. class IV) and those who do not (i.e. the rest of the class categories). Class IV, the petty-bourgeoisie, consists of those individuals who are either self-employed or small employers. This category includes different sectors of the economy. Thus, IVc includes individuals working in the agricultural sector (i.e. farmers and other self-employed individuals working in the primary sector) and IVab includes individuals who do not work in the agricultural sector (i.e. IVa small proprietors with employees and IVb small proprietors without employees). The other class categories consist of employees. Thus, these categories are differentiated one from the other in terms of the degree of asset specificity they imply and the difficulty in monitoring they have. Classes VI (skilled manual

Figure 3.1: Dimensions of work as sources of contractual hazard, forms of employment contract, and location of employee classes of the schema (from Goldthorpe 2000: 223, figure 10.2)



workers) and VII (unskilled manual workers) have low asset specificity and low difficulty of monitoring, and are clearly examples of labour contract relationships. Within class VII a distinction is drawn on the basis of economic sector, as VIIa refers to workers outside agriculture whereas VIIb refers to agricultural workers. Class IIIb is also located in this part of the figure as its occupations (e.g. lowest grade of employment in shops or offices) are also characterised by a labour contract. At the other extreme, we find classes I (i.e. higher-grade professionals, administrators and managerial workers) and II (i.e. lower-grade professionals, administrators and managerial workers) characterised by a service relationship. These two classes present high levels of both specificity of human assets and difficulties in monitoring. The two remaining classes, that is, classes IIIa and V, are formed by occupations with mixed forms of employment relationship. Occupations in class IIIa (higher grade routine non-manual occupations) do not require any specific asset but have some difficulties in being monitored, whereas occupations within class V (lower technical and manual supervisory occupations) are easy to monitor but call for some human asset specificity (Breen, forthcoming: 13; Goldthorpe, 2000: 223).

The class variable has therefore been operationalised through the seven categories found in Goldthorpe's class schema to which I have added two additional categories: the unemployed and full-time homemakers. These two additional categories are not included as class categories following the classification criteria from the Goldthorpe class schema. These two additional categories are included on two grounds: to improve the operationalization of class for both women and the Spanish case. A significant percentage of women[29] do not form part of the remunerated system since they carry out domestic tasks full time. Therefore, by including this category we can analyse a significant proportion of the population- as much as 40% of Spanish women during the mid-1990s. The unemployed category has also been

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[29] Please see Chapter 4, section 4.3.2, for a description of the social structure of men and women in both Great Britain and Spain. The following table displays activity rates for women and men in Spain during the 1990s. It clearly reveals the low rates of female economic activity. Women who are not economically active are either in full-time education, homemakers, retired or disabled.

Active population in Spain during the nineties (% of total population)

Year	Men	Women	Year	Men	Women
1990	68.45	34.26	**1995**	65.06	37.66
1991	67.96	34.73	**1996**	65.1	38.22
1992	66.88	35.43	**1997**	65.1	38.89
1993	66.43	36.11	**1998**	65.09	39.23
1994	65.73	37.08	**1999**	65.5	39.92

Source: Instituto Nacional de Estadística (INE), 1990 to 1999. *Encuesta de Población Activa.* Madrid: INE. (htpp://www.ine.es).

added to capture more accurately the characteristics of the economic system; unemployment was one of the major economic problems in Spain during the 1990s, affecting women above all[30].

Table 3.2: The operationalization of social class
Class I: Higher-grade professionals, administrators and officials; managers in large industrial establishments; large proprietors.
Class II: Lower-grade professionals; administrators and officials; higher-grade technicians; managers in small business and industrial establishments; supervisors of non-manual employees.
Class IIIab: Higher-grade routine nonmanual employees
Class IVabc: Small proprietors and employers and self-employed workers
Class V: Lower-grade technicians and supervisors of manual workers
Class VI: Skilled manual workers
Class VIIab: Nonskilled manual workers and agricultural workers
Class VIII: Unemployed
Class IX: Full-time homemakers

Table 3.2 presents the operationalization of social class used in this research. This shows that social class is measured through the seven traditional classes from the Goldthorpe schema to which

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[30] The following table shows unemployment rates in Spain during the 1990s. It can be seen that they were especially high during the mid-1990s for all groups, and especially high among women throughout the period.

Unemployment in Spain during the nineties (% of total population)					
Year	**Men**	**Women**	**Year**	**Men**	**Women**
1990	11.84	24.46	**1995**	18.04	30.79
1991	12.1	24.06	**1996**	17.5	29.67
1992	14.18	25.77	**1997**	15.9	28.32
1993	18.7	29.4	**1998**	13.68	26.62
1994	19.61	31.62	**1999**	11.03	23.07

Source: Instituto Nacional de Estadística (INE), 1990 to 1999. *Encuesta de Población Activa.* Madrid: INE. (htpp://www.ine.es).

unemployed and full-time homemakers have been added. The variable class has been constructed using information on employment status and socio-economic group for each individual[31].

Education is another independent variable included in the investigation. An individual's level of education is partly a consequence of education opportunities as well as of the level of effort made during her childhood and youth. Education is one of the assets valued in the labour market. One distinct characteristic of education with respect to the occupation or the level of income is its stability across time. Education is measured in the Spanish surveys through a question that requires respondents to state their highest educational attainment. There are 5 possible answers ranging from no education at all to a high level of educational achievement. The British surveys measure education through a question on the highest educational qualifications with 30 possible answers[32]. Hence, the British variable is capable of measuring individuals' education much more precisely. However, the strategy I have followed to overcome this difference in the degree of precision in measuring education is to transform both variables into a similar variable. That is, to select an operationalization of education that allows for a comparison between educational achievements in both countries as if the categories of education were equal.

Education has been operationalised through the educational classification developed by Konig, Luttinger and Muller[33] (1988) as part of the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) project. I have selected this operationalization for two main reasons. Firstly, it has been proved

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[31] See the second section of Appendix A for a detailed description of the operationalization of the variable class.

[32] See the second section of Appendix A for a precise explanation of the process used to operationalise education.

[33] Other interesting references on the CASMIN project are: Braun and Muller (1997) and Muller, Luttinger, Konig and Karle (1989).

to be a very good indicator of educational attainment[34] as it is based on two criteria: "the differentiation of a hierarchy of educational levels according to investment expenditures and value on the labour market of the certificates achieved, and a further differentiation between "general" and "vocationally oriented" education" (Marshall *et al.*, 1997: 217). Secondly, the CASMIN classification was created for the purpose of creating a cross-national comparable measurement. The CASMIN researchers devoted substantial resources to examining educational systems of developed societies so that they were able to construct an educational schema for the measurement and cross-national study of educational attainment. Given the comparative character of this research, adopting the CASMIN operationalization of education would imply an obvious advantage. Hence, education is operationalised as a categorical variable with five possible values from lower educational levels to higher educational levels[35].

The last set of explanatory variables included in the theoretical framework is compounded by *individuals' lifestyles*. Hence, one of the mechanisms put forward in Chapter 2 to explain health inequalities among classes argued that individuals' habits partly accounted for the health gap. It was argued that both social class and education have effects on health through their influence on living habits. The first lifestyle that is analysed is *smoking behaviour*. Like the other research variables, this has been computed equally in both countries[36]. Smoking behaviour is

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[34] For an interesting discussion of the advantages of using the CASMIN classification in comparative research see Marshall, Swift and Roberts (1997).

[35] The exact categories of education are: inadequately completed general elementary education; general elementary education or vocational training; intermediate vocational or intermediate general; lower-level tertiary certificate; and higher education: upper tertiary certificate. Please see the second section of Appendix A for a description of the operationalization of education.

[36] The selection of the categories for both variables has been based on the numerous works that compare drinking or smoking behaviour across countries. The categories selected are similar to those included in part of the research conducted by the World Health Organisation. See for instance the following related references: WHO (2002); Rehn and Room (2001). See also the following

broken down into four possible categories: non-smokers, light smokers (1 to 10 cigarettes a day); moderate smokers (11 to 20 cigarettes a day); and heavy smokers (over 20 cigarettes a day). The second life habit that the research examines is *drinking behaviour*, which is measured through the frequency of having an alcoholic drink. It is also operationalised as a categorical variable with seven possible categories: non-drinker; very light drinker (once every couple of months); light drinker (once or twice a month); moderate drinker (once or twice a week); fairly heavy drinker (three or four times a week); heavy drinker (five or six times a week) and; very high drinker (almost every day).

The theoretical model also includes the *level of physical activity* that individuals engage in doing their principal activity. This variable has been operationalised through a question that measures the degree of physical activity an individual performs as a result of conducting the tasks associated with her principal activity. The question has a categorical nature with four possible answers: no activity; low activity; moderate activity; and vigorous activity.

The last indicator of individuals' life habits included in the research is the relation between an individual's weight and height measured through the Body Mass Index (BMI). The BMI is a reflection of lifestyles taken as a whole. Individuals with lifestyles that do not involve consuming resources that are potentially harmful to their well-being[37], tend to have a normal relation between weight and height, that is, a normal BMI. This variable has four possible categories: underweight; normal weight; overweight; and obese[38].

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references: Johnson and Richter (2002); Droomers, Schrijvers and Mackenbach (2002).

[37] That is, individuals who tend to practise physical exercise, have a balanced diet, drink with moderation, and, who do not smoke.

[38] The BMI equals a person's weight in kilograms divided by her height in meters squared. Thus, it is calculated in the following way: BMI = Kg/m^2. The resulting number is assigned to one of four categories as follows:

BMI	**Final category**
20 or less	Underweight

Table 3.3 summarises sections 3.1 and 3.2 as it shows all research variables as well as their operationalization. It presents the variables and the indicators selected for these variables. These are the indicators that will be employed in the empirical analysis of the thesis, that is, the analysis presented in Chapters 4, 5 and 6. In the following section, I will explain the statistical methods that have been selected to conduct the empirical analysis.

3.4. The statistical techniques

Section 2 has been devoted to explaining in detail the data sets that have been selected for the empirical analysis. Section 3 included a definition and operationalization of the research variables. In this section, I will discuss the two main statistical tools that have been used to analyse the association between class and health at the individual level and the possible explanatory mechanisms[39].

The selection of the quantitative tools has been based on the nature of the dependent variable. As argued in Section 3 above, health has been operationalised through three indicators: short-term objective health, long-term objective health and subjective health.

20 – 25	Normal
25 – 30	Overweight
30 or greater	Obese

[39] This is essentially the empirical analysis presented in Chapters 5 and 6 on Spain and Britain. The empirical analysis from Chapter 4 is mainly descriptive, in that it examines the state of health at the aggregate level of Spain and Britain in a European context. Chapter 4 does not, therefore, include statistical analysis with an explanatory objective except in the case of some multi-dimensional analyses that are presented and discussed in that chapter.

[See Table 3.3 at the end]

The two indicators of the objective dimension of health have a continuous nature. Short-term health is a factor that results from three continuous variables. Long-term health measures the number of chronic illnesses. Given the continuous nature of objective health and that all independent variables are measured at the same level of aggregation, that is, the individual level, the most adequate statistical technique to examine the association between health and class is a multivariate linear regression[40]. Multivariate regression makes it possible to examine the effect of more than one independent variable on the dependent variable. The dependent variable, that is, objective health both in the short and long term, is seen as a linear function of the independent variables, that is, class, education, life habits and subjective health. The general equation for a multiple regression is[41]:

$$Y_i = \beta_0 + \beta_1 x_{i1} + \ldots + \beta_k x_{ik} + \ldots + \beta_K x_{iK} + \varepsilon_i$$

where *Y* is the dependent variable**,** *x'*s are the independent variables, and ε is the error term. The subscript *i* is the observation number from *N* observations. βs are the coefficients, that is, the parameters that indicate the effect of the independent variables on the dependent variable. β_0 is the intercept, which is equal to the expected value of the dependent variable when all the dependent variables are equal to 0. The equation suggests that the independent variables (class, education, living habits and subjective health), that is, x_1, x_2,…, x_k, plus an error term explain the dependent variable (short-term objective health or long-term objective health). The error term is the difference between the predicted and the observed value of Y_i. The coefficients, that is, β_1, β_2 … β_k, measure the linear association that the independent variables have with the dependent variable. Hence, one unit change in x_1 has an effect on Y_i equal to β_1.

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[40] For excellent references on multivariate regression analysis see Lewis-Beck (1980) and Draper and Smith (1998).

[41] The notation for the regression equation is taken from Long, 1997:11-12.

The regression seeks to identify the linear combination of explanatory variables or predictors that correlate maximally with the outcome or dependent variable. It is therefore a very useful technique, since it makes it possible to examine the association between the explanatory variables and the dependent variable. Hence, the results from the regression analysis will allow us to study the relation that exists between an individuals' objective health status and her level of education, living habits and subjective health. The study of the class coefficients, as will be explained in Chapter 5, will also allow us to understand the relation between class and the remaining independent variables.

Individuals' subjective health has been operationalised through a question that asks for self-perceptions of health status. This question has five possible answers that rank from very poor health to excellent health. These five categories can be ranked from low to high although the distance between the categories is unknown. Hence, the variable is ordinal in nature[42] (i.e. five possible values that are ordered in a determined direction). The appropriate statistical technique for studying the association between the explanatory variables and subjective health is therefore an ordered probit regression, as this takes into account the nature of the dependent variable[43]. The use of a linear regression model would not be appropriate as it assumes that the distances between adjacent categories are equal. For example, the

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[42] In Appendices D and E I have run the statistical models recoding subjective health into a binary variable (see footnote 6 in Chapter 5 for a detailed explanation of these models as well as for a discussion of the rationale behind the use of logit models). As explained in these appendices subjective health has two values for these models: "not good health" and "good health". The value "not good health" is the result of adding together the original values "very poor health", "poor health" and "fair health". The value "good health" has been computed adding "good health" and "very good health". For a description and discussion of logit models, please see the following references: Menard (2002); Kleinbaum (1994); Harrell (2001); Jaccard (2001); Borooah (2002); and Cox and Snell (1989).

[43] For an excellent description and interpretation of ordered probit models see Long (1997). See also the following references: Eye (1998); Finney (1971); Aldrich (1984); and Liao (1994).

distance between very poor health and poor health would be assumed to be equal to the distance between poor health and fair health. This could lead to misleading results[44].

The ordered probit model is derived from "a measurement model in which a latent variable *Y** ranging from $-\infty$ to ∞ is mapped to an observed variable *Y*" (Long, 1997: 116). The variable Y provides incomplete information about the underlying variable Y*. The equation that measures Y is defined as follows[45]:

$$Y_i = m \text{ if } \mu_{\text{m-1}} \leq Y_{\text{i}}^* < \mu_{\text{m}} \text{ for m} = 1 \text{ to J}$$

The μ's are the thresholds or cutpoints. The lower bound and the upper bound, 1 and J respectively, are defined by open-ended intervals with the limits $\mu_0 = -\infty$ and $\mu_J = \infty$. We can give an example of the measurement equation. Take the variable measuring subjective health status. As presented above, individuals are asked how they perceive their health and are provided with five possible answers: very poor (VP), poor (P), fair (F), good (G) and very good (VG). The ordinal regression model assumes that this ordinal variable is related to a latent variable, Y*, which has a continuous nature. The latent variable measures the subjective health condition of an individual. The relationship between the two variables, the observed and the latent, Y and Y*, is measured through the following model:

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[44] For a detailed and rigorous discussion of problems posed by estimating an ordinal variable as if it were a continuous variable please see Long (1997: 117-119).

[45] The notation to define the measurement equation for ordinal models has been taken from Long (1997: 116-119).

$$Y_i = \begin{cases} 1 \Rightarrow VP \text{ if } \mu_0 = -\infty \le Y_i^* < \mu_1 \\ 2 \Rightarrow P \text{ if } \mu_1 \le Y_i^* < \mu_2 \\ 3 \Rightarrow F \text{ if } \mu_2 \le Y_i^* < \mu_3 \\ 4 \Rightarrow G \text{ if } \mu_3 \le Y_i^* < \mu_4 \\ 5 \Rightarrow VG \text{ if } \mu_4 \le Y_i^* < \mu_5 = \infty \end{cases}$$

The regression model estimates, therefore, the latent variable and assigns probabilities to the estimated values of being in each category of the latent variable. The regression model for a single independent variable is as follows:

$$Y_i^* = \alpha + \beta x_i + \varepsilon_i$$

where Y_i^* is the latent variable, α is the intercept, β is the coefficient between the independent variable x_i and the dependent variable Y_i^* and ε_i is the error term.

3.5. Conclusion

In this chapter I have presented the necessary tools for the thesis to provide an answer to the research questions. The chapter has presented the data, the research variables and the statistical techniques to be employed in Chapters 4, 5 and 6 to examine the theoretical mechanisms that relate the social structure of a society and its health.

We have seen that Chapter 4 will be based on data collected at the country level. The analysis presented in this chapter will mainly consist of descriptive statistics as its main objective is to describe the state of health in Spain and the United Kingdom. The empirical evidence from Chapters 5 and 6 will be based on the analysis of cross-sectional health surveys. Section 2.2 has discussed the advantages and the limitations of using cross-sectional data. We have seen that there are two main advantages: the operationalization of health such that it adequately captures its theoretical definition; and the possibility of analysing two countries: the UK and Spain. The main disadvantage of this type of data is the impossibility of testing for causality as temporal change cannot be included in the analysis.

Section 3 has presented a discussion of the research variables as well as an argument for the selected operationalization for each variable. The dependent variable has been theoretically defined and operationalised through three indicators. The analysis of the three indicators will make it possible to study health as a multidimensional concept that combines an individual's physical, mental and social well-being. Social class has been defined theoretically and operationalised through the Goldthorpe class schema. The operationalization of class through the Goldthorpe schema has been the result of a critical review of possible class indicators that take account of the relevance of the social structure for the research question. The Goldthorpe class schema allows us to understand classes relationally, a theoretically relevant element for this thesis.

The last section of the chapter has discussed the statistical techniques used to conduct the empirical analysis. The selection of these tools has been based on the nature of the dependent variable. Thus, the objective health dimension will be studied through multivariate linear regressions as it is measured through continuous indicators. The subjective dimension, on the other hand, will be studied through ordered probit regression models as it is an ordinal variable.

Chapter 3 concludes the first part of the thesis. To briefly recapitulate the aims of this part, Chapters 1, 2 and 3 have set out the three main dimensions of the research. First, Chapter 1 was devoted to presenting and discussing the research questions and their theoretical relevance. Second, Chapter 2 offers a discussion of the theoretical framework that tries to provide theoretically grounded answers for the research questions, answers that can be tested empirically. Third, the selection of the tools required to examine the theoretical framework, that is, to test the relevance of the explanatory mechanisms, was explained in Chapter 3. The first part of the thesis provides all the necessary information to develop the second part of the research, that is, the empirical analysis. Hence, Chapters 4, 5 and 6 will study in detail whether there are health inequalities among social classes and the possible mechanisms explaining the health gap.

Table 3.1: Sources of data					
1) First stage of the analysis: health status at the aggregate level (Chapter 4)					
OECD, 2002. *OECD Health Data 2002. A comparative analysis of 30 countries.* OCDE: Paris					
2) Second stage of the analysis: health status at the individual level (Chapters 5 and 6)					
Spain			**UK**		
Survey Name	**Date**	**Number of cases**	**Survey Name**	**Date**	**Number of cases**
CIS 2047 Encuesta Nacional de Salud 1993	February 1993	21 061	Health Survey for England 1993	Jan-Dec 1993	17 687
CIS 2153 Encuesta Nacional de Salud 1995	March-Dec 1995	8387	Health Survey for England 1995	Jan-Dec 1995	16 055

Table 3.3: Summary of the research variables

1) First stage of the analysis: health at the aggregate level (chapter 4)		**2) Second stage of the analysis: health status at the individual level (chapters 5 and 6)**	
Variables	**Indicators**	**Variables**	**Indicators**
Dependent variable:		**Dependent variable:**	
Health status	1. Life expectancy at birth	Health status	1. Objective health dimension:
	2. Life expectancy at age 65		A) Short-term dimension of health: Limitation of everyday activities
	3. Infant mortality		B) Long-term dimension of health: Number of chronic diseases
	4. Perinatal mortality		2. Subjective health dimension:
	5. Maternal mortality		Self-perception of health status
		Independent variables:	
		1. Control variables:	
		Age	Variable with 4 categories: 25-34 years old; 35-44 years old; 45-54 years old and; 55-65 years old
		Civil status	Variable with 4 categories: single; married or cohabiting; separated or divorced; and widowed
		2. Explanatory variables:	
		Social class	Goldthorpe Class Schema
		Education	CASMIN operationalisation of education
		Life styles:	
		A) Smoking behaviour	Variable with 4 categories: non-smoker; light smoker; moderate smoker; and heavy smoker
		B) Drinking behaviour	Variable with 7 categories: non-drinker; very low; low; moderate; fairly high; high; and very high
		C) Physical exercise during principal activity	Variable with 4 categories: no activity; low activity; moderate activity; and vigorous activity
		D) Body Mass Index	Variable with 4 categories: underweight; normal; overweight; and obese

CHAPTER 4: THE STATE OF HEALTH OF GREAT BRITAIN AND SPAIN IN A EUROPEAN CONTEXT

4.1. Introduction

The main purpose of this chapter is to present an accurate description of how the state of health of Great Britain and Spain was in the mid-1990s. In order to answer the two main research questions of the thesis (i.e. to see whether social class and health are related and to identify the mechanisms that relate an individual's class and her health status) we first need to define the health situation of the British and Spanish populations. It is also necessary to locate these two countries in the European context in terms of, for instance, health inputs and outcomes.

The chapter consists of two parts. The first describes the general state of health of the inhabitants of the geographical and political entities of Great Britain and Spain. The chapter also provides an analysis of the general state of health of the European population, primarily in order to put the Spanish and British cases into perspective. This section includes an analysis of the key characteristics of European health care systems, as well as a description of their main health outcomes. The analysis in this section is based on aggregate data. The second part of the chapter focuses on a description of the general state of health of the two countries examined in the thesis, Spain and Great Britain. The analysis is mainly based on individual-level data from the health surveys that will also be used for the empirical analysis in Chapters 5 and 6. This will allow the subjective and objective dimensions of health to be examined at the individual level for both countries.

The chapter is structured as follows. In section 4.2, I present the analysis I have conducted in order to fulfil the first aim of the chapter, that is, to present a general picture of the functioning of European health care systems above all in terms of health care inputs and outputs. The third section of the chapter will analyse the health outcomes of Spain and Britain at the individual level.

As the thesis seeks to understand the link between a society's social structure and its health status, it is also necessary to analyse the characteristic features of the social structure of Spain and the United Kingdom, emphasising the relationship between this and the research variables. This is done in Appendix C, which provides an overview of the explanatory variables of the theoretical framework of the thesis. Hence, here I include a description of the social structure of both societies based on information on the distribution among social classes of the control and explanatory variables, notably age, civil status, education and health-related behaviour.

4.2. The aggregate state of health of Great Britain and Spain in the European context

The main objective of this section is to examine the state of health of Spain and the United Kingdom at the aggregate level over the course of the 1990s. This analysis is essentially comparative in focus, thereby serving to locate the Spanish and British cases in the European context. To this end, the section is structured as follows. First, I describe the general functioning and structure of European health care systems. This sub-section will examine the origin and organisation of European systems through an analysis of the main inputs of health care systems. Secondly, I examine the main health outcomes of Britain and Spain, comparing them to those of the rest of Europe.

The analysis here draws on OECD Health Data[1]. As I described in Chapter 3, this dataset includes information about key aspects of OECD member states' health care systems for the period since the 1960s. The data used in this section measures the main health care inputs and outcomes at the aggregate level.

4.2.1. The general characteristics of health care systems

4.2.1.1. The origin and general evolution of European health care systems: A process of reform and constant change

4.2.1.1.1. The origin of European health care systems

The origins of European health care systems lie in the immediate post-Second World War years. Health care systems were created as part of the early welfare state initiatives promoting public provision in areas such as social security, education, health and housing. The pioneer system, which subsequently served as a point of reference and departure for the other European countries was the British National Health Service (NHS), which came into existence in 1948 in accordance with the *NHS Act* of 1946[2]. This piece of legislation played a crucial role in establishing the

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[1] OECD, 2002. *OECD Health Data 2002. A comparative analysis of 30 countries*. Paris: OCDE.

[2] The establishment of the NHS, however, was not free from controversy. It did not prove easy to achieve the political consensus required to create a health care system aimed at providing universal coverage, equality of access and equality of treatment. The medical profession, for instance, initially opposed some of the proposed features of the NHS, concerned by their potential loss of professional autonomy as a result of increasing local government control of health provision. The Minister of Health, Aneurin Bevan, finally won the support of the medical profession by making a number of key concessions designed to ensure their autonomy. For a detailed discussion of the initial obstacles that the NHS had to encounter, see Robinson *et al*., 1999.

principal guidelines for health care systems in the post-war era. The chief characteristics of the NHS were its almost universal coverage, the predominance of funding raised through taxation, and the primarily public provision of health care. These key principles have guided most European health care systems since the 1950s. Hence, the state gradually became the principle actor responsible for providing a comprehensive health service that had to be available to the population free at the point of use, which effectively promoted equality of access.

The European health care systems created and developed over the course of the second half of the twentieth century have largely followed the defining principles set by the NHS. It is far from easy to outline the very complex evolution of health care systems; however, in almost all cases the organisational strategies implemented in the different European countries have pursued three main objectives (OECD, 1994:14). The first one has been to provide all citizens with adequate and equal access to a minimum set of health care services covering their principal health needs. The second objective has been to try to achieve macroeconomic efficiency, that is, to ensure that the costs of health care should not draw too heavily on national resources. Finally, the third aim of national health care systems has been to pursue microeconomic efficiency, that is, for the combination of services to promote certain health outcomes and consumer satisfaction at a minimum cost.

These three objectives, therefore, have shaped the foundation and functioning of European health care systems in the post-war period. It is difficult to describe a common pattern of evolution for health care systems in different countries because they have been marked by incessant changes and reforms, driven by the changing health needs of the population as well as evolving economic and political constraints. In what follows I present a general overview of the main reforms in health care systems since the 1980s, relating these to the changing socio-political context.

4.2.1.1.2. The process of change of European health care systems

Health care reforms have figured prominently on the political agenda since the early 1980s. The economic crisis in the 1970s and the shift in the dominant economic paradigm away from Keynesianism to neoliberalism led to a fundamental reassessment of the design of social and economic activities that the state had carried out in the past. Health reforms constitute just one example of the difficulties that accompany any process aimed at improving the organisation, structure, management and outcome of the traditional components of the welfare state.

As noted above, one common factor has characterised health care systems across Europe in recent decades: they have all experienced significant change. Reforms have been motivated by a combination of demographic, technological and financial pressures that made necessary a rethinking of the systems to increase their efficiency, effectiveness and consumer satisfaction. The reforms introduced have impacted various aspects of the process and content of systems, including their management, the amount and type of health care resources, the type of funding, and the overall expenditure on health care. Different reforms have had diverse goals; while, for example, some reforms were intended to increase the efficiency of the system, the principal goal of others was cost containment[3]. Any understanding of how health care systems functioned during the 1990s, therefore, must be based on an overall vision of the main reforms implemented since the 1980s. In most OECD countries, these include changes in the following key dimensions of health care systems.

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[3] For a complete account of the reforms implemented in OECD countries please see Saltman and Otter, 1994; Saltman and Figueras, 1997; Saltman, Figueras and Sakellarides, 1998; Figueras, Saltman and Mossialos, 1999; Saltman, Figueras and Sakellarides, 1998.

1. Mandatory health insurance

During the 1980s and the 1990s a number of countries have introduced universal or near universal mandatory health insurance. Australia, Greece, Italy, Portugal and Spain did so in the 1980s, Ireland and Switzerland in the 1990s (Wynand and van de Ven, 1996). In most cases, the new system replaced a scheme in which health care coverage was not equally available to all in so far as it was mainly purchased privately. Different funding arrangements have been established in different countries. Some countries have introduced a tax-funded system (Spain, Ireland, Greece, Italy, Australia and Portugal), while others have opted for a statutory insurance-based system (Switzerland). No country has reduced the number of persons covered by mandatory health insurance. Opt-outs from the public system to the private system have also been limited. They have only been approved in certain circumstances in the Netherlands and Germany.

2. Elements of managed competition and internal markets[4]

During the 1950s and 1960s health care systems were mainly framed in interventionist models of management. The 1970s and 1980s constituted a period of transition, characterised by the introduction of some of principles of neoliberal thinking, and above all market mechanisms. Many scholars consider that the 1990s represented the synthesis of these two models, as a number of countries introduced internal markets into healthcare systems in a bid to achieve the objectives of efficiency –in both a macro- and microeconomic sense- and effectiveness. The specific measures and instruments used to permit the operation of internal markets and managed competition range from the introduction of public

[4] An extensive body of research has examined the effects of managed competition on efficiency. For an excellent overview of the issues see Clancy *et al.,* 1993; Light, 1995, 1997, Sullivan, 2003; Perkins, 1999; Curtis *et al.*, 1999; Jackson, 1994; and Maynard, 1995.

contracts, encouraging competition among private and public providers, as well as among third-party purchasers, to promoting consumer choice of provider.

- Public contract model

This type of reform implies the separation of two of the basic actors in health care systems: the purchasers and the providers of care. In some cases the public authorities can purchase the provision of health care from either public or private providers, in other cases only from public providers. In both cases the public authorities assume the roles of buyers and founders of health care, while physicians and hospitals operating either on a public or and private basis compete to provide health care. As a result, these type of reforms lead to the introduction of a system of contracts between purchasers and providers. Finland, Sweden, United Kingdom and New Zealand, all countries with National Health Services, have introduced different versions of the public contract model[5].

- Competition among providers

Countries like Germany, the Netherlands, New Zealand, Sweden and the United Kingdom have followed Enthoven's principle of encouraging competition among providers of health care as a way of improving the efficiency of the system (Enthoven, 1985; 1988). This has meant that pro-competition

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[5] The degree of application of internal market principles has varied widely. In this sense, the notion of internal markets may or may not include privatisation. For instance, on the one hand, in the United Kingdom, private competition was allowed within hospitals and among physicians, and hospitals were encouraged to become trusts. On the other hand, in Sweden, competition was established only among hospitals and the process was regulated and implemented in a series of planned phases. In short, in the United Kingdom private participation in the production and supply of health care services was allowed, while in Sweden (and Finland) both functions remained public in character.

policies began to compete on the political agenda with command-and-control policies (OECD, 1994). In this new framework, so called third-party purchasers (e.g. regional health authorities or insurers) negotiate the price and quantity of goods and services with providers in accordance with the principles of supply and demand. Such negotiations end with the formulation of binding agreements between purchasers and providers. One negative consequence of free competition among providers might be the failure of some public units –hospitals or physicians- to follow the rules of competition and their consequent exit from the market.

- Competition among third-party purchasers

This has been one of the most divisive issues in the introduction of competition within the health care system. The main source of controversy is the possibility that some public health authorities may start out from a disadvantageous position if they have fewer resources. The issue is also controversial due to the fact that health care production units may concentrate geographically in socio-economically more developed areas, in which they could hope to obtain more substantial contracts from third-party purchasers. A tendency of this type could lead to much greater inequality of access to health care. Belgium, Germany, Switzerland and the Netherlands have introduced competitive markets for third-party purchasing. In Sweden and the United Kingdom, regional authorities –District Health Authorities (DHAs) and county councils respectively- have acquired the regional monopoly of the third-party purchaser. In Italy, Portugal and New Zealand, competition among third-party purchaser was proposed but ultimately rejected.

3. Consumer choice of providers

This type of reforms have given individuals a greater say in logistical (i.e. the choice of doctor and hospital) and clinical (i.e.

participation in medical decision-making) issues. This trend can be seen in Denmark, Finland, Germany, the Netherlands, Spain, Sweden and the United Kingdom. Sweden has also introduced the participation of individuals in local policy making. This innovation could lead to competition among providers in response to consumers' capacity to choose. This pattern can be seen as an attempt to make service provision more sensitive to patients' preferences.

4. Re-evaluation of the role of primary care

Primary care has been promoted in Finland, Germany, Greece, Italy, the Netherlands, Norway, Sweden, the United Kingdom, Spain and the United States. In this way general practitioners (GPs) have been required to serve as gatekeepers for access to specialist care, hospital care and prescription of drugs, in the hope that waiting lists can be controlled in this way. Different countries have introduced a range of different mechanisms to promote primary care. The United Kingdom, for instance, made it possible for GPs to be responsible not just for the provision but also for the management and purchase of care. GP-fundholders operated as independent units which received and managed a budget from the relevant DHA for the provision of the necessary health care to patients purchasing the services of specialists or hospitals[6]. In Germany and Finland, primary health care centres receive a budget to buy specialist care for the population. Switzerland and

[6] In the United Kingdom, the Blair government abolished GP-fundholding as well as competition between hospitals in 2000. The objective of the 2000 NHS Plan, the key plan of Blair's health reforms, was to modernise the system and focus on the needs of patients. The Plan adheres to the main core principles of the NHS (i.e. free access to service based on health care need and state funding) while at the same time introducing some market-oriented strategies (e.g. the use of private providers) and some measures of decentralisation of management (e.g. devolution of management and budgetary control from Whitehall to local NHS organisations).

Sweden have also experimented with different forms of fundholding primary care centers (OECD, 1994).

5. The role of hospitals

Reforms related to the structure and organisation of hospitals have been motivated by serious concerns about costs containment. Some countries, essentially those with tax-based systems, have introduced prospective budgeting, i.e. to pay for hospital services. Other countries finance hospitals through serviced-based systems. A trend towards a case-related payment system similar to that employed by Health Maintenance Organisations can also be seen in some countries. France and Ireland, for example, have established a mixed-payment system (e.g. a case-mix and quality approach that gives priority to cost control and efficiency. Measures to reduce waiting lists have also been established in many health care systems. Alternatives to hospital care (e.g. one-day surgery, nursing homes, day hospital care, home helps, etc) have been implemented (above all in Australia, Denmark, Sweden, Japan and Canada) as a means of using resources more efficiently and effectively.

6. Choices in health care

Many countries have imposed some kind of restrictions on the provision of health care. Restrictions have taken the form of excluding some goods or services from the public financial system and in rationing the use of medical technologies. Choices in health care have taken the form of, on the one hand, the reduction of the number of goods and services covered (e.g. the Oregon experiment) by mandatory health insurance and, on the other hand, the use of protocols and guidelines. One instance of the specific reduction of public coverage has been the elaboration of positive and negative lists of medicines. Other measures adopted in relation to medicines have been the imposition of mandatory prices and reference price systems. If we are to consider the possible impact in terms of equality of this type of measure it is necessary to analyse the services, treatments and drugs not covered by mandatory health insurance, and above all the existence or otherwise of different levels of health care coverage in terms of individuals' level of income.

7. Decentralization process

A number of OECD countries, including Spain and the United Kingdom, have seen a shift towards the decentralization of administrative tasks and sometimes of the policy decision-making process (i.e. devolution) in recent years. Decentralization has not only occurred within the public sector but also spread from the public sector to the private sector (e.g. the formation of trusts and soon of hospital foundations in the United Kingdom, and the creation of hospital foundations in Spain). According to Saltman and Figueras (1998), the trend towards decentralization has been a response to poor efficiency, slow innovation and lack of responsiveness to patients' preferences. The full consequences of this process for health outcomes are still unclear. Some authors (Saltman and Figueras, 1998) consider that there may be negative consequences in terms of individual equality of health outcomes, due to the decentralization of certain dimensions such as strategic decisions on the allocation of health resources, the regulation of public safety and monitoring, evaluating and analysing different populations' health and the quality of services.

4.2.1.1.3. The British and Spanish health care systems in the European context

The combinations of all these reforms, together with other measures implemented in individual countries, have resulted in a variety of health care systems across the European Union. The OECD (1992, 1994, 2002) has classified health care systems in accordance with their main *source of finance* and the predominance of *public or private providers*. These are two main indicators that have been widely used to classify health care systems as they supply information about two basic characteristics of any health care system: *the origin of funding* and *the ownership of provision*.

In terms of these two indicators, EU health care systems in the 1990s can be classified as follows. The first group, comprising the Scandinavian countries (i.e. Finland, Sweden and Denmark), most of the Southern European countries (i.e. Spain, Portugal and Greece) and Ireland and the United Kingdom, is characterised by the predominance of tax-based funding and public providers. A second group of countries is formed by the core European members of the OECD (i.e. Belgium, France, Germany, Austria and Luxembourg) characterised by being financed mainly by social insurance with mixed public and private providers. The remaining two members of the EU (Italy and the Netherlands) finance their health systems through a mixture of social and private insurance and differ in the type of provision, which is mainly through public providers in the case of Italy and private providers in the case of the Netherlands.

Hence, although most of the European health care systems are funded through taxation and are characterised by the public provision of services, the divergence that exist with respect to these indicators reveals the difficulties encountered when trying to create a typology of health care systems. According to this classification, the United Kingdom and Spain are broadly similar in terms of the operation and structure of their health care systems.

The OECD has constructed a more precise typology of health care systems, devised in the light of the models suggested by Evans (1981). This typology is based on the type of *finance*, *payment* and *regulation* of each health care system[7]. An

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[7] For a detailed description of this typology see OECD, 1992 and 1994.

examination of these three variables may help us understand the various national systems, their functioning and structure. The OECD's models analyse the interaction of different actors[8] in health care systems, defining in this way sub-systems of finance, payment and regulation. Again, an understanding of the characteristics and prevalence of these sub-systems should contribute to our understanding of different health care systems[9]. According to this typology, during the mid-1990s, the dominant model in the United Kingdom was the *public contract model* for primary care and the *public integrated model* for hospital services. In the case of Spain, the dominant model for both primary and hospital care was the *public integrated model*[10].

Unfortunately, in the case of the other European countries, it is not easy to provide a general overview of the predominant system

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[8] According to the models proposed by Evans (1981) there are five principal sets of actors in health care systems: the consumers/patients, first level providers (i.e. general practitioners), second level providers (i.e. hospitals), insurers, and the government, as this regulates the system. A number of OECD studies identify the principal interactions between the five actors as: the provision of services; payment for services; referrals from first to second providers and; payment for insurance claims. The models that result from these interactions are a simplification of reality which is nonetheless useful when identifying key characteristics of health care systems as well as permitting comparative studies (OCDE, 1992:19).

[9] Different studies produced by the OECD (see for example OECD 1992, 1994, 1995, 1996) analyse these sub-systems in a bid to define some hypotheses about the strengths and weaknesses of health care systems in terms of their ability to achieve their main objectives. An examination of these sub-systems is therefore useful when analysing the consequences and results of reforms and plans in relation to the main objectives of health care systems.

[10] Evans (1981) identifies two principal sources of finance: voluntary and compulsory or public. He identifies four major methods to pay providers: out-of-pocket by consumers without insurance; out-of-pocket by consumers who are reimbursed by the insurer; indirectly by third parties through contracts; and indirectly by third parties through salaries and budgets within an integrated organisation. There are eight combinations of finance and payment as a result: "the compulsory, out of pocket model; the voluntary, out of pocket model; the voluntary reimbursement of patients model; the public reimbursement model; the voluntary contract model; the public contract model; the voluntary integrated model and; the public integrated model" (OECD, 1992:19).

in each health care system since many of the countries have mixed systems in which the model varies for the sub-system under analysis[11].

In the *public contract model* general taxation is the principal source of funding. Other general features are that the insurers are public (central or local government) and they have contractual relations with the providers of health care who are normally public bodies. Funding bodies are, therefore, separated from providers. Other characteristics of the model are the preservation of freedom of choice of provider for patients; it does not allow freedom of choice of insurer; administration costs tend to be low; payment to providers is normally made through capitation or fee for service; the goal of universal coverage and to achieve the required level of equity in the access to the system. In relation to the efficiency of the system, the model allows "considerable potential for achieving micro-economic efficiency by a combination of consumer-led competition over quality, and the development of suitable incentives and regulations in the contracts between the insurers and the providers (OECD, 1993: 24)". The macro-economic efficiency of the system is the responsibility of the government.

The characteristics of the *public integrated model* are very similar to those of the public contract model. The only significant differences that exist between the two systems are the following. Firstly, in relation to the association between the funding bodies and the providers of care, there is no separation between them, that is, the state is in this case both the principal insurer and the major provider. Secondly, given the integrated nature of the model it is relatively easy for the government to control total health expenditure and administration costs may, therefore, be lower than

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[11] In this respect, the Netherlands would have had a private reimbursement model; Belgium and France were mainly dominated by the public reimbursement model; Germany relied on the public contract model; Sweden and Finland on the public integrated model; Ireland, Portugal, Italy, Greece and Denmark were a combination of the public integrated and the public contract models. For a detailed analysis of the mixture of the eight sub-systems of financing and delivery of health care found in European countries during the first half of the 1990s, see OECD, 1992: 19-55 and OECD, 1994: 11-14.

in the public contract model. Thirdly, in relation to the type of payment to providers, in the public integrated model this is made through salaries and budgets as opposed to capitation or fee for service[12].

Hence, the functioning and organisation of the health care system in Spain and the United Kingdom during the first half of the 1990s was, according to the two typologies discussed above, largely similar[13]. Both countries provided universal coverage funded through general taxation and provision of services was predominantly public. The public integrated model predominated in the provision of both primary and hospital care in Spain, and in the provision of hospital care in the United Kingdom. The principal difference between both countries was that the type of model that dominated the organisation of primary care in the United Kingdom was the public contract model.

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[12] There is no clear consensus with respect to the differences between the public contract model and the public integrated model in the incentives they provide to achieve micro-economic efficiency. From an economic perspective (see for example Enthoven, 1985) the public integrated model would provide fewer incentives to achieve micro-economic efficiency as money does not follow the patient since providers are paid through salaries or global budgets. Providers do not have incentives to minimise costs, and waiting lists for health care treatments tend to be larger. However, reforms aimed at establishing incentives for providers to be more cost effective have not proved to have a significant effect in the long-term (Vaillancourt Rosenau, 1994).

[13] It should be noted that the analysis presented here refers to the functioning of the health care systems in the first half of the 1990s, the period under consideration in this thesis. Both the British and the Spanish health care systems have been the object of later reforms that have had an impact on the structure and organisation of health care. For an excellent overview of these reforms and of the current functioning of the systems see: Rico, A. *et al*., 2001; Dixon, A. *et al*., 2001; European Observatory on Health Care Systems, 2002.

4.2.1.2. Evolution of the main health care inputs for the European health care systems

The adequate functioning of a health care system largely depends on the type and quality of its inputs**.** The purpose of this sub-section is to review how the main health care inputs have evolved during the 1980s and 1990s. I will trace the evolution of different indicators that capture the two main parts of the system: its resources and the use made of them. Hence, the indicators analysed will provide us with an adequate understanding of how the systems have been developing in terms of both their operational capacity and, symmetrically with this, the level of use individuals have made of them. I will start by analysing the evolution of indicators that measure the systems' resources, that is, the main health care inputs as well as expenditure on health. Then, I will discuss some figures that summarise the use of health care systems.

4.2.1.2.1. The evolution of the main health care inputs: The resources of the system

The first indicator I am going to discuss is related to *the human capital* of health care systems, which consists of the personnel working on health care (e.g. doctors or physicians, nurses, administrative staff, etc.) The importance of employment in health services per capita may have a significant impact on the cost, utilisation and outcome of health services. Figures[14] 4.2.1.1 to 4.2.1.6 show the evolution of European countries in terms of

[14] Figures and tables are numbered in line with the number of the section in which can be found. Hence, they take the number of the section with up to three digits and the fourth digit would be the number of the figure or table itself. The crucial digit is he fourth one as, for instance, the figures in Section 4.2.1 are numbered 4.2.1.1, 4.2.1.2 and 4.2.1.3, etc).

total human capital[15] employed in health over the last two decades. Total health employment is measured by the number of people employed in the health care sector per 1,000 inhabitants. We can see that the general pattern has been one of an increase in the number of people employed by the health care system. All countries except Sweden have registered an increase in health personnel. The case of Finland is remarkable, since not only did it begin with the second highest density of health personnel per 1,000 inhabitants but it also showed a particularly large increase, the figure practically doubling in this period. The case of Sweden is also notable since in the early 1980s it had a density that was 2.5 times higher than the European average. As a result, although the number of people working in Swedish health care system in the 1980s and 1990s fell significantly, in 1999 it remained well above the EU average (35.2 as opposed to 24.9). The dramatic fall in employment in Sweden was the result of a series of health care reforms intended to adjust the capacity of the system to the health needs of the population.

With the exception of Finland and Sweden, the European countries also saw a moderate but steady increase in health employment in this same period. The European average density per 1,000 inhabitants rises from 19.6 to 27.5, which means a 40% increase. Sweden, Finland, France and the United Kingdom head the ranking throughout the period, whereas the Southern European countries (Portugal, Spain and Greece) show the lowest number of people employed in the health care system.

Figure 4.2.1.2 offers a static picture of the distribution of health employment in Europe in the mid-1990s. It can be seen that

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[15] Total health employment is defined by the OECD in the following way: number of full-time (i.e. 35 hour per week or more) equivalent persons employed (including self-employed) in health services, including ‘contracted out’ staff and excluding pharmaceutical and medical equipment manufacturing employees. Administrative staff, private for-profit and non-profit medical benefit insurers is included. Health professionals working outside the health services are excluded (e.g. physicians employed in industry). See Appendix B for a full description of the occupations included here based on the International Standard Industrial Classification.

Sweden, Finland and France, followed by the United Kingdom and Germany show figures well above the European average. They are followed by an intermediate group of countries formed by the Netherlands, Denmark and Belgium with a health employment density close to the European mean. Finally, Southern European countries together with Ireland and Luxembourg, present the lowest health employment rates.

Hence, the picture in the mid-1990s was similar to that found throughout the whole period under analysis. Total health employment in each country changes, therefore, in such a way that the gaps among countries remain more or less constant. The only significant exceptions are the major fall seen in Sweden, even if this in fact takes this country closer to the rest of Europe, and the sharp increase in Finland, which accentuates its divergence from the European pattern.

Figure 4.2.1.3 offers a more detailed picture of the evolution of health employment in Spain and the United Kingdom compared to the EU average. Health employment rates remained relatively constant in the 1980s but increased steadily in the 1990s. Spain registered a small increase during the 1980s and, like the United Kingdom, a steady rise during the 1990s. While both countries behaved similarly to the overall EU pattern during the 1980s, the 1990s saw divergence between them and their EU partners: the average for the EU declined for most of the decade whereas Spain and the United Kingdom showed a continuous albeit minor increase.

(See Figure 4.2.1.1. in separate file)

(See Figure 4.2.1.2. in separate file)

(See Figure 4.2.1.3. in separate file)

As noted above, total health employment includes all personnel working in the health care system. It is also interesting to examine this figure at a more disaggregated level. Specifically, it is especially illuminating to trace the trends in the *employment of physicians*[16] themselves, as they are the principal human resource of health care systems. Figure 4.2.1.4 shows this trend for all EU countries as well as the EU average. It can be seen that, as expected, the number of physicians rises throughout the period, especially during the 1990s. As the change of the variance shows (see Table B.1.1 in Appendix B) the gap among countries increases during this period. The variance in the density of physicians per 1,000 inhabitants among the EU increased from 0.15 in 1980 to 0.91 in 2000.

Hence, the variance in the number of physicians in each country increases in parallel to the rise in the absolute number of physicians. Most countries experienced a larger increase in the number of practising physicians during the 1990s than during the 1980s. It should be noted that the countries that display the highest number of practising physicians, are not those with highest rates of total employment on health. Thus, Italy, Greece and Belgium are well above the European average in terms of the number of medical doctors or physicians. On the other hand, the United Kingdom and Ireland for the whole period and Austria, Luxembourg and Ireland during the 1980s, present the lowest figures for this indicator.

[16] The definition of practising physicians used by the OECD is the following: the number of doctors, general practitioners and specialists (including the self-employed) actively practicing medicine in public and private institutions. The data excludes dentists, stomatologists, qualified doctors working abroad, in the administration, or in research and industry positions. Data includes foreign doctors licensed to practice and actively practicing medicine in the country. See Appendix B for a full definition of this indicator.

(See Figure 4.2.1.4. in separate file)

As a background to Chapters 5 and 6, it is interesting to examine the distribution of this health input in the mid-1990s. Figure 4.2.1.5 show this indicator. In terms of the period as a whole, Italy is notable for its high number of practising physicians, which is well above the European average (5.7 vs. 3.08). Two other countries also worth commenting on are Great Britain and Ireland, since they show a very low figure for this indicator. The other countries are either slightly below the EU average (Austria, Finland, Luxembourg, the Netherlands, Portugal, Spain, and Sweden) or somewhat above it (Belgium, Denmark, France, Germany and, Greece).

With respect to Great Britain and Spain (see Figure 4.2.1.6 below), both countries show a constant and slight increase in the number of practising physicians. The rise during the period (40% for Great Britain and 73% for Spain) is constant and there are no significant peaks or turning years. Contrary to the total employment in health, the number of practising physicians is greater in Spain than in Great Britain for the entire period. Spain and Britain both rank below the European average throughout this period.

Another indicator of the important health care inputs is *the number of beds*[17] offered by the system. Figure 4.2.1.7 captures the shifts in the number of in-patient care beds per 1,000 inhabitants since the 1980s. It can be seen that, generally speaking,

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[17] The definition of total in-patient beds given by the OECD is the following: Average daily census or mid-year count of the available beds in all public and private in-patient institutions, including acute care, psychiatric care and nursing homes. An available bed is a bed which is immediately available to be used by an admitted patient or resident if required. A bed is immediately available for use if it is located in a suitable place for care and where nursing and auxiliary staff are available, either immediately or within a reasonable period. Inclusions: both occupied and unoccupied beds are included. For nursing homes, the number of approved beds includes beds approved for respite care. Exclusions: surgical tables, recovery trolleys, delivery beds, cots for normal neonates, emergency stretchers/beds not normally authorised or funded and beds designated for same-day non-admitted patient care are excluded. Beds in wards which were closed for any reason (except weekend closures for beds/wards staffed and available on weekdays only) are also excluded.

(See Figure 4.2.1.5 in separate file)

(See Figure 4.2.1.6. in separate file)

the number of in-patient care beds has fallen throughout the period. This downward trend is partly the consequence of the rapid development of hospital technologies, which has made day-treatments more frequent, making the provision of beds a secondary consideration. This is also a consequence of the excess hospital capacity that most OECD countries experienced at the end of the 1970s. From the 1950s to the 1970s most health care systems experienced a large expansion in hospital provision following the Second World War.

We can see that the Netherlands, Ireland and Austria have the largest number of in-patient care beds available throughout these two decades. On the other hand, the Southern European countries (Spain, Portugal, Greece and Italy) and the United Kingdom had the lowest levels. The evolution of each country throughout the period has reduced the gap among countries in terms of the number of beds available for in-patient treatment. The cases of Sweden and Finland are worth special mention, since both countries began the period with a very large number of available in-patient beds, which, especially during the 1980s, sharply decreased and substantially modified the position of these countries with respect to the rest of the EU; this decline was greatest in Sweden.

The situation in the mid-1990s with respect to the total availability of in-patient beds is to a certain extent similar to that observed in the previous decade. That is, the Netherlands, Ireland, and Germany have the largest amount of this resource while Spain, Portugal and the United Kingdom have the lowest.

(See Figure 4.2.1.7. in separate file)

(See Figure 4.2.1.8. in separate file)

Figure 4.2.1.9 permits closer examination of the evolution of available beds in the United Kingdom and Spain in comparison to the EU as a whole. Every year without exception, both countries show a lower rate than that registered for the EU on average. The number of available in-patient beds gradually diminishes in both countries, as well as for the EU as a whole. The larger decline experienced by the United Kingdom means a change in its position with respect to Spain, as the United Kingdom shows a larger amount of in-patient care beds than Spain for the entire period except the last years in which both countries present a similar amount of this resource.

Another health care input that is vital for the functioning of health care systems is *total expenditure* on the system itself. The level of expenditure a system has access to, as well as its management, is a determinant of the correct functioning of the system and hence, of the correct administration of health treatment. As noted above, rising health expenditure has been a cause of concern in most, if not in all developed societies, for several decades. Part of the reason for this concern is that almost three quarters of the funding of the system is from public resources. Thus, increasing health expenditure has had to be absorbed by the resources that are collected, depending on the type of funding of the system, through general taxation or through social insurance contributions.

(See Figure 4.2.1.9. in separate file)

Figure 4.2.1.10 presents the evolution of health expenditure as a percentage of GDP[18] for the EU between 1980 and 2000. We can see that total expenditure on health has been rising throughout the period, especially in the early 1990s. The 1980s generally saw a slight but constant increase, while the 1990s witnessed a moderate increase in health expenditure, followed by a couple of years of a small decline, the decade ending with a slight renewed increase.

As for differences in expenditure among countries, Germany and France present the higher rates over the two decades. Greece is a notable case since it starts the period with very low levels of expenditure, outstrips the European mean in the mid-1990s, and maintains similar rates until the end of the decade. Luxembourg and the United Kingdom, on the other hand, are remarkable for their low levels of spending; well below the European average for the entire period. Spain had particularly low expenditure levels during the 1980s. During the 1990s expenditure increased but it did not surpass the average level of the EU as a whole. The case of Portugal is also noteworthy since it registered very low spending in the first part of the 1980s, which significantly increased and reached higher than EU-mean levels in the second half of the 1990s. Ireland also displayed a remarkable trend, albeit shifting in the opposite direction to Portugal. Hence, it started out as one of the countries with the highest percentage of GDP spent on health

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[18] Total expenditure on health is defined by the OECD as the sum of expenditure on activities that (through application of medical, paramedical, and nursing knowledge and technology) are intended to promote health and prevent disease; cure illness and reducing premature mortality; care for persons affected by chronic illness who require nursing care; care for people with health-related impairments, disability, and handicaps who require nursing care, assisting patients to die with dignity, providing and administering public health, providing and administering health programmes, health insurance and other funding arrangements. In the terms of this definition, general public safety measures such as technical standards monitoring and road safety are not considered as part of expenditure on health. Activities such as food and hygiene control and health research and development are considered health-related, but are not included in total health expenditure. See Appendix B for a complete definition of this variable.

care but finished the period with below EU average levels of spending.

The differences between the European countries in expenditure levels in the mid-1990s can be seen in Figure 4.2.1.11. Germany and France, in line with the trend for the whole period, present the highest expenditure levels, Luxembourg and the United Kingdom, on the other hand, register the lowest expenditure rates. The European mean is in between both limits with a gap equal to approximately two percentage points with respect to both extremes (10.6% as opposed to 8.17% vs. 6.4%). The other countries are either slightly above the European mean or just below it. Thus, expenditure on health presented a divergence among EU countries in the mid-1990s although most of the countries registered levels close to the average. These exceptions were Germany and France at the upper extreme and Luxembourg and the United Kingdom at the lower extreme.

As Figure 4.2.1.12 shows, the evolution of total expenditure on health in Britain and Spain follows a similar trend. That is, most of the 1980s constituted a period of cost containment, the end of the decade and early 1990s a period of rising expenditure, and the rest of the decade a new shift towards containment. Great Britain presented higher levels of spending than Spain during the 1980s; however, the moderate increase that Spain experienced at the end of the 1980s meant that this country showed a higher level of spending than Britain. Both countries followed a similar trend to Europe as a whole. The European mean value for total expenditure on health is larger than the Spanish and the British one throughout these two decades.

(See Figure 4.2.1.10. in separate file)

(See Figure 4.2.1.11. in separate file)

(See Figure 4.2.1.12. in separate file)

It is interesting not just to examine the evolution of absolute expenditure on health over the last two decades, but also to consider *the change in the percentage of GDP spent on health care* for each EU member state. Given the pressures for cost containment that health care systems have been experiencing in recent decades, an analysis of variations in the percentage of GDP spent on health should make it possible to consider the extent to which these pressures have been taken into account.

Figure 4.2.1.13 shows that there have been changes in the monetary resources devoted to health care systems since the 1980s. Some countries (i.e. Denmark, Sweden and Ireland) have spent less on the system, but most of them have in fact significantly increased spending. This is particularly true, in this order, of Portugal, Spain, Belgium and the United Kingdom. Cost containment pressures have only been effective, when at all, in those countries that at the beginning of the period enjoyed the highest levels of expenditure. The countries that have experienced the greatest growth in the amount of funding for the system are precisely those that appeared to be under-funded in 1980. The evolution, therefore, of the % of GDP spent on health care has reduced the gap between European countries, as reflected in the reduction in variance from 1.92 in 1980 to 1.14 in 2000 (see Table B.1.2 in Appendix B).

In order to gain a more accurate picture of how the expenditure on health has changed over the period under consideration, it is also interesting to examine how the percentage of GDP invested in health has varied *annually*. Figure 4.2.1.14 shows the annual growth of total expenditure on health for Spain, the United Kingdom and the European average. The trend that both countries as well as the European average follow is to a certain extent similar: slight positive growth during the early 1980s; a steep increase between 1984 and 1988; positive but declining growth until 1993; rising growth during 1994 and 1995 which again declines until 1997; a positive increase in 1998, 1999, and 2000 meant a minor decline in the rate of growth. It is remarkable the growth that expenditure on growth shows for Spain

(See Figure 4.2.1.13. in separate file)

between 1984 and 1988, which goes from being negative, -2.08%, to being positive and well above the European average (15.38%). This sharp increase reflects the creation of the *Sistema Nacional de Salud* (National Health Care System), established by the General Health Act in 1986. The rising increase in health expenditure in this period meant that, as we showed in Figure 4.2.1.12, Spain started to spend more on health than the United Kingdom. This increase brought Spain closer to, although still at a distance from, the European average. The fluctuations in the growth of expenditure were similar between both countries, especially during the 1990s and, although for a few years the rate of growth was higher than that of the EU as a whole, both countries were still below the European average expenditure rate at the end of the period.

Besides the cost containment issue, the *responsibility for financing health care* has been another issue related to the funding of health care systems that has dominated the political agenda in recent decades. The source of funding for health care and, specifically, the share of public-private mix of funding has been the object of intense debate in most EU countries. Reflecting that health care is a public good, all systems have drawn most of their funding from public resources, that is, they are systems funded either by general taxation or by contributions to the social security system. Public funding allows matching ability to pay with actual contributions. It also allows need to be linked to treatment. The issue of public funding has been related to the issue of cost containment. The need for cost containment has been used as an argument to establish incentives for private funding or at least to contain the public share of the total funding. That is the reason why, as seen in Section 4.2, some of the reforms implemented have favoured the introduction of private funding, mainly by out-of-pocket payments or private health insurance, of through payment for some health care services.

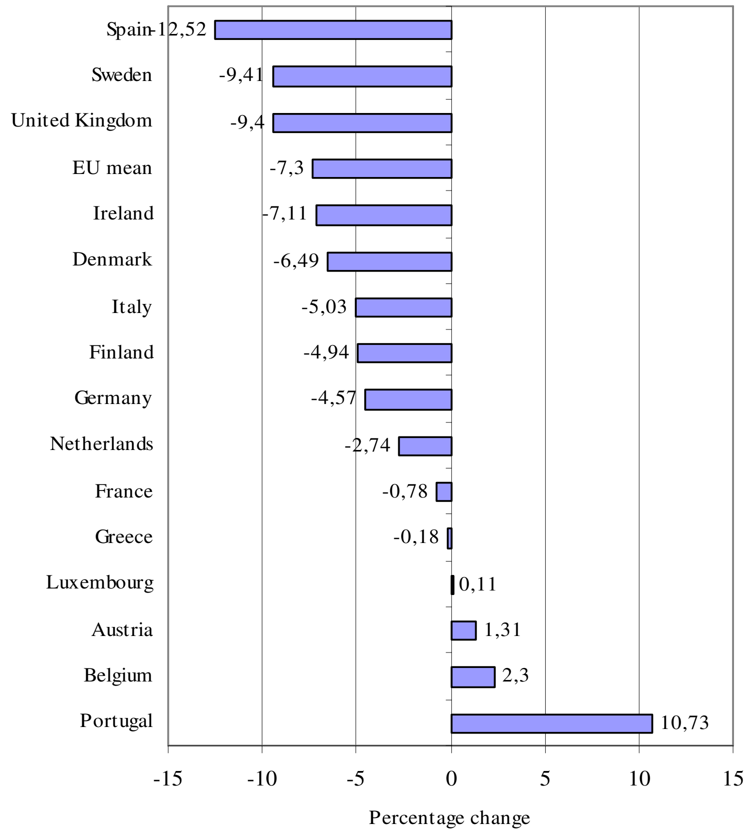
(See Figure 4.2.1.14. in separate file)

Figure 4.2.1.15 shows the change in public funding for health care[19] between 1980 and 1998. We can see that, on average, in the EU, public funding has declined by about seven percentage points since 1980. Thus, although most of the funding is public in character (on average around 70% of the funding comes from public resources, see Table B.1.3 in Appendix B), private funding has slightly and slowly increased across European countries. On average, the percentage of public funding has diminished from 78.3% to 72.6% in the period under analysis.

It is interesting to observe differences between countries. On the one hand, Spain, Sweden and the United Kingdom show a large decrease; at the other extreme, Portugal registers a large increase in the proportion of public funding. Belgium, Luxembourg and Austria are the other two countries to show an increase in public share. The remaining countries have seen a process of diminishing public spending, although the decline has been moderate. Hence, the process of reforms in which European health care systems have been immersed (some motivated by the issue of cost containment) has, in part, meant a slight increase in private funding. This funding has mainly taken the form of out-of-pocket payments or private health insurance. However, this rise in private funding has, on average, been small (i.e. 7%) and there are small differences between countries. The evolution of the public share for each country has resulted in greater similarity among countries in the origin of the resources that fund the system. Thus, differences between countries in the percentage of public funding have diminished significantly throughout the period (see the trend in the variance in Table B.1.3 in Appendix B). Countries that at the beginning of the period were among those with the highest public share (i.e. Sweden and the United Kingdom) are much closer to the European average at the end of the period.

[19] The OECD defines public funding as health expenditure incurred by public funds. Public funds are those spent by state, regional and local government bodies and social security schemes. Public capital formation on health includes publicly financed investment in health facilities plus capital transfers to the private sector for hospital construction and equipment.

Figure 4.2.1.15: Change in the public share of expenditure on health, 1980-1998, for the EU



Symmetrically, Portugal, which in 1980 presented a low share of public funding, gradually increased the public share of the funding. As a result, by the end of the period public funding for some three quarters of the total across the EU, a figure just below that registered in 1980, and the level of homogeneity among countries had increased significantly.

With respect to the evolution of the public share of expenditure on health in Great Britain and Spain, Figure 4.2.1.16 shows that both countries have followed a rather similar trend. Public funding in both countries has steadily and slowly decreased although a very small increase was registered in some years. Spain started and finished the period with a public share that is approximately ten percentage points below that found in Great Britain. With respect to the European average, for most of the period the Spanish figures are slightly below the European mean, whereas Britain lies a few percentage points above the mean.

4.2.1.2.2. The evolution of the rates of utilisation of the system

In the previous section, we have seen that, on average, total health employment has increased significantly in health care systems, and part of this increase is due to the number of practising physicians. At the same time, despite the pressure for cost containment, in general total expenditure on health has risen throughout the period. We have also seen that part of the increase in total expenditure on health has come about as the result of an increase in private funding, although the expansion of this has been relatively small.

In this sub-section, I trace the level of activity of European health care systems through an analysis of recent evolution of indicators of *health care utilisation*. I will present in turn the rates of in-patient utilisation and the rates of acute length of stay (ALOS) in care. These two indicators provide an adequate overview of the utilisation that Europeans make of their health care system.

(See Figure 4.2.1.16. in separate file)

Figure 4.2.1.17 shows figures for the total use that patients in the EU have made of part of the health care institutions –i.e. those institutions providing in-patient care- since the early 1980s. This graph clearly reveals that *total in-patient utilisation*[20] has in general increased in all EU countries over the last two decades. Austria, Finland and France appear to be the countries with the highest rates of use throughout the period, whereas the Netherlands, Portugal, Spain and Greece are at the opposite end of the scale. It should be noticed that the gap among countries in terms of their rates of utilisation rose gradually over time. Thus, the variance was almost 3 times greater in 1999 than in 1980 (i.e. 4543 as opposed to 1561[21]). We can also see from the graph that those countries that have consistently had the highest utilisation rates show here sharper differences with those countries characterised by lower levels of in-patient care.

The static picture of total in-patient utilisation in the mid-1990s (see Figure 4.2.1.18 below) for the EU countries is generally similar to that for the period as a whole. Spain, the Netherlands, Portugal and Greece present low rates of in-patient care whereas Austria, Finland and France have high rates of utilisation. The difference between the country with the highest rate of utilisation, Austria, and the country with the lowest rate, Spain, is considerable and equal to approximately 80% of the European mean.

The position occupied by both the United Kingdom and Spain during the period under analysis can be seen more clearly in Figure 4.2.1.19. Both countries present lower utilisation rates than the EU mean. This is particularly true in the case of Spain, which had a lower rate than the United Kingdom throughout the period. It can also be seen that, as is the case for the EU mean, Spain and the United Kingdom, show a gradual, albeit very slight rise in rates of total in-patient care over the course of the period.

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[20] OECD defines total in-patient care as follows. Total in-patient care is computed as the number of people who were admitted and stayed at least one night in an in-patient institution divided by the population and multiplied by 100.

[21] Results not shown here.

(See Figure 4.2.1.7. in separate file)

(See Figure 4.2.1.18. in separate file)

(See Figure 4.2.1.19. in separate file)

We can obtain a fuller picture on the rate of utilisation by considering the variations in the average length of time that individuals stay as in-patients. That is, the rate of utilisation of resources is measured not just through the number of individuals who access certain health care institutions, but also through the average number of days they stay in treatment. Figures 4.2.1.20 to 4.2.1.22 provide data on the *acute length of stay (ALOS) in in-patient care*[22].

As can be seen in Figure 4.2.1.20, most EU countries have registered a decline in the ALOS in in-patient care. The EU mean declines from 10.8 to 6.7 days over the course of the 1980s and the 1990s. The decline is gradual throughout the period and generalised, with the result that the gap between countries does not vary significantly. The indicators of utilisation of health care resources reveal, therefore, a common pattern of an increase in the number of individuals accessing the system combined with a decline in the number of days individuals remain in health care institutions.

These indicators would appear to reflect, therefore, the evolution of health care techniques, which have facilitated a shift from intensive in-patient care to the greater use of day-surgery and out-patient care. Over the last decade, therefore, medical practice has moved towards the greater use of medical treatment in health care institutions and home recovery.

Figure 4.2.1.21 shows the distribution of EU countries on the axis that measures the ALOS for in-patient care in the mid-1990s. Germany is the country with the highest value and Sweden the lowest. As for Spain and the United Kingdom, the former registers a value slightly above the EU mean while the latter takes a value below than the mean. In Figure 4.2.1.22, we can observe in more detail the trend found in Spain and the United Kingdom. This shows that while the value of this indicator fell in both countries,

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[22] The OECD computes the average length of stay by dividing the number of days spent in hospital (from the date of admission in an in-patient institution) by the number of separations (discharges + deaths) during the year.

(See Figure 4.2.1.20. in separate file)

(See Figure 4.2.1.21. in separate file)

(See Figure 4.2.1.22. in separate file)

Spain consistently ranked above the EU mean and United Kingdom below it.

4.2.1.2.3. Summary and conclusions

In this sub-section, we have presented a general overview of the evolution of the main health care inputs and utilisation rates in European health care systems over the course of the 1980s and 1990s. The analysis of these indicators has enabled us to consider some of the principal trends in the operation of European health care systems, as well as to locate the British and the Spanish systems in this context. While the purpose of this analysis has not been to form a typology of health care systems, it is both possible and desirable to draw some general conclusions regarding the evolution over time of these indicators in order to highlight some of the similarities and differences between the British and the Spanish systems. To this end, I will discuss the main general conclusion for Europe as a whole before considering locating Spain and the United Kingdom within the different types of European system.

The general conclusion to be drawn from the analysis presented here is that as a result of the evolution of the main health care inputs the resources and functioning of the various systems has become increasingly similar in recent decades. Thus, human resources of health care systems have shown a steady, if moderate increase in most countries, at the same time as the variance among them has declined. When we looked at the disaggregated figures, we also found that the main human resource, the total number of practising physicians, also increased in most countries, although in this case the divergence between countries rose slightly right towards the end of the period. The number of beds available to patients has gradually declined as a result of the organisational reforms implemented in most systems. The gap between countries in the availability of beds has also diminished. We have seen that the pressure to contain costs is partially reflected in a slight increase in the role of private funding of the system, but has not led to a decline in total health expenditure, which has grown slightly in most countries. The gap among European countries in terms of the share of the GDP devoted to health care systems shrank towards the end of the period. We have seen that, generally speaking, the trends in the utilisation of health care resources reflect the reforms implemented across Europe, which were designed to prevent the over-utilisation of hospital services by promoting the greater use of primary care services and day-treatment.

The evolution of European health care systems, which is to a large extent the result of the different reforms implemented over the period, could be characterised by a combination of measures that have gradually resulted in a certain tendency towards the harmonization of the structure and functioning of the systems. European health care systems are more similar in terms of the amount and type of resources with which they operate; in the distribution between the public and private sector of responsibility for funding; and in the use that Europeans make of the services. However, there are still significant and profound differences among countries.

Although the purpose of this research in not to define a typology of health care systems, multi-dimensional analysis can be used as a rigorous way of determining whether there is a cluster of health care systems[23]. The purpose of multidimensional scaling is to provide a visual image of the pattern of proximities (i.e. similarities or distances) between a set of objects. Thus, the method can be used to detect meaningful underlying dimensions that make it possible to explain observed similarities or dissimilarities between the variables under analysis. This method implies constructing a range of Euclidean distances between all

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[23] For an excellent example of the application of this technique to cluster countries, see Tilley, 2000. For an account of multi-dimensional scaling, please see: Green, 1989; Kruskal and Wish, 1978; Borg and Groenen, 1997; Davison, 1983; Schiffman, Reynolds and Young, 1981; and Cox and Cox, 2001.

the countries under analysis for each of the health indicators[24]. Figure 4.2.1.23 plots a two-dimensional solution for each country. The purpose of this technique is similar to that of factor analysis[25]; thus, countries that present similar values in the variables included in the analysis will cluster together, while countries that do not present similar trends will not form a cluster. The more similar the values of the health indicators, the closer the countries will be to each other.

The analysis has been carried out using data from 1995 for all the variables we have analysed in the previous section, that is, all health care inputs (total health employment, practising physicians, total in-patient care beds, health expenditure, change of percentage of GDP spent on health and change in the public share of expenditure on health) and all indicators of the utilisation of health care services (total in-patient utilisation and ALOS in-patient care).

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[24] Multidimensional scaling is based on finding a set of vectors in a p-dimensional space such that the matrix of Euclidean distances among them corresponds as closely as possible to some function of the input matrix according to a criterion function called *stress* (see Kruskal and Wish, 1978 for a formalisation of the stress function). The number of dimensions can be decided by plotting the stress value against different number of dimensions (see Kruskal and Wish, 1978 for a discussion of the application of this plot to multidimensional scaling). When the decrease of stress values (eigenvalues in factor analysis) appears to level off to the right of the plot, then that is the number of dimensions that should be employed. This is the rule that I have followed: the stress function was approaching zero when two dimensions were selected. This is the case for the two figures that plot EU countries according to health care inputs and outputs in figure 4.2.1.23 and according to scores in subjective and objective health in figure 4.2.2.19.

[25] The aim of both statistical methods is similar. However, there are some differences between them. For example, in factor analysis, similarities between variables are expressed in a correlation matrix, whereas in multidimensional scaling it is possible to analyse any kind of similarity or dissimilarity matrix and not just correlation matrices. Moreover, for factor analysis the underlying data must necessarily be distributed as multivariate normal, and the relationships must be linear. Multidimensional scaling, on the other hand, does not need such conditions.

(See Figure 4.2.1.23. in separate file)

The two-dimensional scaling plot for the EU countries shows that there are three distinctive groups of countries that cluster together. Portugal, Spain, Greece, Italy and the United Kingdom (in other words, the Southern European countries and the United Kingdom) form one group. Belgium, Germany, Austria, Finland and France make up a second, while Denmark, Sweden and Luxembourg form the third group. These three sets of countries can be grouped together insofar as they present similar values for the different health care indicators. Significantly, we can conclude from this the UK and Spanish health care systems operate in broadly similar ways. I would like to turn now to a discussion of the three distinct groups resulting from the multi-dimensional analysis.

The first group is formed by the Southern European systems (i.e. Greece, Portugal, Spain and Italy) together with the United Kingdom. This group is characterised by low rates of total health employment[26], low rates of available in-patient beds and low health expenditure rates (except in the cases of Portugal and Greece in the 1990s, when their health expenditure increased faster than the EU mean) although with high rates of increase throughout the period. Regarding the shift towards private funding of the system, this group is less uniform. Spain and the United Kingdom register a large decrease in public funding (which fell by some 10 percentage points), Italy and Greece present a small decrease and, Portugal, on the other hand, finished the period with

[26] This analysis of the different categories in which European health care systems can be classified should be treated with some caution. As noted above, my purpose here is not to propose a typology of health care systems that could serve for analytical purposes, but merely to clarify the similarities and differences between the Spanish and the British systems. The generality of the stated conclusions can be seen, for instance, in the apparently divergent results for the two indicators of human capital. On the one hand, Southern European countries present low rates of total employment in the health care system and, on the other hand, some Southern European countries (i.e. Italy and Greece) present high rates of total number of practising physicians. Thus, the analysis on the different groups in which health care systems can be organised will provide us with added information to study the British and Spanish cases but not with a rigorous and meticulous typology of systems.

a 10 per cent increase in the public share of total funding. As for rates of utilisation of the system, all countries from the group present increasing rates although they are the lowest of all the European countries. Accordingly, this first group of European systems is characterised above all by its low albeit rising rates of both health care resources and health services utilisation.

Most of the core European countries (i.e. Belgium, Germany, Austria and France) and Finland[27] belong to the second group of European health care systems. These countries are characterised by the considerable resources devoted to health care. Thus, they present very high figures for the total number of people employed in the health care sector as well as for practising physicians[28] (except in the case of Austria that has one of the lowest numbers of practising physicians). They also have large, and well above the EU mean, numbers of in-patient care beds. Expenditure on health as a percentage of GDP is very high in this group of countries, and especially in the cases of Germany and France during the entire period. The pressure towards cost containment has not been reflected, therefore, in the level of expenditure on health care in these countries, as the percentage of change of GDP spent on health between 1980 and late 1990s is positive in all cases, and especially significant in the cases of Belgium (35.94%) and Germany (20.45%). The pressure to contain costs, however, can be seen in the cases of Finland, Germany and to a more limited extent in France through the shift towards private funding of the

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[27] The Finish case merits special comment, since while it behaves like the other Scandinavian countries (albeit more like Sweden than Denmark) with respect to some indicators (e.g. total health employment, change of percentage of GDP expenditure on health during the period under analysis, ALOS in-patient care), the values of most of the indicators of both health care inputs and utilisation are closer to those of most core European countries.

[28] The total number of practising physicians appears to be an indicator of those countries that present values that are not in line with the values for other indicators. In other words, countries can be classified congruently and coherently by examining the values of the other indicators analysed. The total number of practising physicians is in some cases and for some countries, in line with that classification but in some others it is not.

system. The change in the public share of expenditure on health between 1980 and 1998 was -4.94% in Finland, -4.57% in Germany and -0.78% in France. Austria and Belgium, on the other hand, underwent a positive increase in the public share of total funding (1.31% and 2.3% respectively). Over the course of this period, this group of countries consistently boasts the highest utilisation rates, with the only exceptions of the ALOS in acute care for France and Finland, which is below the European average. Thus, in contrast to the first group of health care systems (Southern European countries and the United Kingdom), this group of systems consistently presents high rates of the different health care inputs as well as high utilisation rates of the system.

In accordance with these same criteria, the third distinctive group of health care systems is formed by most of the Scandinavian countries (Sweden and Denmark) and Luxembourg. This group is characterised by a particular pattern: while the values of some indicators in some countries are close to the Southern European countries, in some other cases, and for some countries, these are close to those of the core European countries. This third group is also characterised by two other factors. First, it is a less homogeneous group than the previous two other groups. Second, its values are very close to the European average.

In relation to the human capital that these countries employ, Sweden has the highest rate of all the European OECD members until 1995, when it slipped into second place behind Finland. Denmark presents a moderate density of health employees per 1,000 inhabitants, while Luxembourg has the second lowest figure after Portugal. In common with the other European systems, this group of countries showed a declining rate of the number of beds throughout the period, all the countries, and above all Luxembourg, recording figures close to the European average. Equally, over the course of the period total expenditure on health in these countries is very close to the European average, except in the case of Luxembourg which shows the lowest percentage of GDP devoted to health of the entire EU. Sweden and Denmark also recorded a change in the public share of expenditure on health which was very close to the European average, implying a slight shift towards increased private funding, whereas Luxembourg presents a minor (just 0.11%) increase in public responsibility for funding. As for utilisation rates, the three countries (Sweden, Denmark and Luxembourg) show figures that are slightly above the European average, except in the case of Sweden and Denmark for the ALOS for acute care (where they register the lowest values in the entire EU). While the trends presented by this group of countries are not as clear-cut as in the case of the other two groups, this third group can nonetheless be considered to lie somewhere between both groups, as it presents values close to the European average for most of the health care indicators.

The two remaining countries under analysis, the Netherlands and Ireland, appear to be more difficult to classify as they present values for the health care indicators that are in some cases closer to one group and in others closer to another group. Thus, the Netherlands seems to be similar to the core European countries in terms of health care inputs (e.g. total health employment and total in-patient beds) and close to Southern European countries in terms of health care utilisation. Ireland, on the other hand, does not adhere to the pattern of any of these three groups, showing similarities to different groups depending on the indicator in question.

The analysis of the evolution over time of the health care indicators has allowed us to classify health care systems into three main groups. We have seen that both Spain and the United Kingdom appear to behave similarly to the remaining Southern European countries. This group of systems is characterised by its low levels of both health care inputs and utilisation of health care services. The core European countries (Belgium, Germany, France and Austria), together with Finland, form a second group of systems characterised, in contrast, by high levels of health care inputs and high rates of utilisation of the system. Sweden, Denmark and Luxembourg form the third group of systems and present values that are to a certain extent between the two extremes of the classificatory axis. Ireland and the Netherlands do not appear to fit easily into any of these three groups.

It should be emphasised, once again, that this analysis is not meant to define a precise classification of European health care systems. Rather, it is merely intended to make it possible to see whether Great Britain and Spain have undergone similar developments during the last few decades, as well as to see if they have evolved in the same direction as other European countries. We have seen that both countries can be classified in the same group which is also formed by Italy, Portugal and Greece. These results, therefore, are in line with the analysis presented in the previous section on the general principles ruling the origin, structure and functioning of health care systems.

4.2.2. Health outcomes in the European Union

The aim of this sub-section is to provide a general picture of the health and mortality trends of the Spanish and the British populations within the European context. All graphs have been computed using OECD aggregate-level data.

As I argued in Chapter 3, I have defined health as “a state of physical, mental and social well-being with functioning capacity and not only the lack of illnesses or afflictions”. The indicators that I argued could be used to operationalise this definition of health were (1) a measure of subjective health status and (2) objective health status variables providing information about the capacity to carry out everyday activities (i.e. to be able to perform normal activities and tasks). I will therefore present data that captures these two dimensions. Information on these dimensions will consequently provide us with a clearer idea of where Great Britain and Spain stand in terms of health as compared to the rest of the EU. I will first discuss the subjective dimension of health and then the objective health status.

4.2.2.1. The subjective dimension of health

The general state of health of any society can be partly assessed through morbidity data on objective health. However, in order to know more accurately how individuals' health is, it is also necessary to analyse their subjective health status**.** Knowledge of individuals' subjective health also has policy-oriented implications: the way individuals perceive their own health is what ultimately guides health-related policies. If the objective of policies is to improve individuals' health status, such policies should be focused not only on objective health measures but also on improving individuals' perception of their health state.

Figures 4.2.2.1 and 4.2.2.2[29] give a general picture of how Europeans perceived their own health at the end of the 1990s. When evaluating subjective health, individuals are asked the following question "How is your health in general? Very Good, good, fair, bad or very bad?" This is the same question that will be used in the empirical chapters on Great Britain and Spain in order to evaluate the subjective dimension of health. As I discussed in Chapter 2, this question has been proved a good indicator of future health status and prospective health care use, as well as of mortality trends.

Figures 4.2.2.1 and 4.2.2.2 show the percentage of individuals that have defined their health as good or very good. We can see that in the cases of both women and men there is a similar grouping of countries in terms of the percentage reporting good or very good health. The first group comprises France and Ireland, the countries with the best perception of their health, with over 80% of the population reporting good or very good health. There is a second group of countries in which between 70% and 80% of the individuals report that they are in good health. In the case of both women and men this group is formed by the Netherlands, Belgium, Denmark, Sweden, Austria, the United Kingdom and

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[29] Greece and Luxembourg have not been included in these graphs as there is no available data on their subjective health status at the aggregate level.

(See Figure 4.2.2.1. in separate file)

(See Figure 4.2.2.2. in separate file)

Finland. The following group of countries is made up countries where under 70% of the population consider themselves in good health. The countries in this group are Spain, Finland, Germany, Italy and Portugal. The two last two countries and above all Portugal stand out for their poor perceptions of health, well below the European mean (68.6% for women and 73.4% for men).

In terms of gender differences, the graphs show that subjective health is in general worse for women than for men. We will find this result again when analysing the objective dimension of health and it will be analysed in detail in the chapters devoted to Spain and Great Britain. It should be noted, however, that although a gap between men and women is found across Europe in favour of the former, the position of countries in the three main groups stands regardless of gender.

We will provide a more detailed, comparative analysis of the health outcomes of Great Britain and Spain in the next section. However, at this point it should be noted that these graphs show that Spain has a low position in the ranking of subjective healthiness, especially in the case of men. Accordingly, at the aggregate level the British population presents a slightly better subjective condition than the Spanish one.

4.2.2.2. The objective dimension of health

As defined in Chapter 3, health is a concept with both a subjective and objective dimension. The objective dimension of health captures the extent to which individuals are able to carry out their daily activities given there health condition. If individuals are healthy they will be less likely to be constrained in their daily activities than those individuals who suffer from poor health. At the individual level, it is easy to measure individuals' objective condition; it is simply the degree in which they are able to pursue their normal lives. Chapters 5 and 6 will analyse this dimension at the individual level in detail.

Here I discuss the objective dimension at the aggregate level. The greater individuals' capacity to carry out adequately their daily activities, the healthier they are and the longer they live. Hence, one way of measuring a society's level of health at the aggregate level is by studying individuals' average life expectancy. As individuals' level of health gradually increases, their *life expectancy* will also rise.

In Figures 4.2.2.3 to 4.2.2.8, I present information on life expectancy in Europe. Figure 4.2.2.3 shows how all European countries have seen a steady increase in their life expectancy at birth over the last two decades. Average life expectancy rose by five years during the twenty years under analysis, increasing from 73.8 to 78.7 years. Hence, Europeans born at the beginning of the present decade are expected to live longer than those born twenty years earlier. There are, however, disparities between countries. Portugal is the country with the lowest life expectancy both at the beginning and at the end of the period. Portugal is situated in this position despite the fact that its life expectancy is rising at a faster rate than that experienced by Sweden (4.1 vs. 3.9), which is the country that consistently enjoys the highest life expectancy.

As for the evolution in life expectancy of Great Britain and Spain, Figure 4.2.2.4 shows that although both countries show a steady increase, the gap between the two in Spain's favours had not disappeared by the end of the 1990s. Throughout the period, Spain enjoyed a higher life expectancy than both Great Britain and the EU average. The gap between the two countries did shrink, but even at the end of the period it stood at over a year and a half. Thus, during the 1980s and 1990s, both Spain and Britain adhered to the EU-wide pattern of rising life expectancy. While Britain registered a slightly greater increase than Spain, this was still insufficient to take it to either the European average or the even higher Spanish life expectancy.

(See Figure 4.2.2.3. in separate file)

(See Figure 4.2.2.4. in separate file)

Another way of measuring the degree of well-being of a society is by examining how long its members live from a later age. The reasoning behind the use of this indicator is that we would expect that the healthier a society is, the greater the life expectancy of its members at a later stage in life. Figures 4.2.2.5 to 4.2.2.8 show *life expectancy at age 65*. It is a broad, mortality-based indicator of the health of elderly people. Figures 4.2.2.5 and 4.2.2.6 show that this has been steadily increasing in all EU countries, and for both women and men. We can see that far from reaching a limit, the life expectancy of Europeans at age 65 has continued to rise in recent years. One result of this has been that the elderly account for a steadily increasing proportion of the population throughout the EU. I present results for women and men independently since there is a significant gender gap in favour of women, which amounted to 3.67 years at the beginning of the period and had increased to 3.76 years by the end of the 1990s. Thus, on average, although life expectancy has been rising progressively for everyone in Europe over the last two decades, European women live longer than men also in the latter stages of their lives.

In terms of national differences in life expectancy, it can be seen that in the case of women, Ireland shows the lowest score whereas France registers the highest throughout the period. In the case of men, there is not such a clear pattern. While Luxembourg registered the lowest life expectancy in 1980, improvements over the period meant that by the end of the 1990s it had ceded the bottom place in the ranking to Ireland. Spain, on the other hand, boasted the highest longevity at the beginning of the eighties, but by the end of the 1990s, while still performing well, it had been replaced by Greece as the country with the highest male life expectancy. A closer look at the position of each country during the period of analysis shows no dramatic changes in the national ranking in terms of longevity. For all individuals, Ireland together with Portugal consistently registers the lower figures, whereas

Sweden, Spain, France and Greece occupy the best places in the longevity scale[30].

Figures 4.2.2.7 and 4.2.2.8 provide a more detailed view of the progress that Spain and the United Kingdom made with respect to life expectancy. In general, in both cases life expectancy at age 65 follows the same pattern as life expectancy at birth. Thus, it is consistently higher for Spain than for Britain despite the gradual increase registered in both countries. In the case of women, the gap between the two countries increased slightly from 1.3 years in 1980 to 2 years in 1999. In the case of men, for the same period,

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[30] Premature mortality or potential years of life lost (PYLL) constitute another indicator of a society's health. We would expect that the healthier a society is, the higher its life expectancy will be and, hence, the fewer the years lost due to health-related issues. PYLL are measured as the total PYLL due to ill health before age 70 given the current age-specific death rates. This measure is weighted towards deaths amongst the young. For instance, a death at 3 years of age represents 67 PYLL; one at 62 years only 8 PYLL. Mirroring the increase in life expectancy across Europe during the last decades, PYLL figures have also declined gradually (results not shown here). Premature mortality has on average declined by about 35% since the 1980s. The decline has been slightly more rapid for females than for males (38% as opposed to 34%). Matching the magnitude of the increase in life expectancy, the decline in the figure for PYLL is lower for women than for men. On average, across the period under analysis, premature mortality is around 45% higher for men than for women. In relation to the national ranking, throughout the period for both women and men, Portugal presents the highest rate whereas Sweden, on the other hand, is the one in which individuals lose the lowest number of years due to health-related issues. As for the size of the improvement in the reduction of premature mortality, irrespective of gender, Sweden, the Netherlands and Spain are the countries with the greatest improvement, whereas Portugal, Luxembourg, the United Kingdom and Denmark are the ones with lower attainments. The evolution in terms of premature mortality of Great Britain and Spain is similar to that for the EU as a whole. That is, the incidence of this type of mortality has declined gradually in both countries and it is lower for females than for males. The gap between these two countries on the one hand, and between these two countries and the European average on the other hand, declined slightly during the 1980s and 1990s. In the case of women, the sign of the difference in PYLL is, as in the case of life expectancy, favourable to Spain in comparison to Britain or the European mean. In the case of men, however, the balance is favourable to Spain at the beginning of the 1980s but changes in favour of Great Britain over the course of the period.

the gap slightly declined from 2.2 to 1.1 years. For all the years under analysis, British life expectancy is slightly lower than the EU mean. On the other hand, Spain consistently records a higher figure.

The health of pregnant women and newborn babies represents another indicator of the objective health status of a society. The healthier a society is the lower the expected *infant, maternal and perinatal mortality rates*. These indicators have been widely used in comparative analyses carried out by the principal health-related institutions such as the WHO, the World Bank, the Inter-American Development Bank (IDB) and the OECD[31]. They are considered accurate indicators of objective health since they measure to a certain extent the rate of healthy growth of a population. These indicators are the principal targets of policy reforms. Figures 4.2.2.9 to 4.2.2.14 present the information about the evolution of these indicators for the EU since the early 1980s.

Maternal mortality is defined as the number of deaths during pregnancy or while giving birth. The first observation that becomes clear from Figure 4.2.2.9 is that although this figure has declined significantly across Europe since the 1980s, national rates of maternal mortality fluctuate in a way that other indicators of mortality do not. Since maternal mortality series are recording very small numbers, there are likely to be large annual fluctuations. Figure 4.2.2.9 shows that Luxembourg, Portugal and France present relatively higher levels of maternal mortality. On the other hand, Denmark, Finland, Sweden and Spain register low levels of maternal mortality. The United Kingdom presents levels of maternal mortality that fluctuate across time, rising above the European mean in some periods, but falling below it in others.

[31] Some examples of the extensive literature employing maternal, perinatal and infant mortality as indicators of objective health are the following: WHO, 2002; World Bank, 1993; World Bank, 2001; Inter-American Development Bank, 1999; and Inter-American Development Bank, 2000.

(See Figure 4.2.2.5. in separate file)

(See Figure 4.2.2.6. in separate file)

(See Figure 4.2.2.7. in separate file)

(See Figure 4.2.2.8. in separate file)

(See Figure 4.2.2.9. in separate file)

The data shown in Figure 4.2.2.10 makes it possible to consider in more detail the differences and similarities between Spain and Great Britain in terms of the evolution of maternal mortality over the last two decades. In common with the other EU countries, in both Britain and Spain rates of maternal mortality fluctuated over the course of the period under analysis. Maternal mortality decreased rapidly during the first half of the 1980s, but less sharply until the mid-nineties. During the second half of the 1990s, mortality continued to decrease in Spain albeit at a slower rate, while in Britain in this period mortality first increased slightly and then fell. At the beginning of the 1980s, Britain and Spain had a similar maternal mortality rate; however, the rapid decrease experienced by Spain put the latter ahead of the former throughout the period.

Figures 4.2.2.11 and 4.2.2.12 track *perinatal mortality* firstly for the EU as a whole and, secondly for Spain, the United Kingdom and the EU average. Perinatal mortality is defined as the number of deaths in the first seven days of life (early neonatal deaths), plus foetal deaths of 28 weeks of gestation or more per 1,000 total births (live and stillbirths). Perinatal mortality is one of the indicators of objective health that is most clearly connected to a country's level of economic and social development.

There is substantial evidence[32] to show how this indicator is positively and significantly associated with indicators of economic growth such as the growth of GDP or the adequate evolution of macroeconomic figures. The significant association between the level of development of a society and its level of perinatal mortality helps explain why the variance among the EU member states in this respect is relatively limited (see Figure 4.2.2.11). We can see, first, that the level of perinatal mortality is quite similar in the various European countries and, second, that the rate of change of this indicator is comparable among these countries. On average, perinatal mortality declined by 50% over the period. Most

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[32] See for example: Wilkinson, 1996; Wilkinson, 1997a; Wilkinson, 1997b; Kawachi, Kennedy, Lochner and Wilkinson, 1999; and Kennedy, Kawachi and Prothrow-Stith, 1996.

(See Figure 4.2.2.10. in separate file)

Southern European countries (Portugal, Greece and Italy) show higher rates throughout the period (except Portugal for the second half of the 1990s) while the Scandinavian countries (Sweden, Denmark and Finland) together with Spain are the countries with the lowest rates. The decline in perinatal mortality has been particularly impressive in Portugal, where it fell from 23.9 deaths per 1,000 births in 1980 (over 40% above the EU average at that time) to 6.2 in 2000 (below the EU average that year).

A closer look at perinatal mortality in Spain and Britain reveals that this indicator declined to a similar degree in both countries. During the 1980s perinatal mortality was higher in Spain than in Britain; however, during the 1990s, the situation changed, Britain experiencing a slight increase which put it above Spain in this respect. As in the case of the other health indicators, for most of the period Spain ranks slightly below the EU average while Britain is a little above it.

Infant mortality rates are also widely used in international comparisons to analyse the effect of economic and social conditions on the general state of health of a society. As revealed in Figure 4.2.2.13, infant mortality has followed a similar pattern to perinatal mortality. Thus, it decreases in all European countries over the course of the period, and above all during the 1980s. There were significant differences between countries at the beginning of the 1980s; however, these decrease steadily to the extent to almost converge at the end of the 1990s. Over the last two decades, infant mortality has declined gradually in all European countries. Infant mortality rates were, on average, 60% higher in 1980 than they were in 2000 (4.9 deaths per 1,000 live births as opposed to 12.3). The drop in infant mortality, similarly to the case of perinatal mortality, has been remarkable in the case of Portugal, as it was reduced by almost five times (24.3 deaths per 1,000 live births in 1980 as opposed to 5.5 in 2000). The Southern European countries (except Spain) are once again the countries which consistently present the higher incidence of infant mortality. The Scandinavian countries, in contrast, are those which again perform best with respect to this indicator. Spain moved

(See Figure 4.2.2.11. in separate file)

(See Figure 4.2.2.12. in separate file)

(See Figure 4.2.2.13. in separate file)

closer to this group of countries during the 1990s, while Britain is close to the European average throughout the period.

Figure 4.2.2.14 reveals that Spain and Britain have followed a similar trend in infant mortality over the last two decades. Infant mortality has declined by about 60% in the Spanish case and by about 50% in the British case. In both cases the decline was more pronounced during the 1980s. Infant mortality was initially higher in Spain. During the second half of the 1980s, however, it was higher in Britain. During the early 1990s Spain again overtook Britain, while at the end of the decade British mortality rose slightly again, outstripping Spain. In any event, differences between the two countries with respect to this indicator are very minor and can be disregarded. It is also true that the divergence from the European mean is also very low.

The last indicator that I am going to use to analyse the objective state of health of the EU is *mortality rates by all causes*. Mortality rates are age-standardised death rates from all causes per 100,000 inhabitants. As can clearly be seen from Figures 4.2.2.15 and 4.2.2.16, mortality rates have been declining in Europe in recent decades. This decline has been similar across the EU and has resulted in lower variance at the end of the period. As was the case of the other indicators of objective health status, women show better results than men. Mortality rates are lower for women than for men and, on average, they have declined at a slightly faster pace (25.5% as opposed to 23%). Thus, the rate of mortality for women was 64% lower than that for men in 1980 and the difference between them rose to 69% by the end of the period.

As for national differences in absolute mortality rates, Portugal and Ireland present the highest rates for both women and men. Luxembourg also registers high levels of mortality in the case of men. On the other hand, Sweden and Spain achieve low levels of mortality for all individuals. France in the case of women and Greece in the case of men also present comparatively low mortality rates. Great Britain registers rates that in most years and for all individuals are slightly above the European average.

(See Figure 4.2.2.14. in separate file)

(See Figure 4.2.2.15. in separate file)

(See Figure 4.2.2.16. in separate file)

Mortality rates in Britain and Spain have followed a similar trend to that seen in Europe as a whole. That is, mortality rates for both women and men have declined significantly over the last twenty years. Absolute rates of mortality are higher for men than for women. The decline in mortality has been more pronounced for women than for men in Spain, while the opposite is true in Britain. In terms of the evolution of mortality rates, male mortality has decreased more significantly in Britain than in Spain (29% as opposed to 6.4%) while female mortality dropped more in Spain (27% as opposed to 23.4%). The decline in male mortality in Britain is especially remarkable, as by the end of the period the divergence with both the Spanish rate and the European mean rate had almost disappeared. This indicator for the Spanish case is always below the European average. Thus, during the 1980s and 1990s, mortality rates declined in both Britain and Spain. The decline in British male mortality was large enough to take it very close to the Spanish value by the end of the period. The female mortality rate also fell very significantly in Britain, although it is still higher than that registered in Spain.

4.2.2.3. Summary and conclusions

In this sub-section, we have examined the health status of the EU countries at the aggregate level. We have analysed both the subjective and objective dimension of health. The overall picture shows that the health of Europeans gradually improved during the 1980s and 1990s, and that women's health appears to be better than men's except for the subjective dimension. As was the case of the previous section, the purpose of this section has not been to provide a ranking of European countries in terms of their level of health, but rather to locate Britain and Spain in the European context. Nevertheless, it is worth noting some points that arise up from the analysis of the findings for each health indicator. Similarly to the previous section, I have run a multi-dimensional scaling analysis to observe whether countries form specific groups. As argued above, the aim of this analysis is not to draw a precise and complete classification of European countries in terms of their health status, but rather to observe the position of Spain and the United Kingdom in the European context. Figure 4.2.2.19 shows the multi-dimensional scaling analysis done for all the health indicators analysed in this section[33].

We can see that Spain clusters together with Sweden and France, implying that they register similar scores for the variables included in the analysis. Italy, which is the other country that shows very good health, does not cluster with these countries possibly because its scores in perinatal and infant mortality are rather dissimilar. In other words, Italy shows an excellent state of health which is comparable to that of Sweden, France and Spain, but its scores for some health indicators are very different to those of these countries.

The United Kingdom appears to group with Germany, Austria and Luxembourg. Greece is close to this group of countries although it does not seem to cluster with them. The Netherlands, Finland and Belgium form another cluster, which is very close to the group formed by the United Kingdom and some core European countries. We have seen that all these countries present rather similar values in all the health indicators analysed in the section. The mean values of these countries lie somewhere in between those of the healthiest cluster of countries and those of the group with the worst health status.

Portugal and Ireland cluster together as they have the lowest health scores across time. Denmark also presents low health scores; however, it scores slightly better than Portugal or Ireland in some health indicators such as perinatal and infant mortality. Hence, these three countries do not group together.

The multi-dimensional scaling analysis does therefore provide support for classifying Spain among the healthiest countries, and

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[33] This graph shows the results of an analysis of all health indicators except subjective health for women. I have excluded this indicator since there is no data for Greece and Luxembourg. However, an analysis including this variable groups the countries in a similar way. The data used date from 1995.

locating the United Kingdom close to the EU mean. Another conclusion which can be drawn from the multi-dimensional scaling is that although countries form distinctive groups, we can also see that with the exception of Italy and Denmark, countries are placed on a single continuum (i.e. left to right dimension), which suggests that there is a high correlation between the different measures of health.

The analysis of the health indicators presented in this sub-section suggests four other interesting points. First, we have seen that the subjective dimension and the objective dimension present, to a certain extent and for some countries, divergent results. Thus, some of the countries that score well for almost all objective indicators (i.e. Spain and Italy) show, in contrast, low scores in the subjective dimension. On the other hand, Ireland is characterised by the large proportion of people reporting good or very good health, but also by its poor level of objective health. The other countries present more congruent scores in the subjective and objective dimensions of health (e.g. France has a very good ranking both for the subjective and the objective dimension). This is an interesting finding since, as we will see in Chapters 5 and 6, the subjective dimension of health is significantly correlated with individuals' objective health in the long term. This divergence in the findings between the aggregate level of analysis and the individual level of analysis will be further discussed in Chapter 7.

Another relevant finding for our understanding of the state of health of Britain and Spain is the position that these countries occupy in comparison to the other European countries. The position of France, Sweden, Italy and Spain is very clear. This group of countries consistently registers the best scores for all the indicators of objective health indicators analysed here (with the exception of Italy for infant mortality). Hence these countries are the healthiest during the period under analysis. The improvement registered in the health of all the EU countries has not been sufficient to reduce the gap between this group of countries and the rest. Spain is thus one of the healthiest countries in Europe. It boasts the third highest life expectancy at birth; the second highest

(See Figure 4.2.2.17. in separate file)

(See Figure 4.2.2.18. in separate file)

(See Figure 4.2.2.19. in separate file)

life expectancy at age 65 for women and the third highest for men; the lowest maternal mortality; the third lowest perinatal mortality, the third lowest infant mortality; the second lowest mortality for women and the fourth lowest for men.

A third interesting finding is that the United Kingdom is in good health, although its scores for the different health indicators are lower than those of Spain and, in some cases at least, the European mean. The only indicator for which Britain scores slightly better than Spain is the subjective dimension. As will be seen in Chapters 5 and 6, this finding is repeated when we analyse subjective health at the individual level. On average, Britain ranks tenth in terms of overall life expectancy; twelfth for life expectancy at age 65 for women and tenth for men; tenth with respect to maternal mortality; twelfth in both perinatal and infant mortality; twelfth in female mortality and eighth in male mortality. The British state of health thus appears to be close to that of the European mean. A closer examination of the health indicators over time shows that the United Kingdom scores close to some core European countries such as Germany, Austria and Luxembourg.

The final finding of note concerns the overall evolution displayed by the other countries. In general, all countries saw an improvement in their health, both subjective and objective, during the period under analysis. For instance, average life expectancy at birth increased by five years and average life expectancy at age 65 by four years, while mortality rates declined by about a third during the period. Europeans were therefore significantly healthier at the end of the 1990s than at the beginning of the 1980s. It is also interesting to consider the general improvement in relative terms, that is, to examine the variation in the health gap between countries. The evolution of the health indicators shows that throughout the period some countries consistently figure in the best positions (i.e. France, Sweden, Italy and Spain), at the same time as some other countries consistently register the worst health condition (i.e. Ireland, Portugal and, in some cases, Denmark). The other countries (i.e. Austria, Germany, Finland, the United Kingdom, Luxembourg, Belgium, the Netherlands and Greece) in most cases occupy intermediate positions between these two extremes. This ranking of countries remains almost constant over time. Thus, the general European health improvement is such that countries maintain a similar ranking throughout the 1980s and the 1990s.

4.3. The general state of health of Britain and Spain at the individual level

Until now, this chapter has analysed the general state of health of the British and the Spanish populations at the aggregate level. It has been seen that while Spaniards' objective health appears to be better than that of the British, the United Kingdom appears to enjoy slightly better subjective health. The aim of this section is to complement this general aggregate analysis by introducing health outcomes at the individual level. The section will therefore present an analysis of the variables that will be employed in the following two chapters, which aim to disentangle the association that links class and health at the individual level. The objective of the section is to present a clear picture of how health is distributed in England and Spain at the individual level, emphasising the analysis of the allocation of this resource among social classes. The data presented in the section come from the *Encuestas Nacionales de Salud* for Spain and from the *Health Surveys for England* for the United Kingdom (which only covers England)[34]. It is therefore the same data that will be employed in Chapters 5 and 6 devoted to the detailed analysis of the association between class and health. This section will focus on the analysis of the dependent variable of the research, that is, the state of health. Appendix C will present some information that complements the information presented in this section. This shows the distribution

[34] The analysis of health at the individual level for the British case only refers to England as the survey used analyses a sample of individuals living in England. To the best of my knowledge, no equivalent survey examines individuals from all the countries that make up the United Kingdom.

at the individual level of the explanatory variables of the research, that is, education and living habits. Chapter 4 will end by providing an overview of the state of health at the individual level as observed during the mid-1990s in Spain and the United Kingdom.

Chapter 3 presented the definition and indicators of health status as well as of the other variables used in the individual-level analysis. The definition of health included a subjective dimension of health (i.e. the degree to which individuals feel well) as well as the objective aspect of health (i.e. their actual capacity to carry out their daily activities normally). In this section, I will present the distribution of the objective and the subjective indicators of health at the individual level.

Figures 4.3.1 and 4.3.2 present the subjective health dimension for women and men in Spain and England. In all cases, almost two thirds of the individuals place themselves in the categories corresponding to "good" or "very good" health. The "poor" and "very poor" categories of health account for under 8% of the Spanish population and less than 5% of the English respondents. The remaining value, "fair", accounts for slightly less than 20% of the population in both countries. Thus, irrespective of gender or nationality, the vast majority of the population enjoys a healthy subjective condition.

Regarding differences in the subjective condition of men and women, it can be seen that if we take the values "good" and "very good" together, the gender gap is only relevant in the Spanish case, where there is a percentage difference of some 8 points between men and women. Thus, a slightly lower proportion of Spanish women than men consider their health to be good or very good, whereas in England there is an insignificant difference between the two sexes. When nationality is taken into account, it can be seen that Spanish women are also in a worse position than their English counterparts. This gap between countries is only found in the case of women. In the case of men, the percentage reporting "good" or "very good" health is similar.

(See Figure 4.3.1. in separate file)

(See Figure 4.3.2. in separate file)

This finding does not totally concur with the data presented on subjective health at the aggregate level in the previous section. There it was shown that a gap exists in favour of England for both men and, above all, women. Although the question used to measure this indicator of health was the same in both cases, the timing was not, a factor, which may help account for this divergence[35].

The health surveys analysed in this section allow us to consider the degree of "good health" in a more disaggregated fashion. Thus, we can see that irrespective of gender there are differences between the two countries in the two categories of health: responses of "good health" are more frequent among the Spanish population and "very good health", on the contrary, more frequent among the English.

The empirical evidence presented in the previous two figures shows that there are differences in the subjective dimension of health among men and women and also between England and Spain. For the main objective of the research, that is to deepen our theoretical and empirical understanding of the link between class and health, it is evidently necessary to consider whether there are health inequalities between different social classes. In order to do so, it is important to see if the association between class and the different explanatory variables is statistically significant. To this end, the following tables include the result of the chi-square test, which tests whether the observed frequencies for each category of the variable differ from their expected values under the null hypothesis of no association between social class and health[36]. If the relationship between the two variables proves to be significant,

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[35] The data on subjective health status from this section is from the pooled data from 1993 and 1995 whereas that from the previous section is from 1997. As stated above, the aggregate-level data used refers to Great Britain as a whole, whereas the individual-level data refers to England alone, a factor which clearly accounts for some of the differences in results found at the two levels of analysis.

[36] All cross tabulations presented in this section are statistically significant at a 95% confidence level unless otherwise stated. The relevant test in each case (the chi-square test) shows that the association between the two variables included in the table is statistically significant with a 95% confidence level.

it will then be important to test whether the association is significant in a disaggregated way, that is, for each category of the class variable. Thus, for example, Tables 4.3.1 to 4.3.4 show the distribution of subjective health among social classes. For each class, the tables present the percentage of individuals that define their health as "very poor", "poor", "fair", "good" or "very good". Each cell also includes the standardised residuals, which is an adequate measure of the statistical significance and the degree of independence between the dependent and the independent variables[37]. Generally speaking, it can be seen there are significant health inequalities among the social classes, which mainly favour the more privileged classes. As will be seen below, health inequalities appear to be greater in England than Spain. It is more complicated to analyse these differences in terms of gender, as the pattern is not always clear. However, as we will see, very roughly speaking, class differences seem to be greater for women in Spain, whereas in England they are larger for men. In what follows, I will describe in more detail the findings for the association between class and health in both countries firstly for men and secondly for women.

Table 4.3.1 shows that the category "good health" is the largest one for all classes. Thus, most women define their health as good irrespective of class. However, the residuals show that the association between most class categories and good health status is significant and large and favours the most advantageous classes. This can clearly be seen in the value of the residuals from class I versus the residuals for classes VIII or IX. The category "poor

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[37] As explained in Chapter 2, the standardised residuals are the difference between an observed value and the expected value divided by the square root of the residual mean square. The expected value is the number of cases that would be expected in the cell if there were no relationship between the two variables. A positive residual indicates that there are more cases in the cell than there would be if the dependent and the explanatory variables were independent. Hence, in the case of a cross tab between class and subjective health, if there is a positive and significant –i.e. larger than |1.96|- standardised residual in a cell then there are more individuals in that category of subjective health than we would expect were class and health independently distributed.

health" also clearly shows that there are health inequalities and that the association between class and health operates in a negative direction. For instance, there are fewer women in class I than might be expected were class and health independent. On the other hand, classes VIIab or IX contain more women than we would expect if class and health were independent.

Table 4.3.2 shows the link between class and health for women in England. The large value of the residuals implies that health inequalities seem to be greater among English than Spanish women. Hence, similarly to the Spanish case, health inequalities favouring the more privileged classes are significant, although they are also greater in the English case. The sequence of the value of the residuals for the "very good" and the "poor" health categories are highly significant in this sense. The large value of the residuals shows that health inequalities are especially important for the higher-grade professionals in comparison to the other classes.

Health inequalities are also significant among men in both England and Spain. Tables 4.3.3 and 4.3.4 show that similarly to the case of women, class inequalities are greater in England than in Spain. For men too, inequalities favour those classes with occupations with higher qualifications. In the case of Spain, we can see that the residuals for the health categories "very good", "good" and "poor" follow a pattern that would be expected if the two variables had a statistical significant relationship, which favours the more privileged social classes. Table 4.3.4 shows that men in England follow a similar pattern to men in Spain. That is, there are clear and significant health inequalities, which operate in the same direction in favour of the higher classes. Inequalities, similarly to the case of women, are greater in England than in Spain. The large value and the sign of the residuals for all the health categories, except the middle one, provide clear and significant evidence of this.

(See Table 4.3.1. in separate file)

(See Table 4.3.2. in separate file)

(See Table 4.3.3. in separate file)

(See Table 4.3.4. in separate file)

As stated above, individuals' health has been defined in this research as the degree of subjective well-being individuals feel, as well as their objective capacity to function normally. As argued in Chapter 2 the objective dimension of health has been operationalised through an indicator of short-term health as well as an indicator of respondent' long-term health condition [38]. Chapter 3 presented a justification for the use of chronic illnesses as an indicator of long-term health. Figures 4.3.3 and 4.3.4 present the distribution of chronic diseases among men and women. Almost three fifths of the population are free of chronic diseases; around a fifth suffer from one, and the rest suffer from two or more, although the percentages are close to zero after three illnesses. In this case, the pattern for men and women is very similar and no significant differences can be observed. As for any differences between England and Spain, it can be seen that these too are minor; however, chronic illnesses appear to be slightly more frequent in England than in Spain for both men and women.

Since the main aim of the thesis is, first, to discover if there are health inequalities among social classes and, second, to account for any such differences, it is crucial to know the distribution of chronic illnesses among social classes. Tables 4.3.5 to 4.3.8 present the distribution of this indicator among the different social classes for both men and women. Irrespective of gender, most individuals do not suffer any chronic illness. However, differences do exist between social classes, and the percentage of individuals with no major long-term health complications decreases as we move from the professionals to the less-qualified classes (e.g. column 1 Table 4.3.5). Symmetrically, in most cases, the percentage of individuals with long-term health problems increases slightly as we move from class I to class IX (e.g. column 3 Tables 4.3.5 and 4.3.6), although this increase is not linear.

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[38] This section does not include an analysis of the indicator of short-term health. This indicator is a continuous variable, which is the result of a factor analysis. A cross tabulation between social class and short-term health would therefore not be possible.

(See Figure 4.3.3. in separate file)

(See Figure 4.3.4. in separate file)

As argued above, the standardised residuals for each cell constitute an accurate indicator of the association between social class and the health indicator in question. The standardised residuals from Tables 4.3.5 to 4.3.8 indicate that, in general, health inequalities seem to be greater in England than in Spain although the difference is very small. That is, the less advantaged social classes show more individuals with a long-term disease than we would expect were there no relation between class and chronic illnesses. Similarly, there are fewer individuals from the higher social classes with a long-term complaint that we would find if these two variables were not significantly related. As for gender differences, as the value and sign of the residuals show, health inequalities among the social classes seem to be slightly greater for women than for men in both countries. In most cases we find, therefore, a significant social gradient with respect to long-term ill health in favour of the more socially privileged. The gap between the social classes is more pronounced among women than men.

As regards a more detailed analysis of the relation between class and long-term health for women, the sign and magnitude of the residuals from Tables 4.3.5 and 4.3.6 indicate that there is a stronger and more pronounced relation in the English case, even if this is not as clear as it was for subjective health. In general, the value of the coefficients for both countries is lower and in many cases they are not statistically significant. However, England seems to show a larger difference in the residuals between the first and the last classes for individuals that have two or three or more chronic illnesses.

With respect to health inequalities among men, the distribution of chronic diseases among the social classes is more similar than in the case of women. Compared to the subjective health dimension, the variation among classes in the frequency of having chronic illnesses is significantly lower. Although the association as a whole between class and chronic illnesses is significant, in most class categories this association is not significant. It is therefore difficult to assess whether England and Spain show different degrees of health inequalities among men in the long-term. Hence, although the value of the standardised residuals for some class categories in England (e.g. classes I and II for the category "no chronic illnesses") shows that the first class categories suffer less in the long-term than what we would expect, it would not seem reasonable to derive any conclusions from this with respect to the differences between the two countries. Chapters 5 and 6 will provide further information that will allow us to examine this question in more detail.

In short, in this section I have described the general state of health of the Spanish and the English population measured at the individual level. We have seen that health inequalities exist in both countries favouring the more privileged social classes, and that the inequality is particularly pronounced with respect to self-perceptions of health. Although the exact size of this gap is not easily quantifiable on the basis of the analysis developed so far, it can be said that inequalities seem to be rather greater in England than in Spain for both men and women. With respect to the gender differences within each country, women appear to have poorer health than men in Spain, whereas in England the opposite would appear to be true. This analysis, has therefore, resulted in some interesting findings that I will summarise in the following paragraphs.

We have seen that irrespective of gender or nationality, the vast majority of the population (around 70%) enjoys good health. The comparison of both countries shows that English women feel healthier than Spanish women do, whereas there are no significant differences between men in the two countries. Another interesting difference between the two countries is that within the categories denoting good health condition (i.e. "good" and "very good") England shows an even distribution (approximately 40% define their health as "good" and 30% as "very good") while Spain does not (60% of Spaniards consider their health to be "good" and "10%" evaluate "very good"). This constitutes further evidence for the better subjective health of the British population.

(See Table 4.3.5. in separate file)

(See Table 4.3.6. in separate file)

(See Table 4.3.7. in separate file)

(See Table 4.3.8. in separate file)

As for the association between subjective health and social class, as the chi-square test shows, both countries show the existence of a statistically significant relationship favouring privileged social classes. In Spain, the inequalities are greater for women, whereas in England they are greater in the case of men. The analysis of the standardised residuals has shown that inequalities for both men and women are greater in England than in Spain.

Objective health has been studied through the number of chronic illnesses, a measure that indicates individuals' long-term health. Both England and Spain present a very similar distribution for all individuals: around three-fifths do not suffer any chronic illness; one-fifth present one; and another fifth suffer from two or more such conditions. The percentage of people presenting some chronic illness is slightly higher in England. Similarly to the subjective dimension of health, chronic illnesses are distributed unequally among social classes favouring classes I to IIIab. The inequalities are greater in England than in Spain and for women in both countries.

4.4. Summary and conclusions

The main objective of this chapter has been to analyse the state of health of the English and Spanish populations in the mid-1990s. To examine in detail the health status of these two countries is a necessary step in order to answer adequately the two main research questions of the thesis, that is, to analyse if there is a significant association between an individuals' class position and her health status as well as to provide an explanation for this association. Chapter 4 has provided evidence to answer the first question. Chapters 5 and 6 will provide an answer to the second question.

The aim of the chapter has been fulfilled through the analyses presented in the two main sections. The first section has included an analysis of the general state of health of the English and

Spanish populations at an aggregate level. The section has presented an analysis of the evolution during the 1980s and the 1990s of the main health indicators. This section began by analysing the origin, structure and functioning of the English and Spanish health care system putting them into a European context. The second section of the chapter has been devoted to the analysis of the state of health of England and Spain at an individual level. This analysis has been done through an examination of health indictors measured at an individual level. In the following paragraphs, I will present a summary of the main findings.

The analysis of general state of health at an aggregate level was preceded by an examination of the main similarities and dissimilarities between the English and the Spanish Health care systems in sub-section 2.1. The principles governing both systems are similar as the Spanish *Sistema Nacional de Salud* founded in 1986 was inspired by the British NHS. The continuous reforms implemented in both systems during the 1980s and early 1990s resulted in two systems with very similar structures and guiding principles. The section presented two different classifications of health care systems put forward by the OECD. In accordance with both classifications, most elements of both systems can be classified in the same type of system (i.e. the pubic integrated model financed mainly through taxation and with mainly public provision of services although there is also some private provision). Thus, in the mid-1990s, the functioning and organisation of the two health care systems were largely similar.

The section then turned to the analysis of the evolution of the main health care inputs for the European health care systems. The sub-section consisted of an examination of the two main elements of any health care system: its resources and its utilisation. We saw that the evolution of most of these indicators led to a shrinking of the gap between systems by the end of the period. The evolution of countries in terms of systems' resources and utilisation rates was such that differences among countries at the beginning of the period slowly and gradually declined, although in most cases they did not actually disappear. Regarding the inputs of the system, we saw that total health employment has increased significantly and that despite the pressure for cost containment, total expenditure on health increased throughout the period although some of this rise was due to an increase in private funding. In relation to the rates of utilisation of health care systems, the evolution has been characterised by a general increase in the use of the system and by a change in the type of medical practice, which has shifted from intensive in-patient care to day-surgery and treatments.

The multi-dimensional scaling analysis computed from all health care inputs and indicators of health care utilisation presented evidence in support of this general evolution of the indicators of health care and showed three distinctive clusters of systems. England and Spain group together with the other Southern European countries (i.e. Italy, Greece and Portugal). This group is characterised by low rates of total health employment, low rates of available in-patient beds and low health expenditure rates, although expenditure increased significantly during the period. This group is also characterised by presenting a shift towards private funding, which is greater in the cases of Spain and England. The rates of utilisation of health care resources increased during the entire period, although they remained the lowest in Europe. Thus, the analysis of the evolution of health care inputs shows the increasing similarity of the Spanish and the English health care systems.

The next sub-section of the chapter, section 2.2, analysed Spain and England's aggregate-level health. The two dimensions of health, that is, the subjective and the objective dimensions, have been studied for Spain and England but also for the other EU countries over the course of the 1980s and 1990s. The general picture shows that Europe's health has gradually improved, and that women enjoy better health than men, except in the subjective dimension. Despite improvements in health outcomes, there are still significant differences among countries. As a result, there exists a well-defined ranking of countries in terms of the health of their inhabitants. Spain, together with France, Sweden and Italy belongs to the group of countries with the healthiest populations.

The scores resulting from the multi-dimensional scaling analysis show that on the basis of its life expectancy at birth, life expectancy at age 65, maternal mortality, infant mortality and mortality, Spain clusters alongside Sweden and France. England, in turn, also enjoys good health at the aggregate level, even if it ranks slightly behind Spain. For most of the indicators, England scores very close to the European average. As the multi-dimensional scaling analysis shows, England groups together with some core European countries such as Germany, Austria and Luxembourg. Thus, the analysis included in this section shows that the state of health of England and Spain has significantly improved during recent decades. Spaniards enjoy better objective health than the English, although, in contrast, the English score better in subjective terms.

The third section of the chapter complements this analysis. It does so by including an analysis of the state of health of Spain and England at the individual level. The analysis has been carried out using the health surveys that will be the matrix of data for Chapters 5 and 6. This section examines the distribution of the indicators of health across the social structure in order to study the link between health and social class. We have seen that both England and Spain enjoy good subjective and objective health, with the former being in general better in England and the latter better in Spain. In both countries, health levels vary across the various social classes, the differences favouring the privileged classes. The analysis of the standardised residuals shows that health inequalities are greater in England than in Spain for all individuals, and especially in the subjective health dimension.

The chapter has therefore provided sufficient empirical evidence to answer the first question posed in this thesis. Thus, in the mid-1990s England and Spain showed health inequalities across social classes. The sign and direction of this gap is as hypothesized, that is, a movement from professional classes towards the lower class categories implies a general decline in the state of health. Now the first research question of the thesis has been answered, the following two chapters will seek to answer the second main research question. Chapters 5 and 6 will empirically test the theoretical explanation offered in this thesis for the causes of health inequalities. Thus, the following two chapters will firstly quantify the exact extent of health inequalities among social classes for Spain and England, and secondly test the theoretical mechanisms presented in Chapter 2.

However, before embarking on the empirical analysis that examines the adequacy of the mechanisms of explanation, it is necessary to find out to what extent the structures of inequality of Spain and England are similar. To understand how certain resources such as education or lifestyles are distributed across social classes will prove useful for understanding the operational mechanisms between class and health. As the full results are analysed in Appendix C, here I will merely summarise the main conclusions. The appendix shows that both England and Spain are stratified societies, although the stratification differs in some respects. Spanish society, first, shows lower labour market participation (especially for women) and a large percentage of the occupations are unqualified and manual. England, on the other hand, in the mid-1990s, had a larger active population with a large percentage working in skilled and non-manual occupations. Differences between both countries are more pronounced for women than for men. Appendix C also shows that the English population is more educated than the Spanish one, independently of gender. The analysis also shows that the differences between the social classes are greater in England. The distribution of civil status is similar in both countries although people remain single more frequently in Spain and divorce more often in England. The analysis also shows a distribution of individuals' lifestyles. We can see that there are no significant differences between both countries in smoking behaviour (two thirds of the population are non-smokers) and in the practise of physical exercise (between 60 and 80% of the population have a sedentary lifestyle). There are some differences though in relation to drinking behaviour (the English show higher levels of alcohol consumption) and the BMI (English men and women are more obese than their Spanish counterparts). In most cases, the association between living habits and social class is not statistically significant; in those cases in which it is (e.g. smoking behaviour for men in England, drinking behaviour for men in Spain, level of physical exercise for all individuals in both countries), there is no clear social pattern except for the association between BMI and class that clearly shows a social gradient favouring the most privileged social classes.

Figure 4.2.1.1: Total health employment in the EU

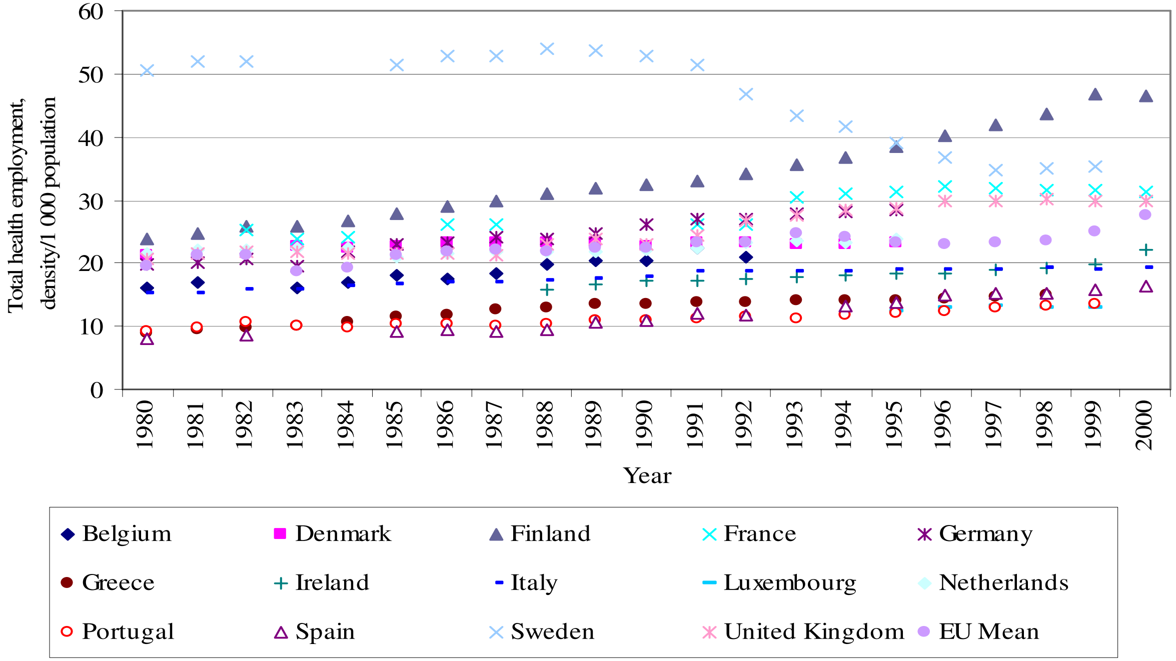


Figure 4.2.1.2: Total health employment in the EU (mid-1990s)

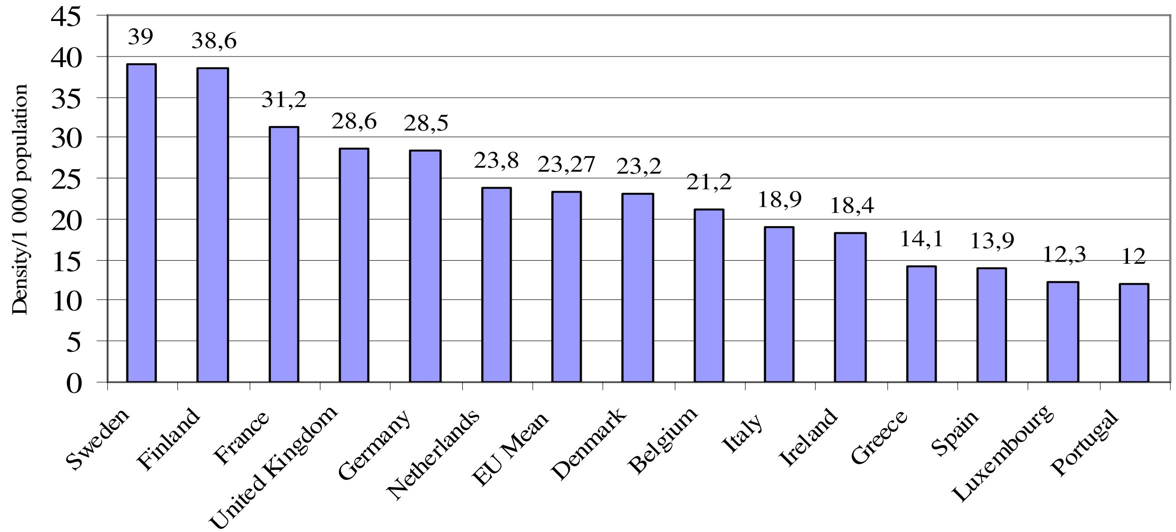


Figure 4.2.1.3: Total health employment in Spain and the UK

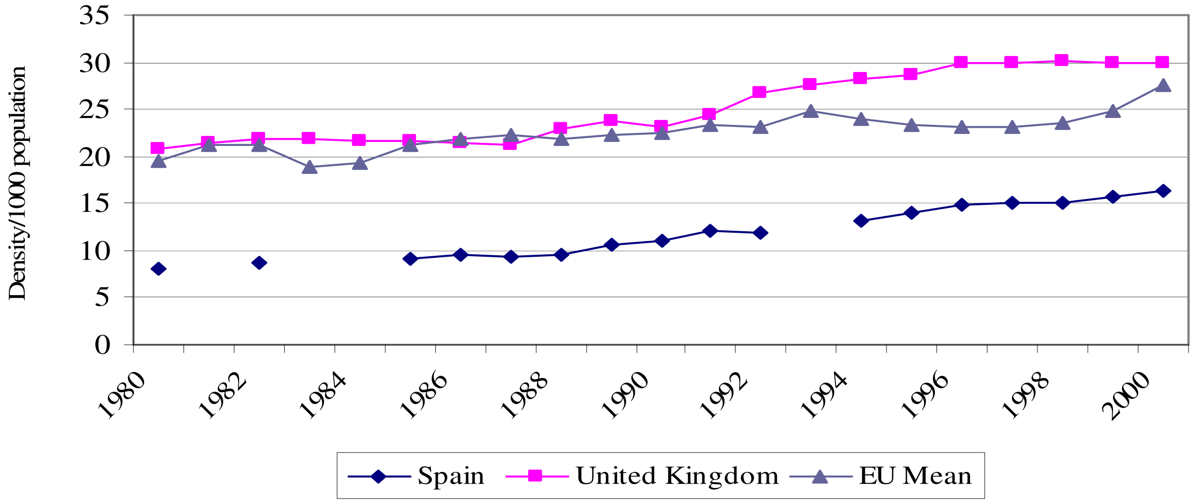


Figure 4.2.1.4 : Practising physicians in the EU

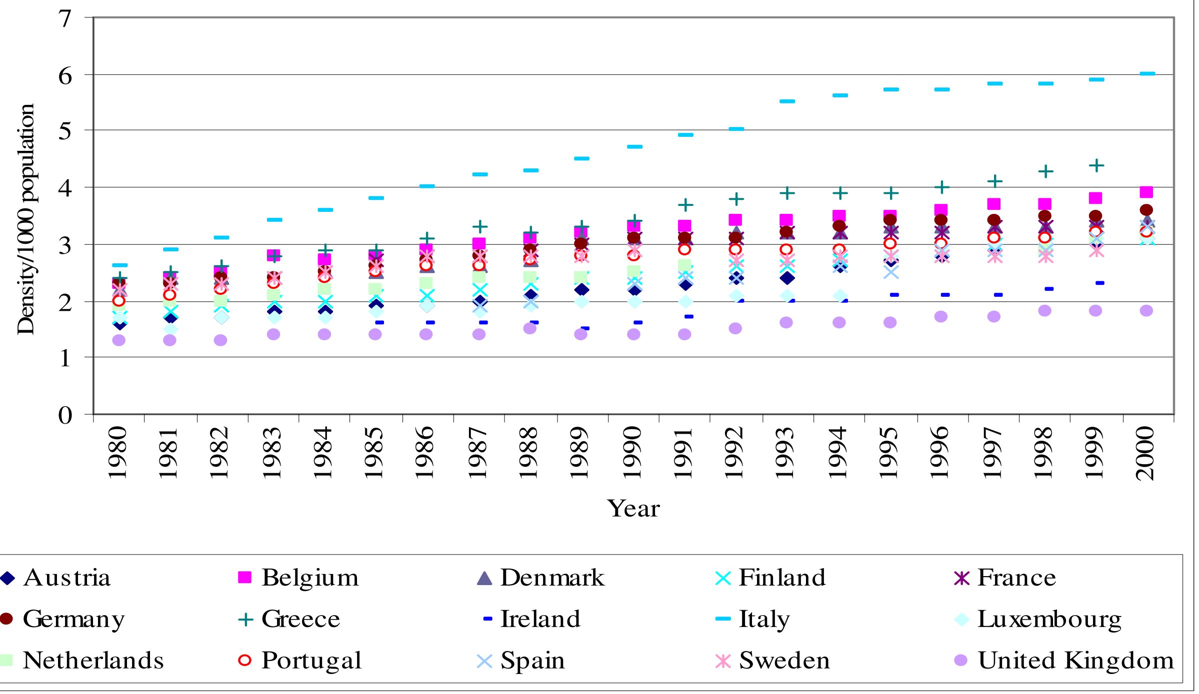
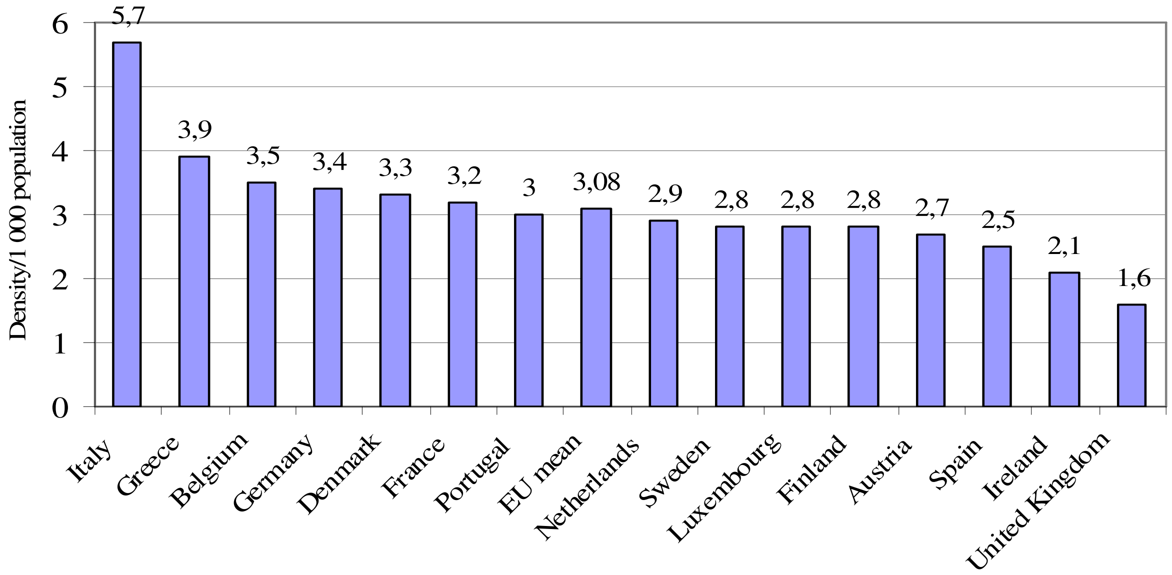


Figure 4.2.1.5: Practising physicians in the EU (mid-1990s)



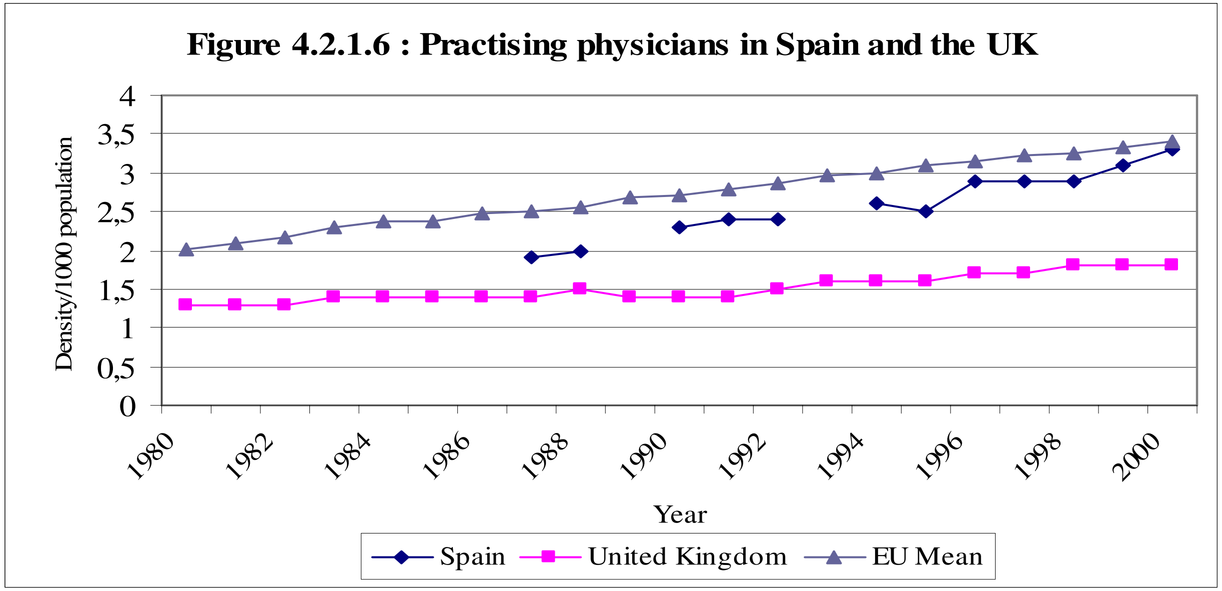


Figure 4.2.1.6 : Practising physicians in Spain and the UK
Density/1000 population
4
3,5
3
2,5
2
1,5
1
0,5
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
Year
Spain
United Kingdom
EU Mean

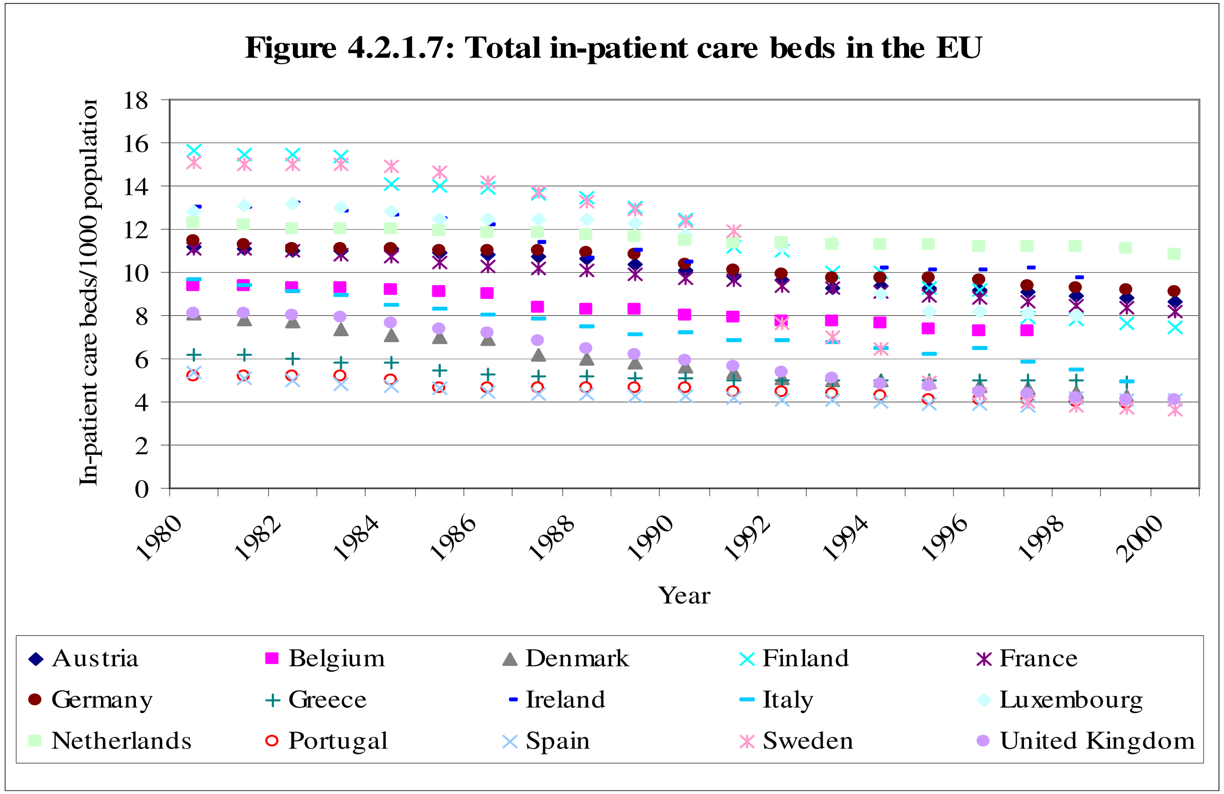


Figure 4.2.1.7: Total in-patient care beds in the EU
In-patient care beds/1000 populatior
18
16
14
12
10
8
6
4
2
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
Year
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom

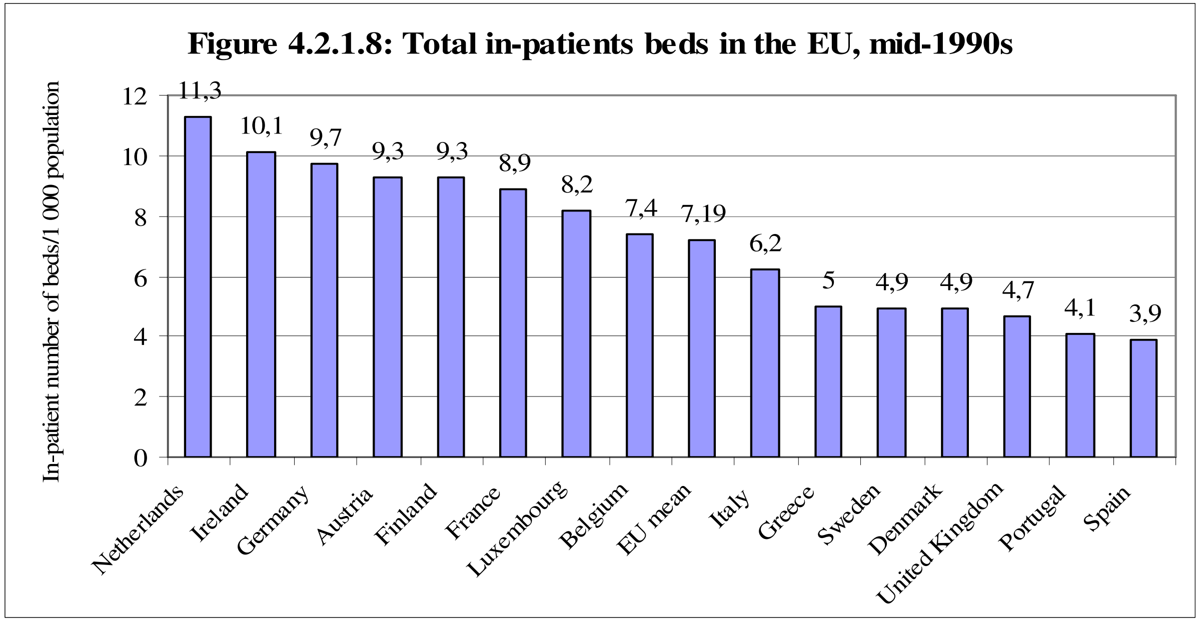


Figure 4.2.1.8: Total in-patients beds in the EU, mid-1990s
In-patient number of beds/1 000 population
0
2
4
6
8
10
12
11,3
10,1
9,7
9,3
9,3
8,9
8,2
7,4
7,19
6,2
5
4,9
4,9
4,7
4,1
3,9
Netherlands
Ireland
Germany
Austria
Finland
France
Luxembourg
Belgium
EU mean
Italy
Greece
Sweden
Denmark
United Kingdom
Portugal
Spain

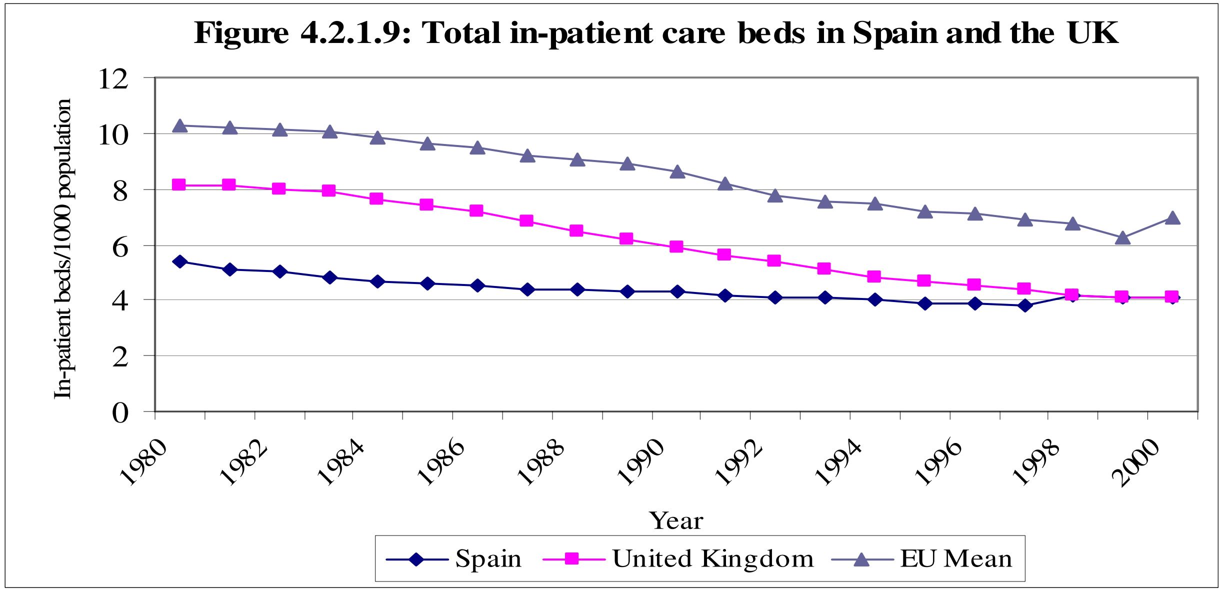
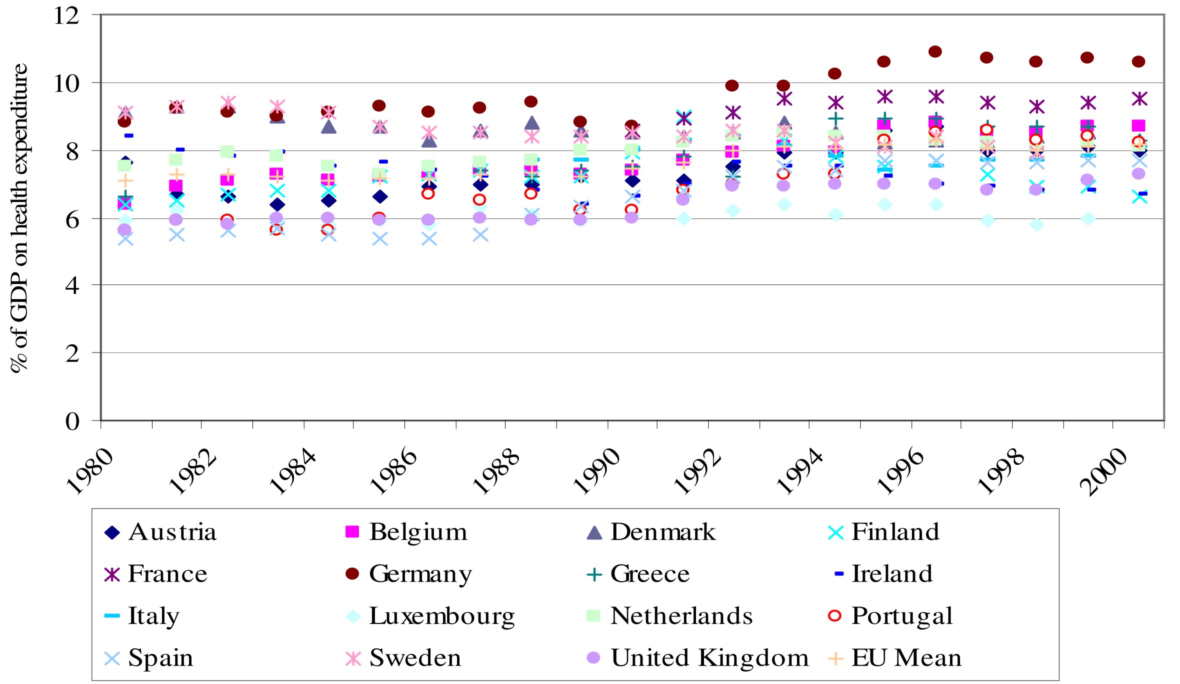


Figure 4.2.1.9: Total in-patient care beds in Spain and the UK
In-patient beds/1000 population
12
10
8
6
4
2
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
Year
Spain
United Kingdom
EU Mean

Figure 4.2.1.10: Health expenditure in the EU



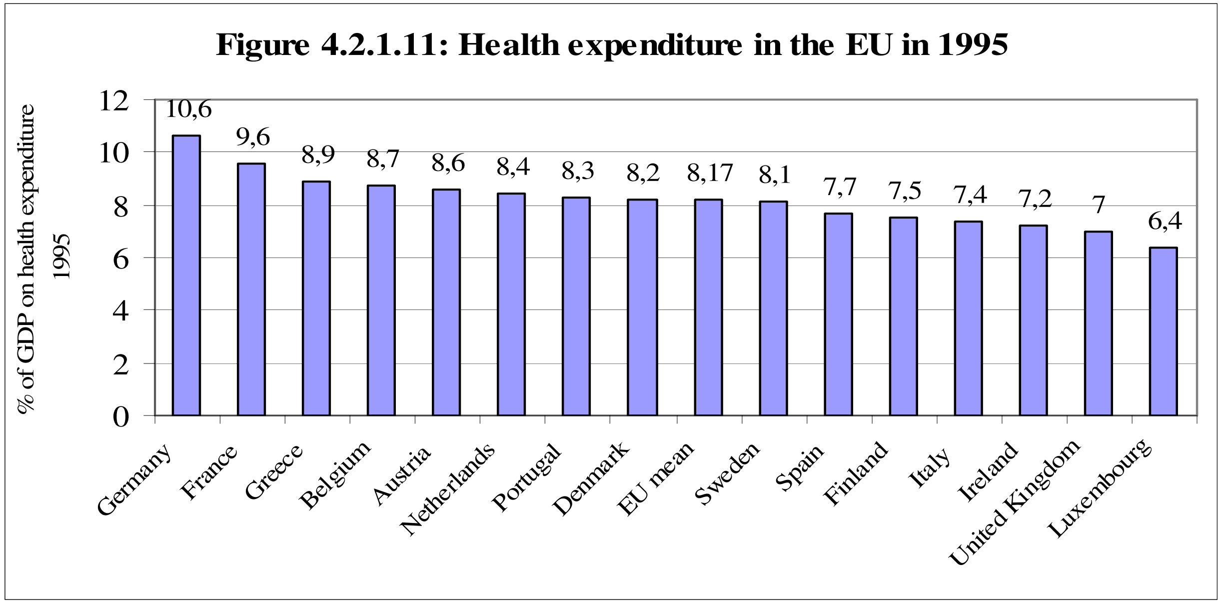
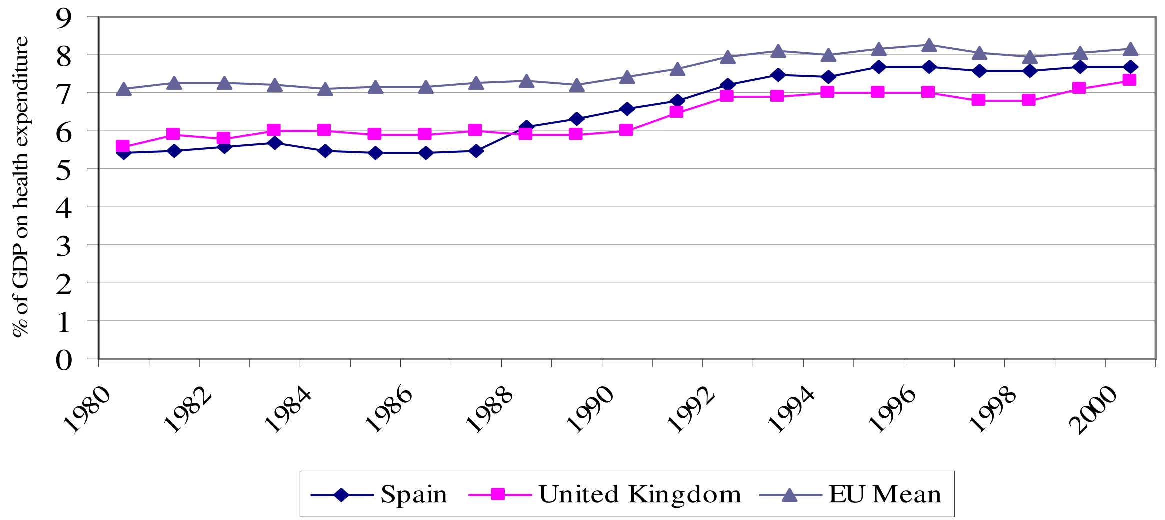


Figure 4.2.1.11: Health expenditure in the EU in 1995
% of GDP on health expenditure 1995
12
10
8
6
4
2
0
10,6
9,6
8,9
8,7
8,6
8,4
8,3
8,2
8,17
8,1
7,7
7,5
7,4
7,2
7
6,4
Germany
France
Greece
Belgium
Austria
Netherlands
Portugal
Denmark
EU mean
Sweden
Spain
Finland
Italy
Ireland
United Kingdom
Luxembourg

Figure 4.2.1.12 : Health expenditure in Spain and the UK



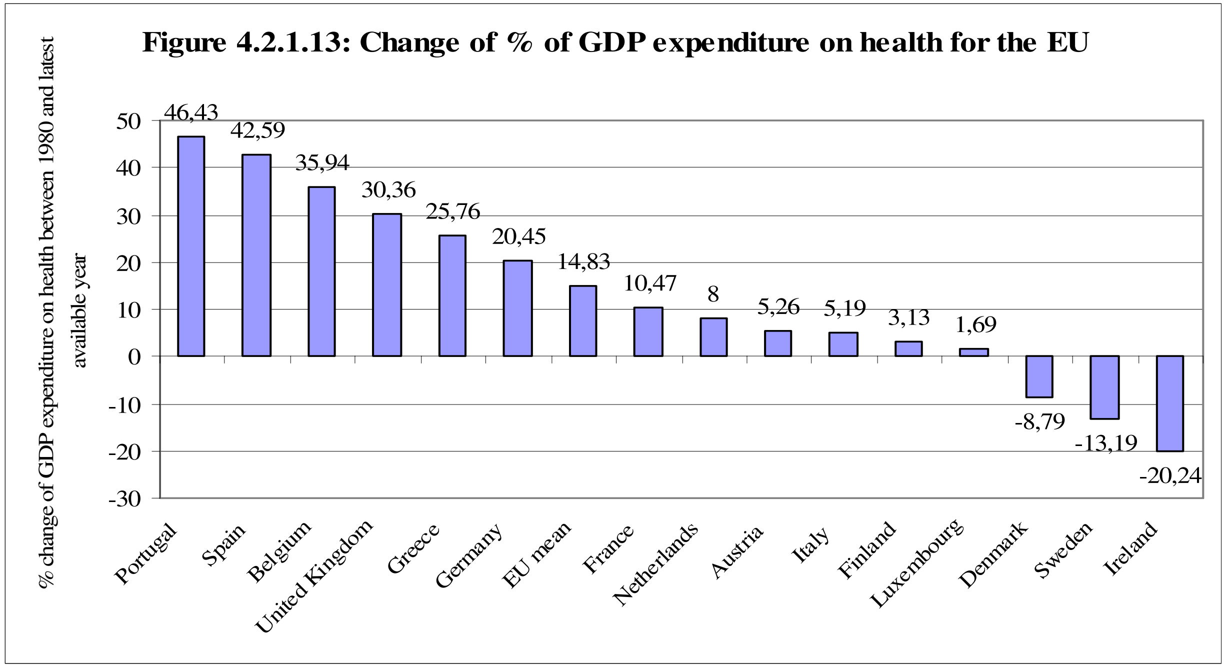


Figure 4.2.1.13: Change of % of GDP expenditure on health for the EU
% change of GDP expenditure on health between 1980 and latest available year
50
40
30
20
10
0
-10
-20
-30
46,43
42,59
35,94
30,36
25,76
20,45
14,83
10,47
8
5,26
5,19
3,13
1,69
-8,79
-13,19
-20,24
Portugal
Spain
Belgium
United Kingdom
Greece
Germany
EU mean
France
Netherlands
Austria
Italy
Finland
Luxembourg
Denmark
Sweden
Ireland

Figure 4.2.1.14 : Average annual growth of health expenditure in Spain and in the UK

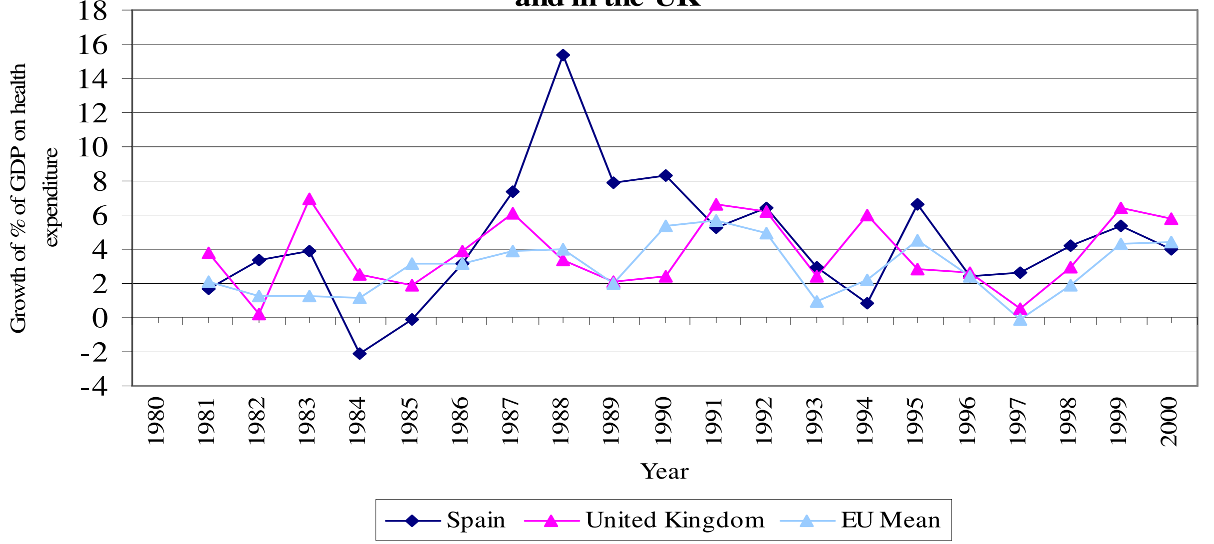
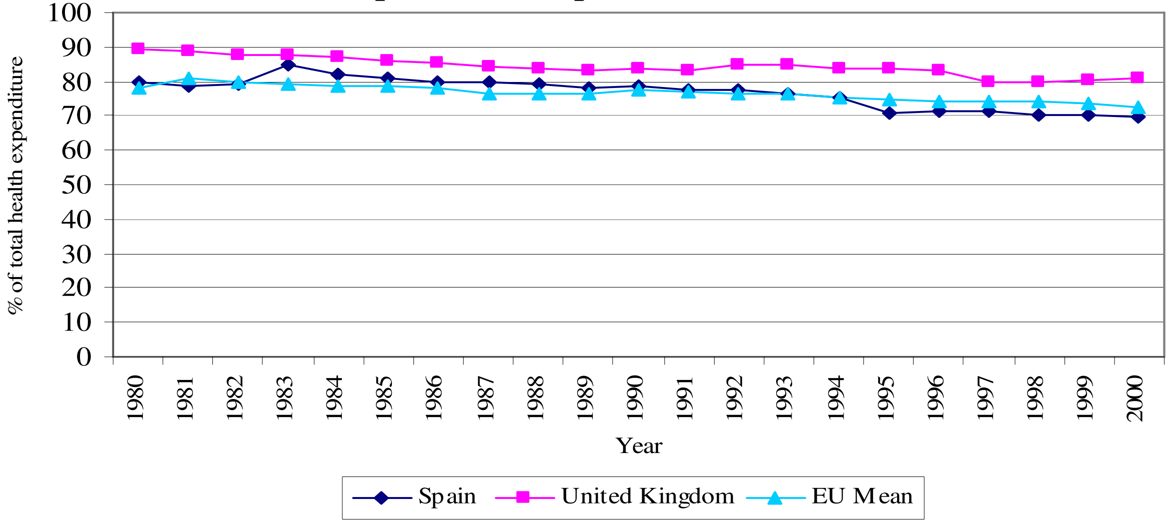


Figure 4.2.1.16 : Public funding as a percentage of total health expenditure in Spain and the UK



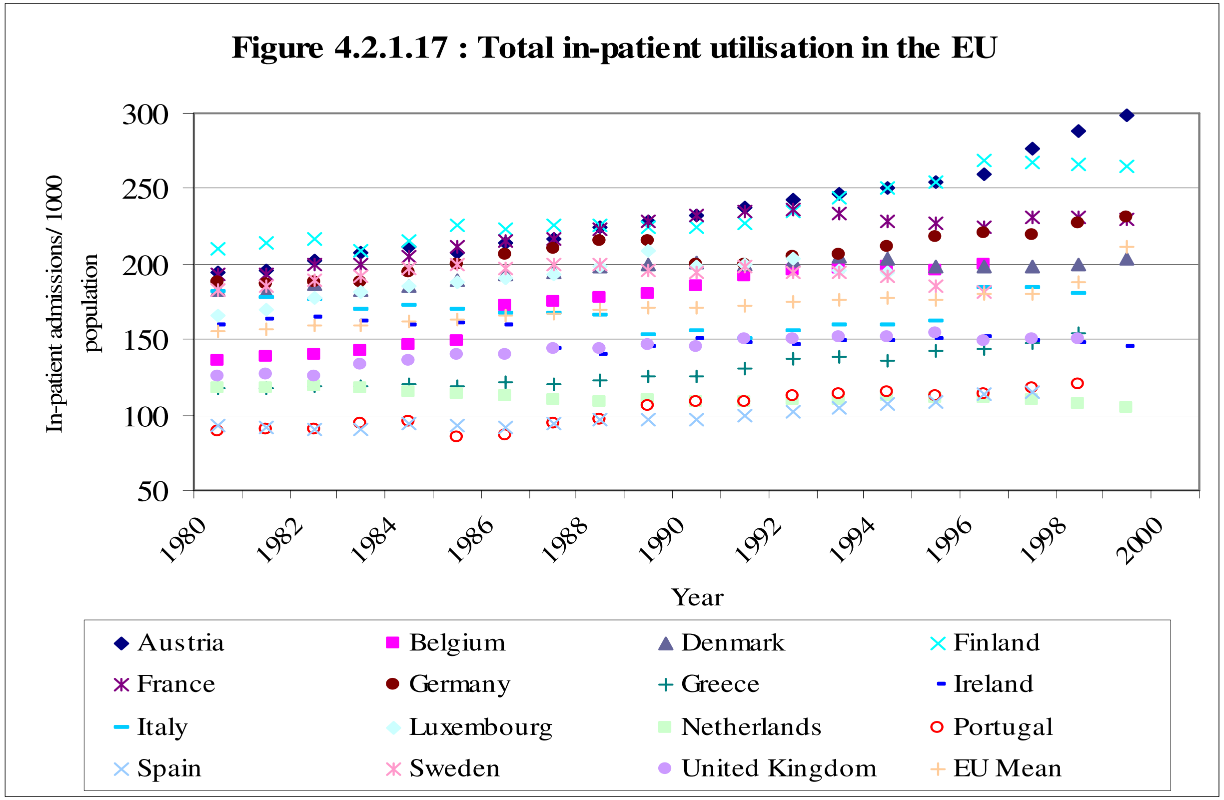


Figure 4.2.1.17 : Total in-patient utilisation in the EU
In-patient admissions/ 1000 population
300
250
200
150
100
50
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
Year
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom
EU Mean

Figure 4.2.1.18: Total in-patient utilisation in the EU (mid-1990s)

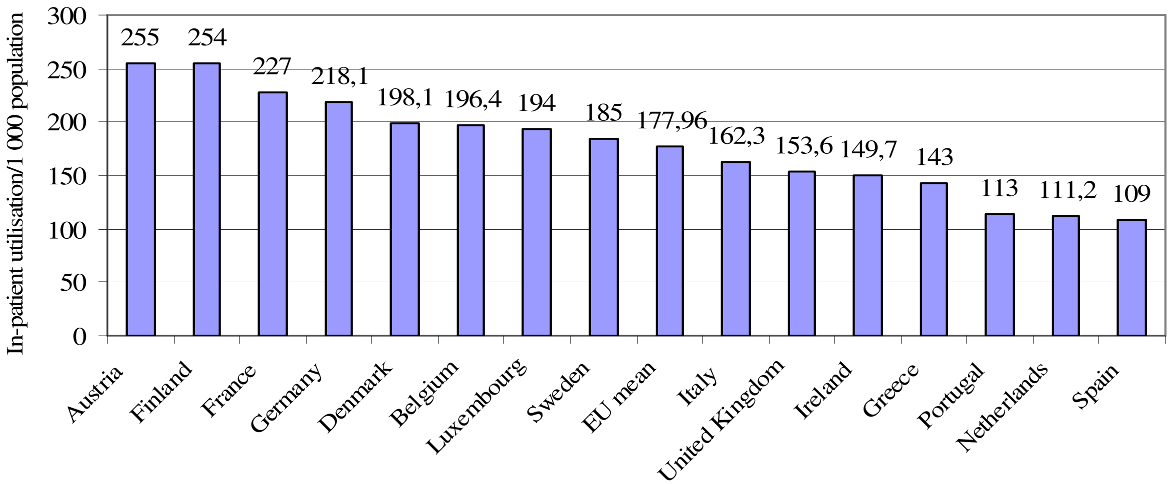


Figure 4.2.1.19 : Total in-patient utilisation in the UK and Spain

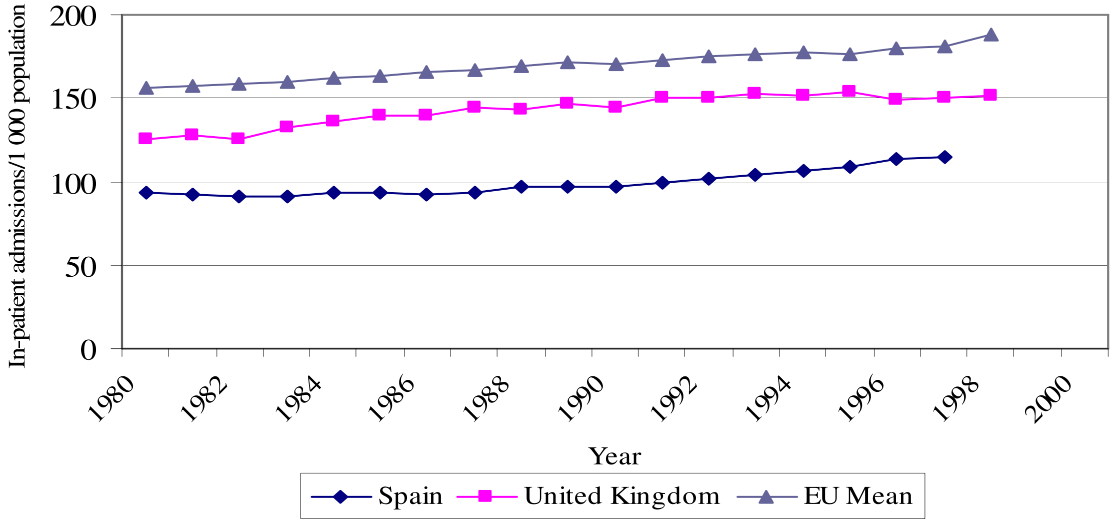


Figure 4.2.1.20 : ALOS in-patient care in the EU

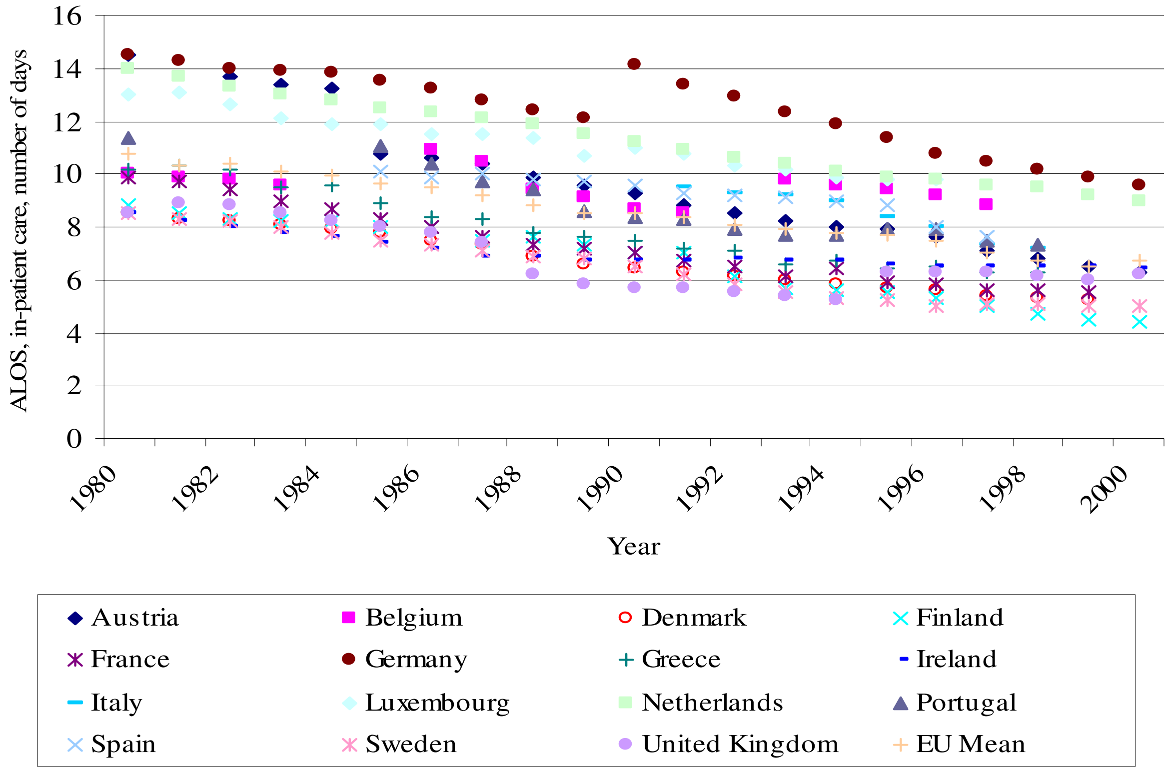
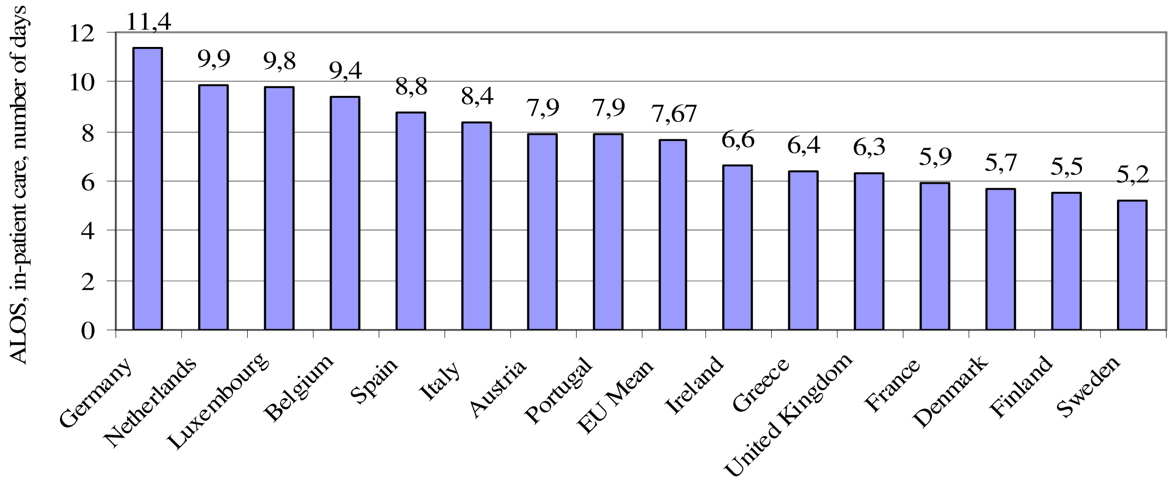


Figure 4.2.1.21: ALOS, in-patient care in the EU, mid-1990s



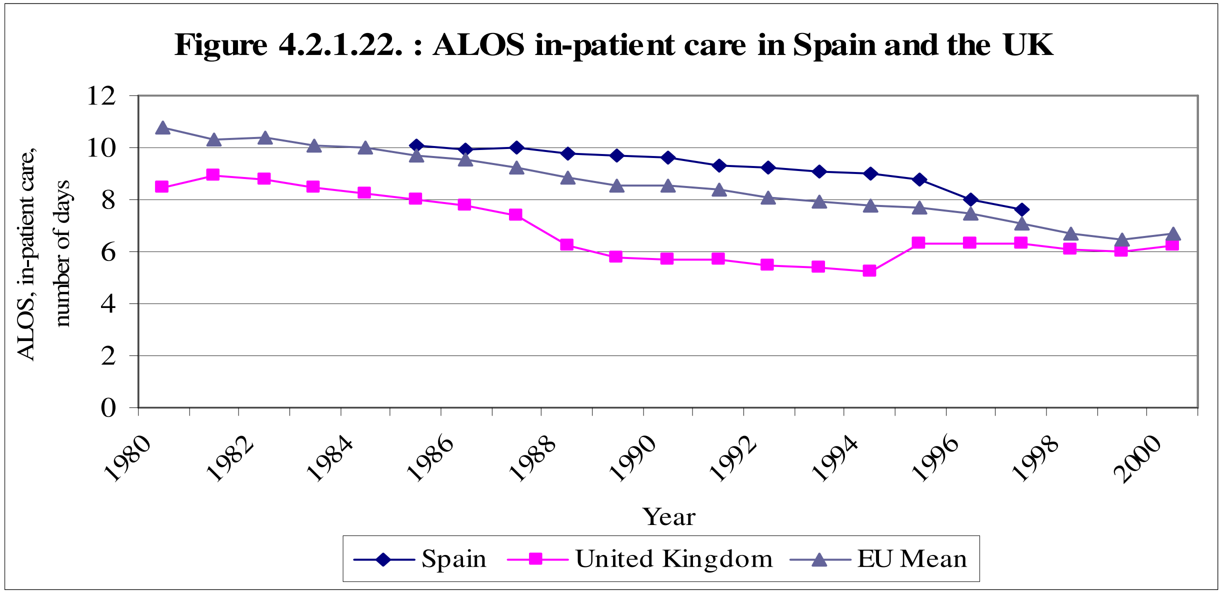
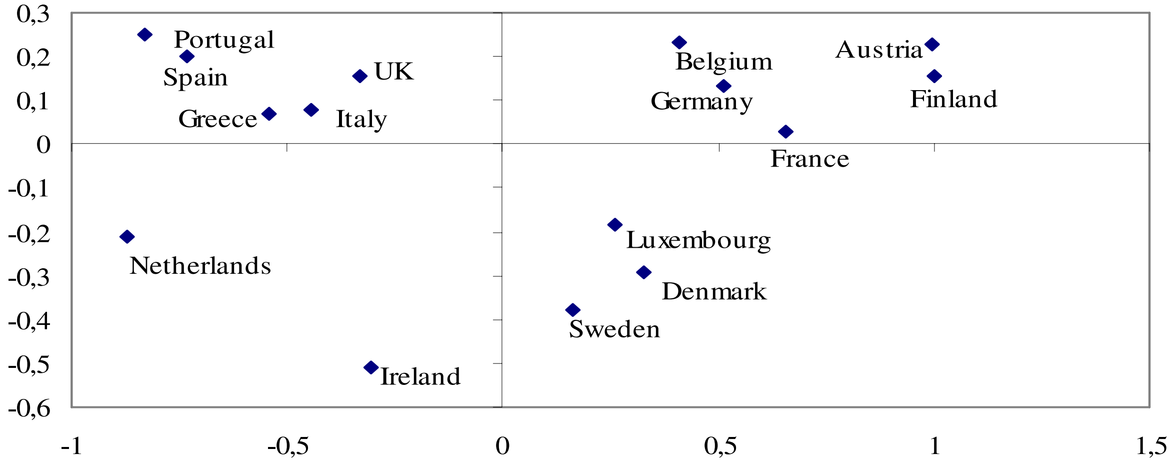


Figure 4.2.1.22. : ALOS in-patient care in Spain and the UK
ALOS, in-patient care, number of days
12
10
8
6
4
2
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
Year
Spain
United Kingdom
EU Mean

Figure 4.2.1.23: Mutidimensional scaling (Euclidean distance model) Health care inputs and utilisation of health care services



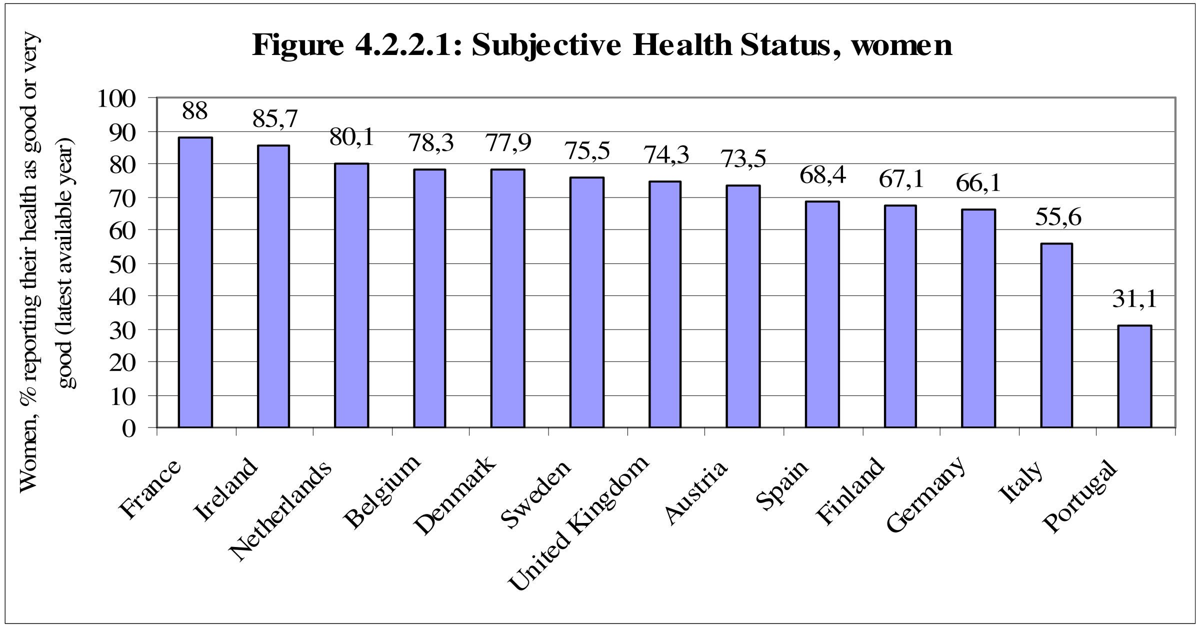


Figure 4.2.2.1: Subjective Health Status, women
Women, % reporting their health as good or very good (latest available year)
100
90
80
70
60
50
40
30
20
10
0
88
85,7
80,1
78,3
77,9
75,5
74,3
73,5
68,4
67,1
66,1
55,6
31,1
France
Ireland
Netherlands
Belgium
Denmark
Sweden
United Kingdom
Austria
Spain
Finland
Germany
Italy
Portugal

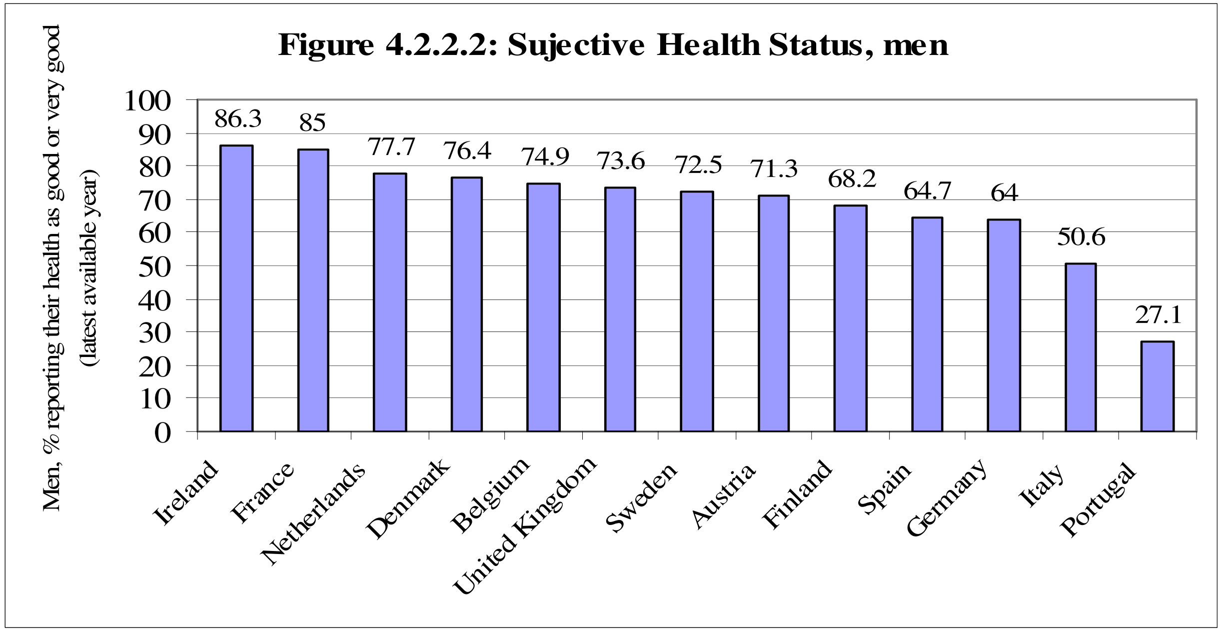


Figure 4.2.2.2: Sujective Health Status, men
Men, % reporting their health as good or very good (latest available year)
100
90
80
70
60
50
40
30
20
10
0
86.3
85
77.7
76.4
74.9
73.6
72.5
71.3
68.2
64.7
64
50.6
27.1
Ireland
France
Netherlands
Denmark
Belgium
United Kingdom
Sweden
Austria
Finland
Spain
Germany
Italy
Portugal

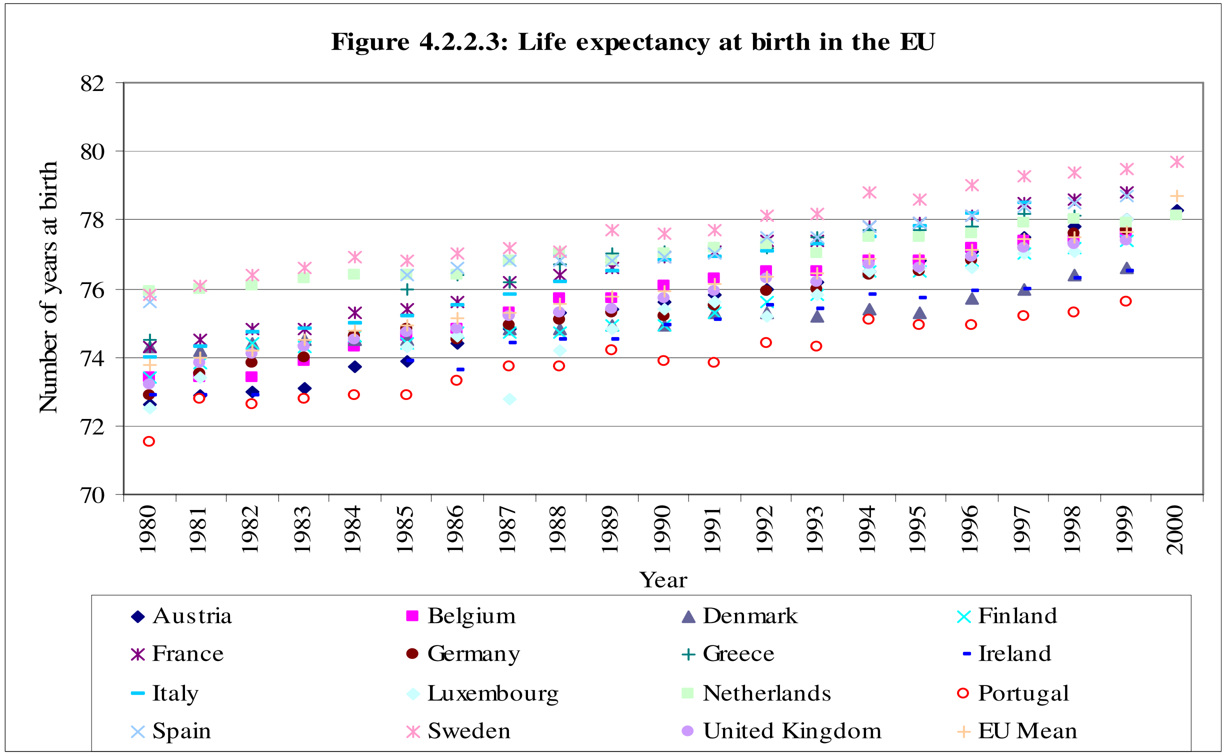


Figure 4.2.2.3: Life expectancy at birth in the EU
Number of years at birth
82
80
78
76
74
72
70
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom
EU Mean

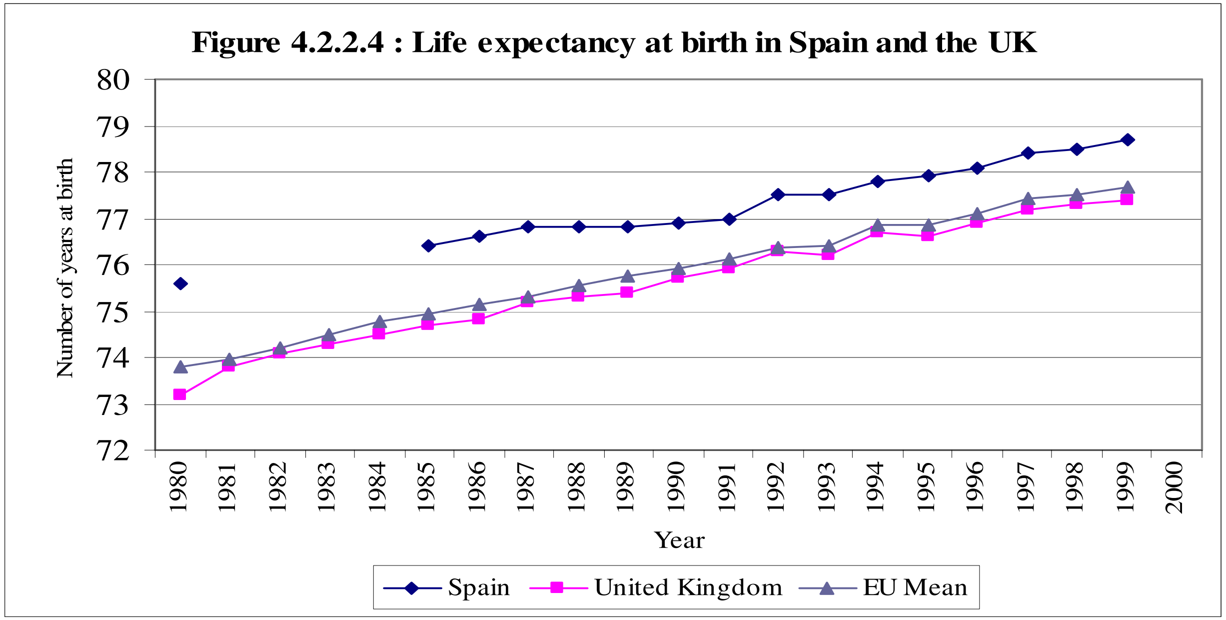


Figure 4.2.2.4 : Life expectancy at birth in Spain and the UK
80
79
78
77
76
75
74
73
72
Number of years at birth
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Spain
United Kingdom
EU Mean

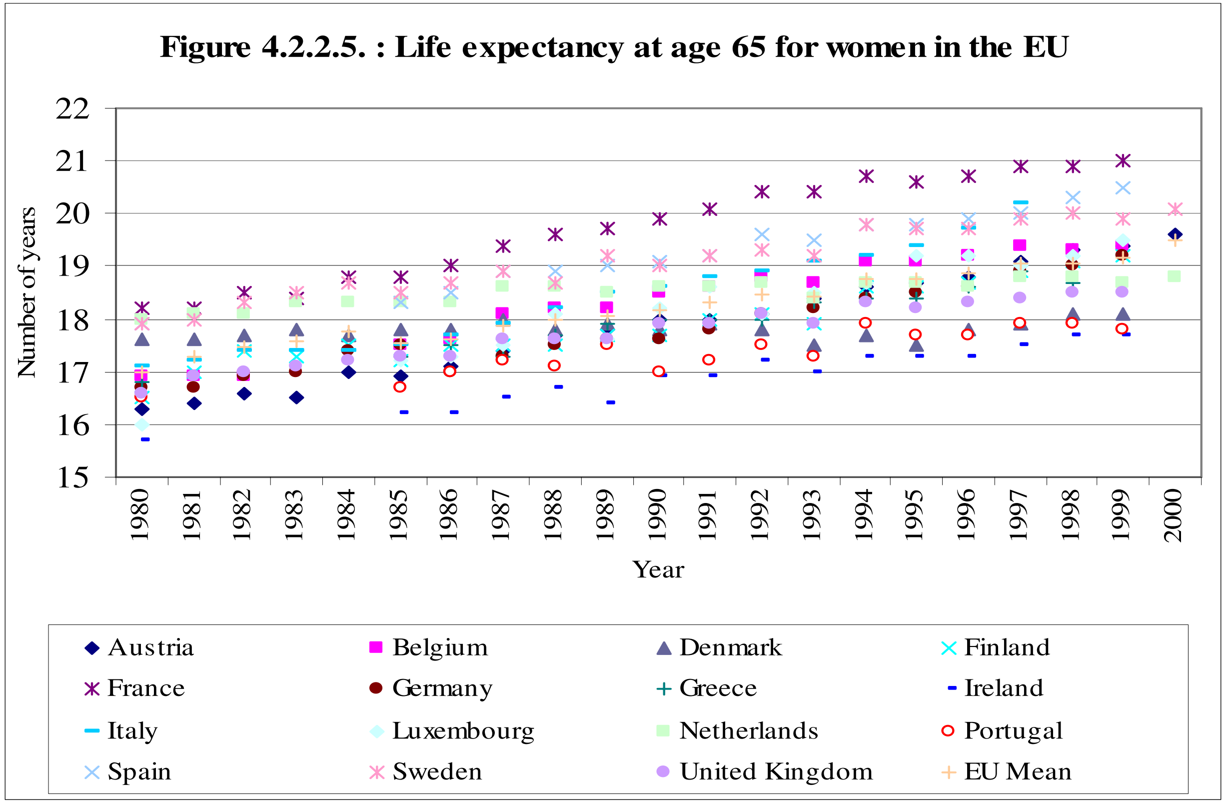


Figure 4.2.2.5. : Life expectancy at age 65 for women in the EU
Number of years
22
21
20
19
18
17
16
15
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom
EU Mean

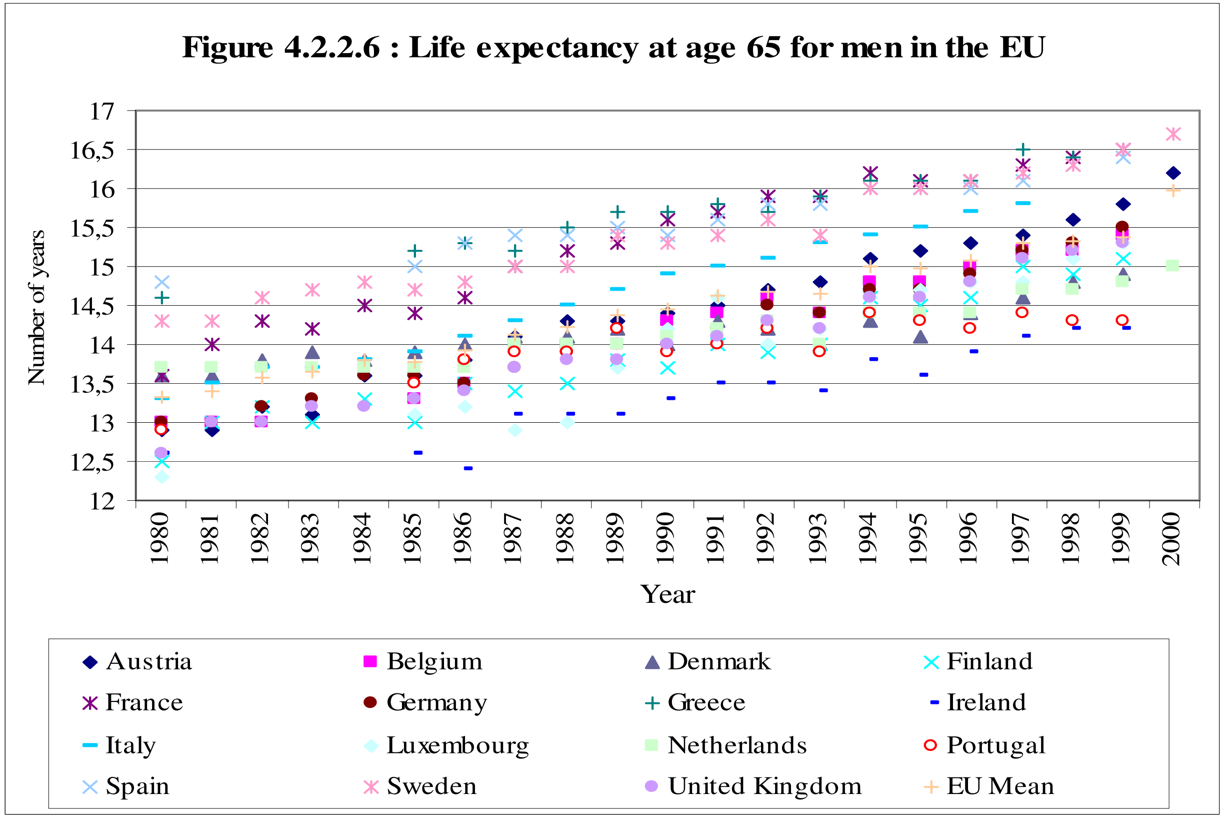


Figure 4.2.2.6 : Life expectancy at age 65 for men in the EU
Number of years
17
16,5
16
15,5
15
14,5
14
13,5
13
12,5
12
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom
EU Mean

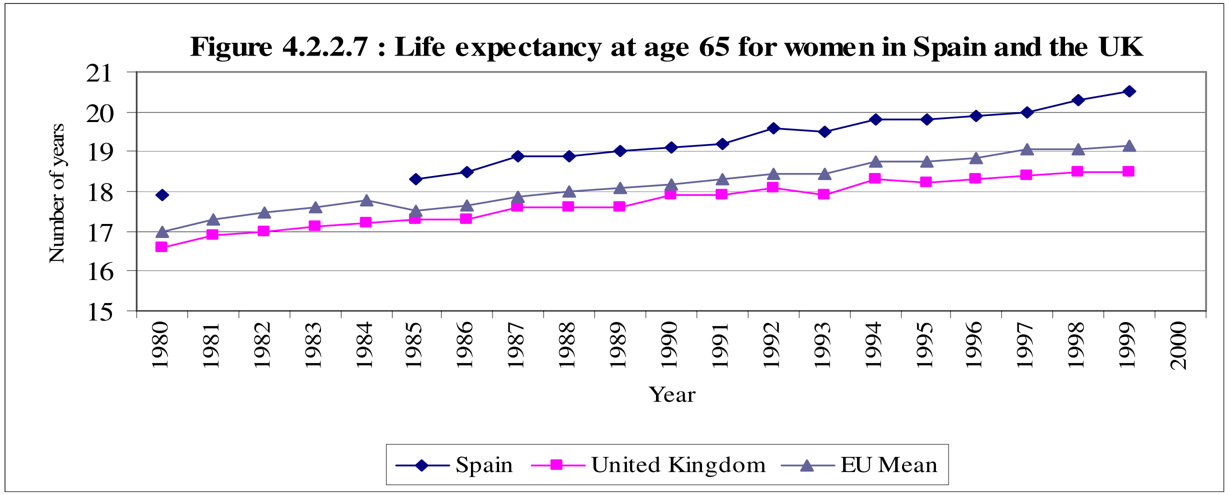


Figure 4.2.2.7 : Life expectancy at age 65 for women in Spain and the UK
21
20
19
18
17
16
15
Number of years
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Spain
United Kingdom
EU Mean

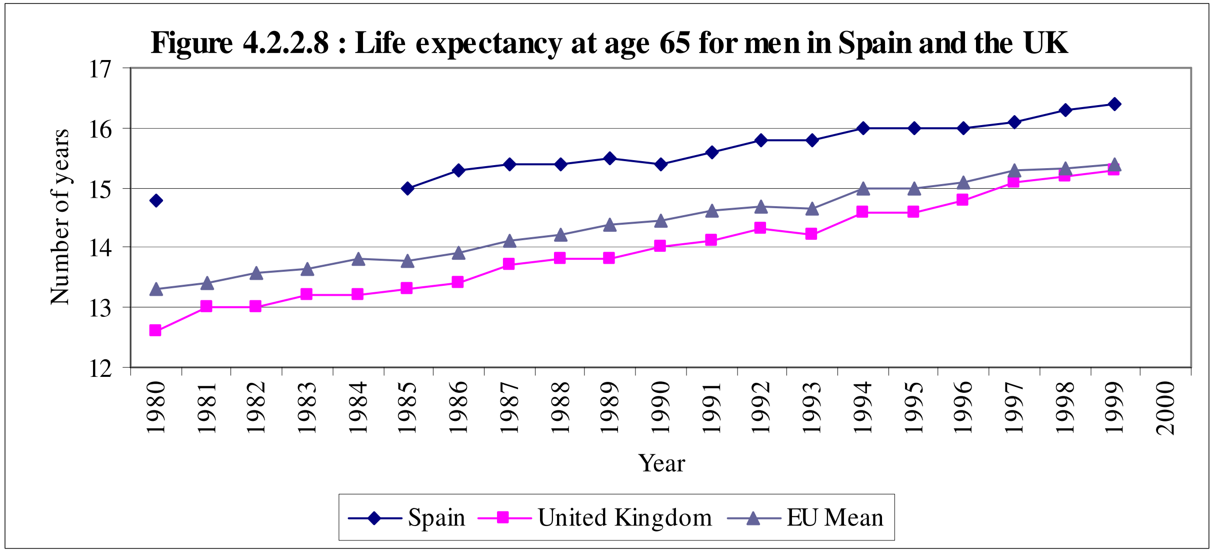


Figure 4.2.2.8 : Life expectancy at age 65 for men in Spain and the UK
17
16
15
14
13
12
Number of years
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Spain
United Kingdom
EU Mean

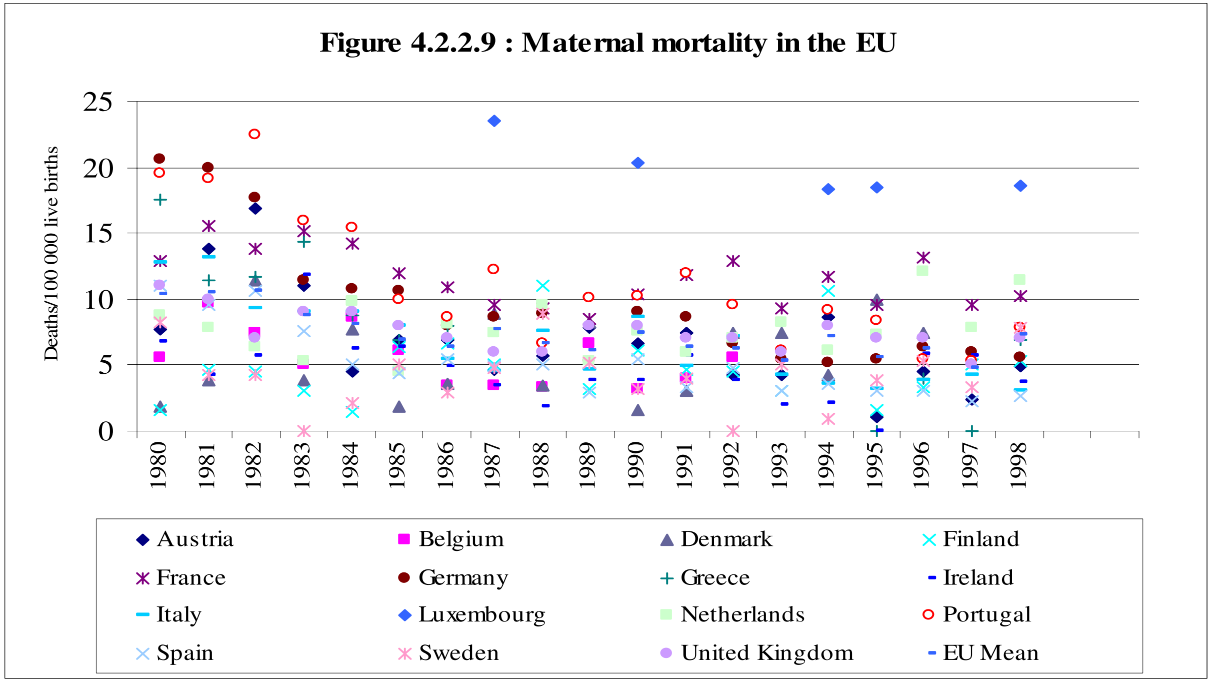


Figure 4.2.2.9 : Maternal mortality in the EU
Deaths/100 000 live births
25
20
15
10
5
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom
EU Mean

Figure 4.2.2.10 : Maternal mortality in Spain and the UK

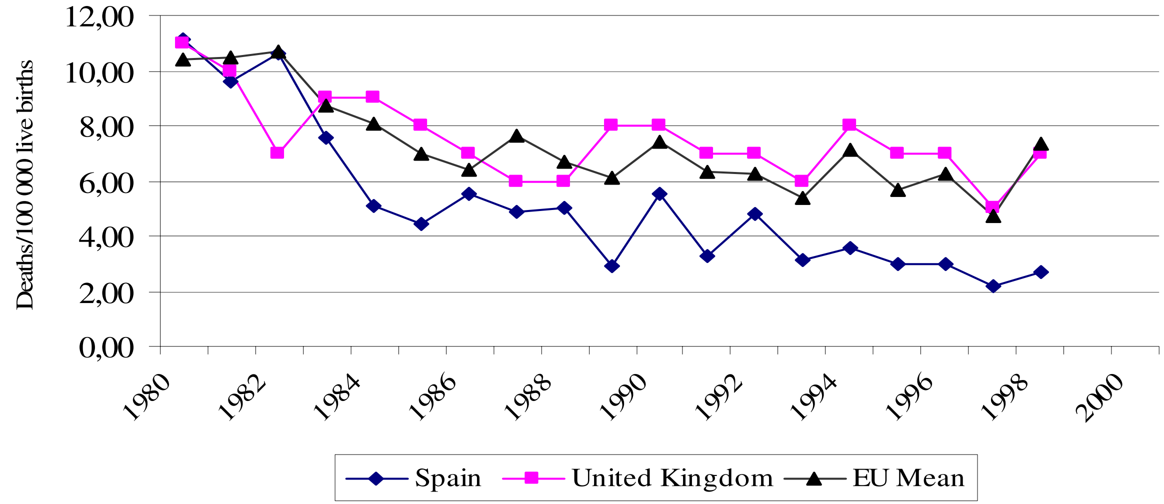


Figure 4.2.2.11 : Perinatal mortality in the EU

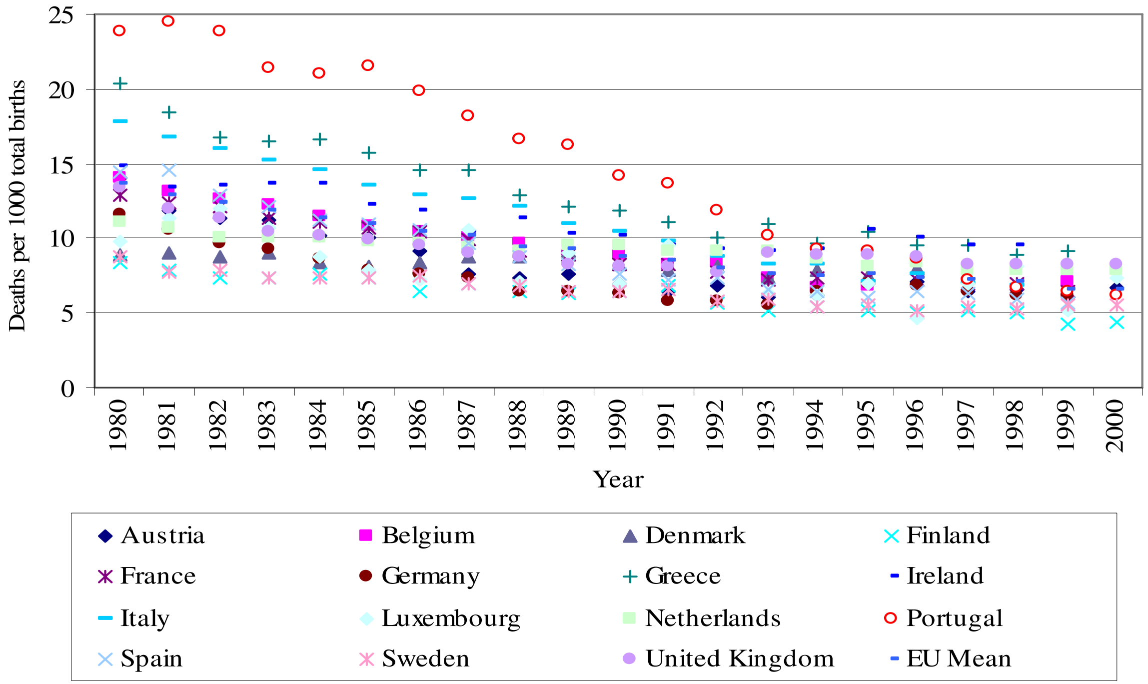
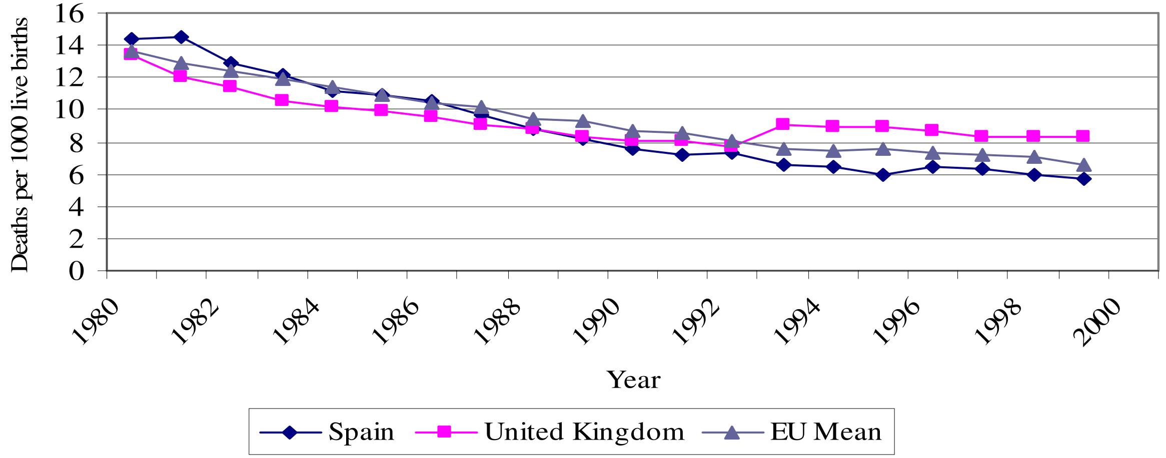


Figure 4.2.2.12 : Perinatal mortality in the UK and Spain



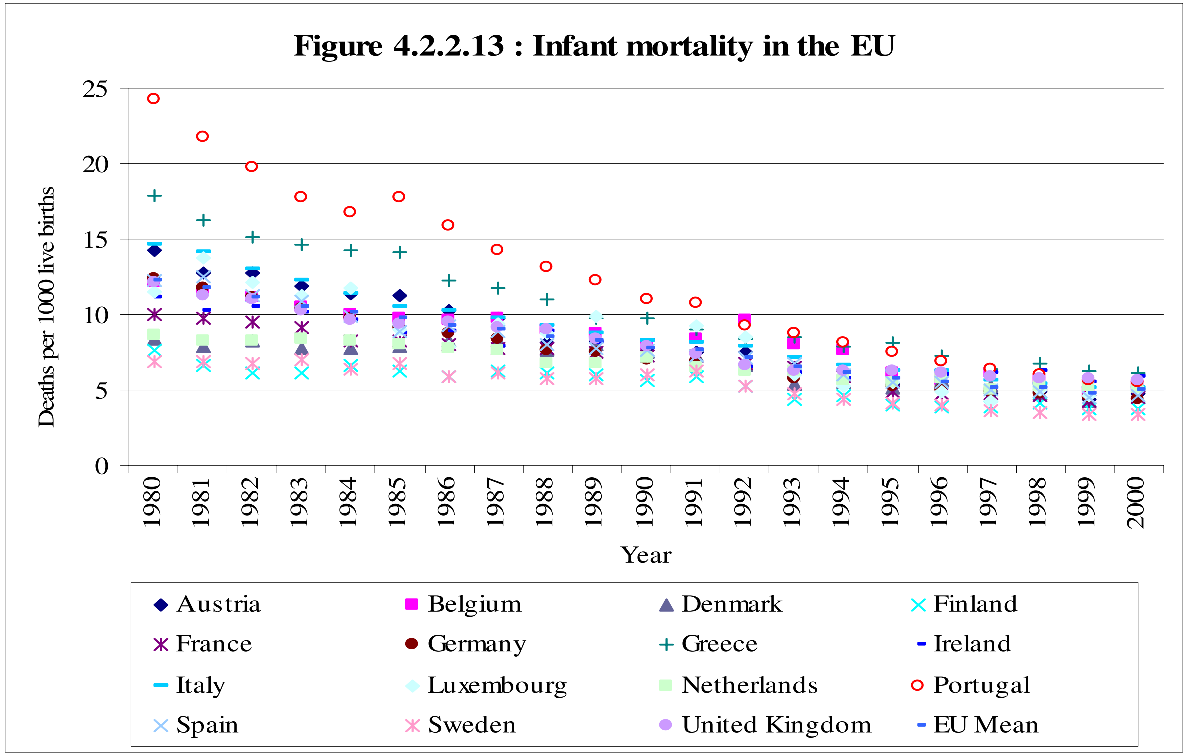


Figure 4.2.2.13 : Infant mortality in the EU
Deaths per 1000 live births
0
5
10
15
20
25
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom
EU Mean

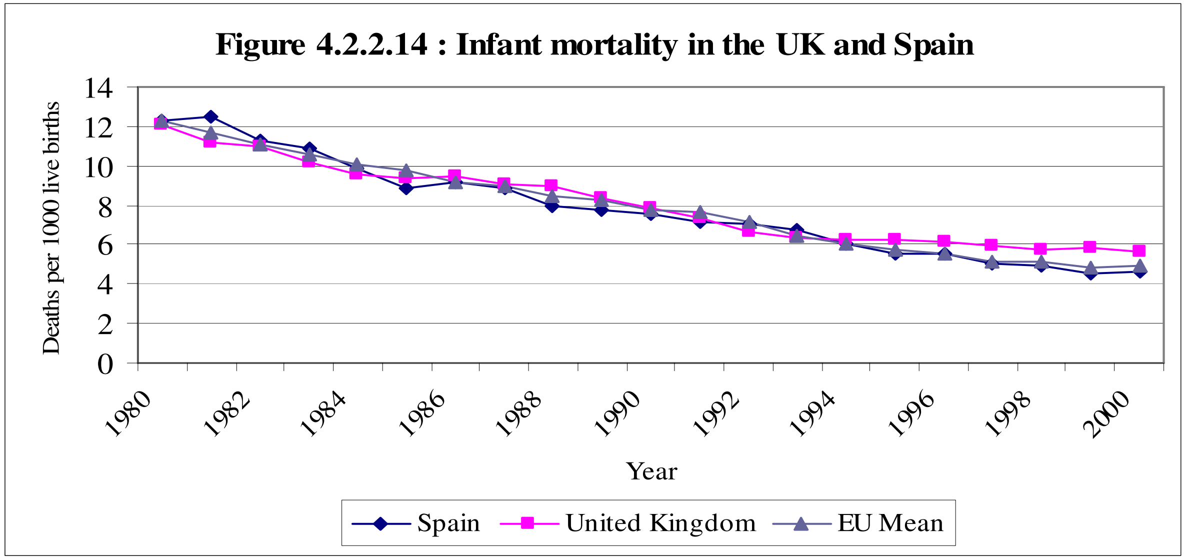


Figure 4.2.2.14 : Infant mortality in the UK and Spain
Deaths per 1000 live births
14
12
10
8
6
4
2
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
Year
Spain
United Kingdom
EU Mean

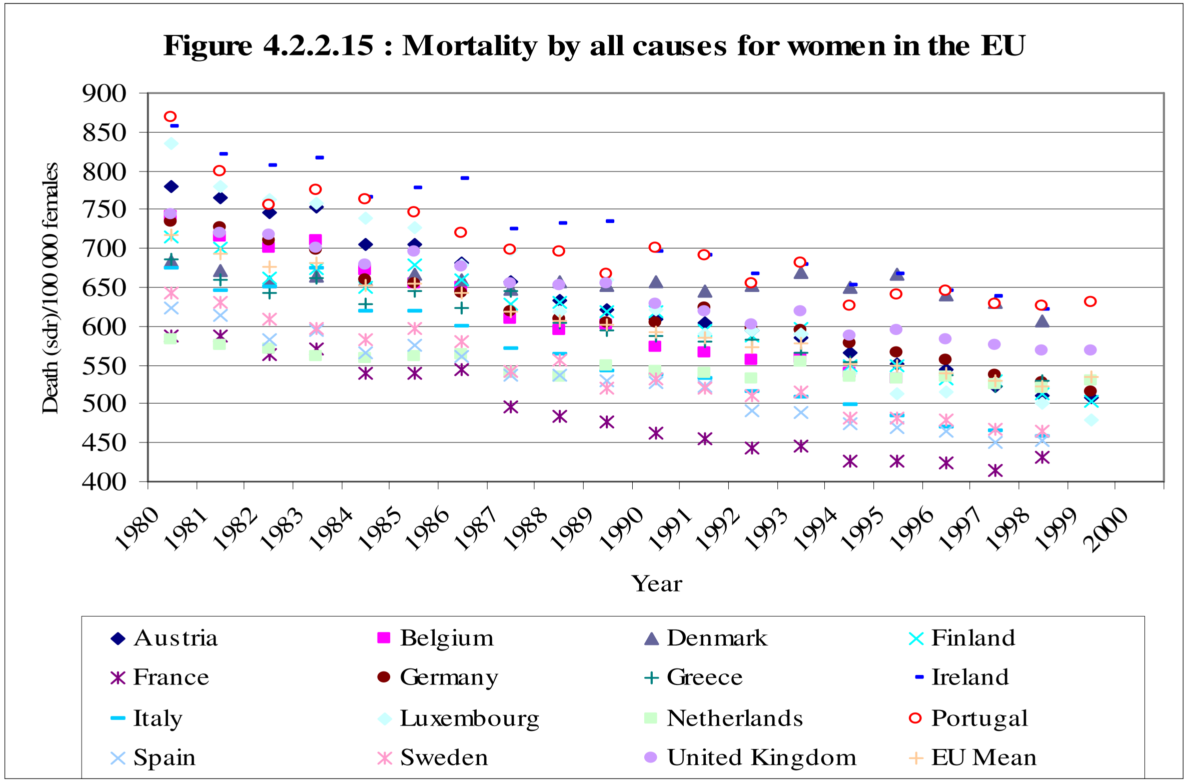
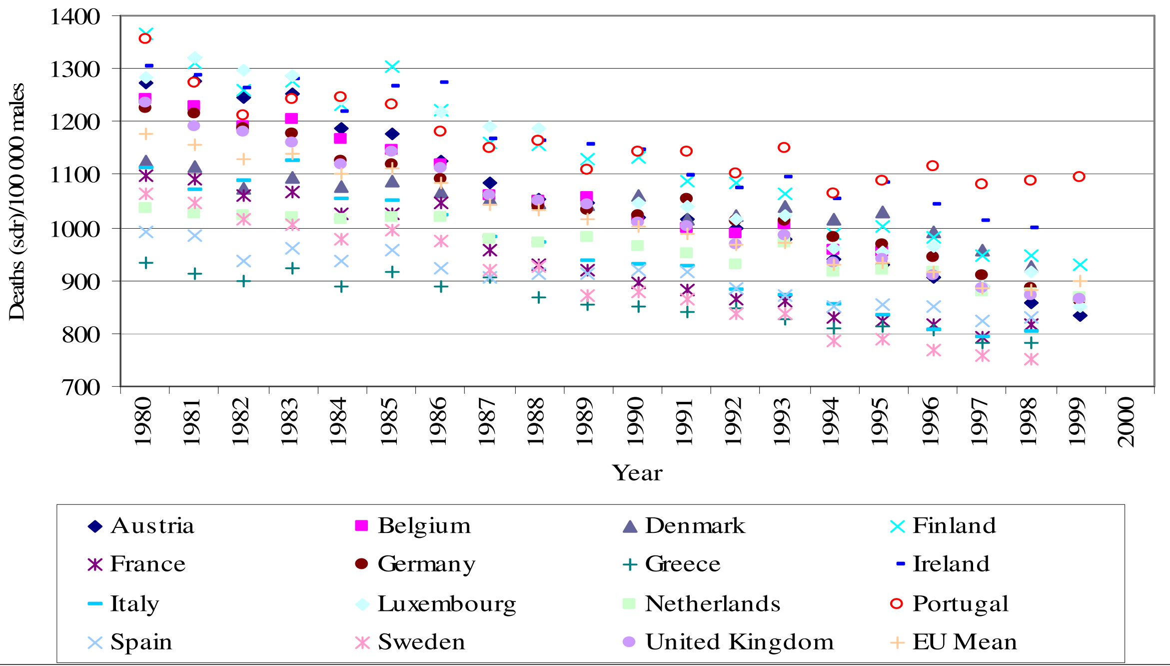


Figure 4.2.2.15 : Mortality by all causes for women in the EU
Death (sdr)/100 000 females
900
850
800
750
700
650
600
550
500
450
400
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Austria
Belgium
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Portugal
Spain
Sweden
United Kingdom
EU Mean

Figure 4.2.2.16: Mortality by all causes for men in the EU



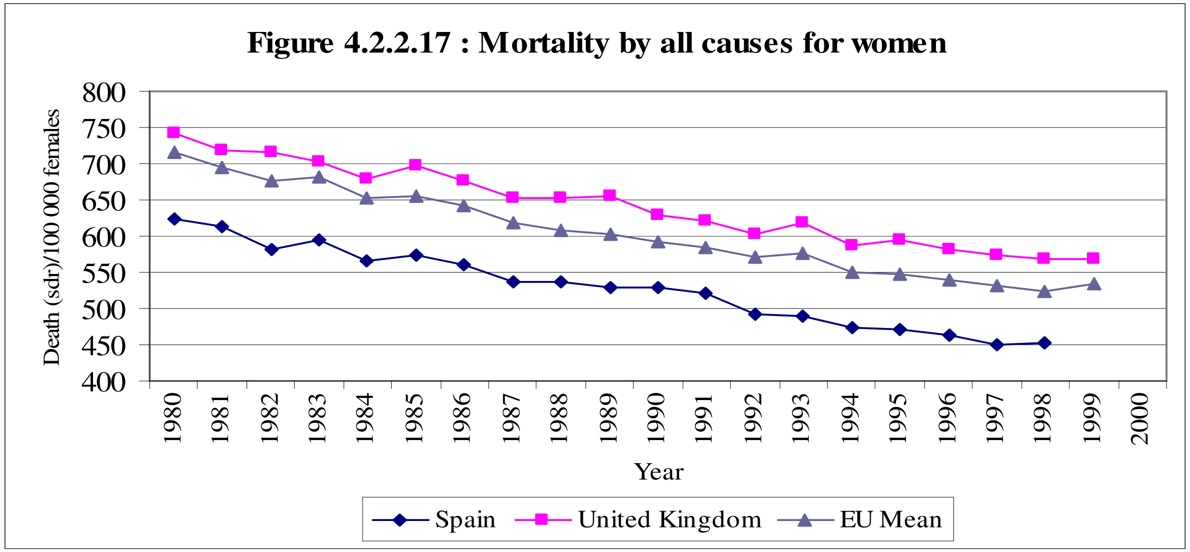


Figure 4.2.2.17 : Mortality by all causes for women
800
750
700
650
600
550
500
450
400
Death (sdr)/100 000 females
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
Spain
United Kingdom
EU Mean

Figure 4.2.2.18 : Mortality by all causes for men

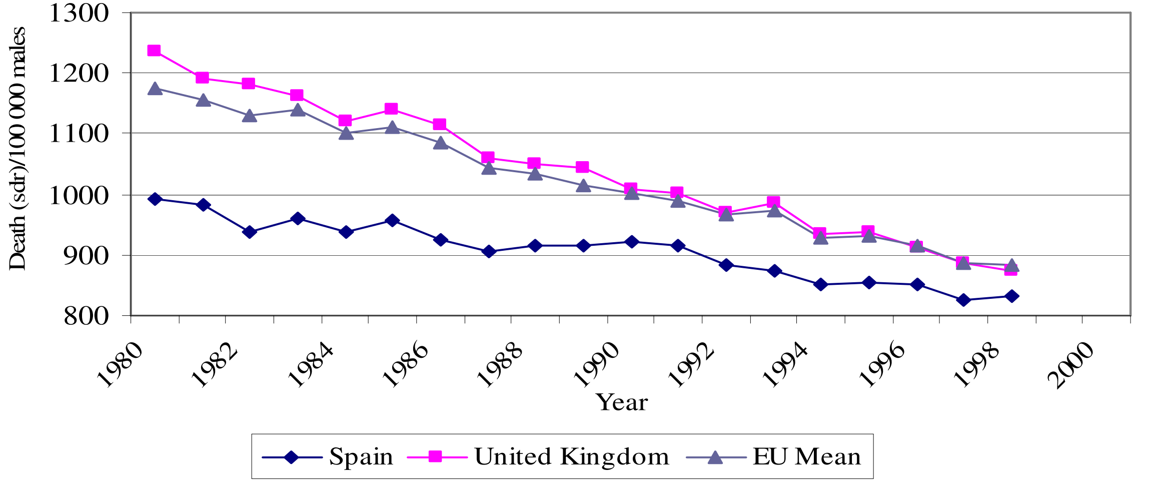
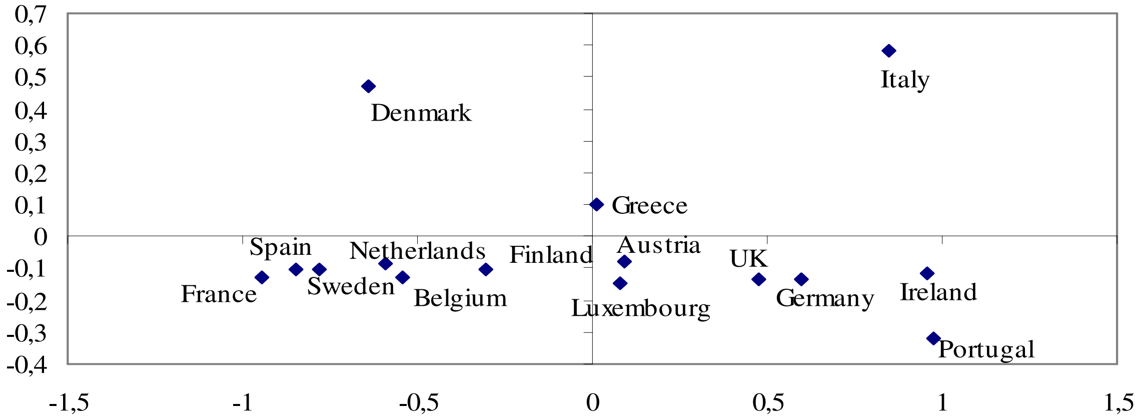


Figure 4.2.2.19: Mutidimensional scaling (Euclidean distance model) Health status indicators



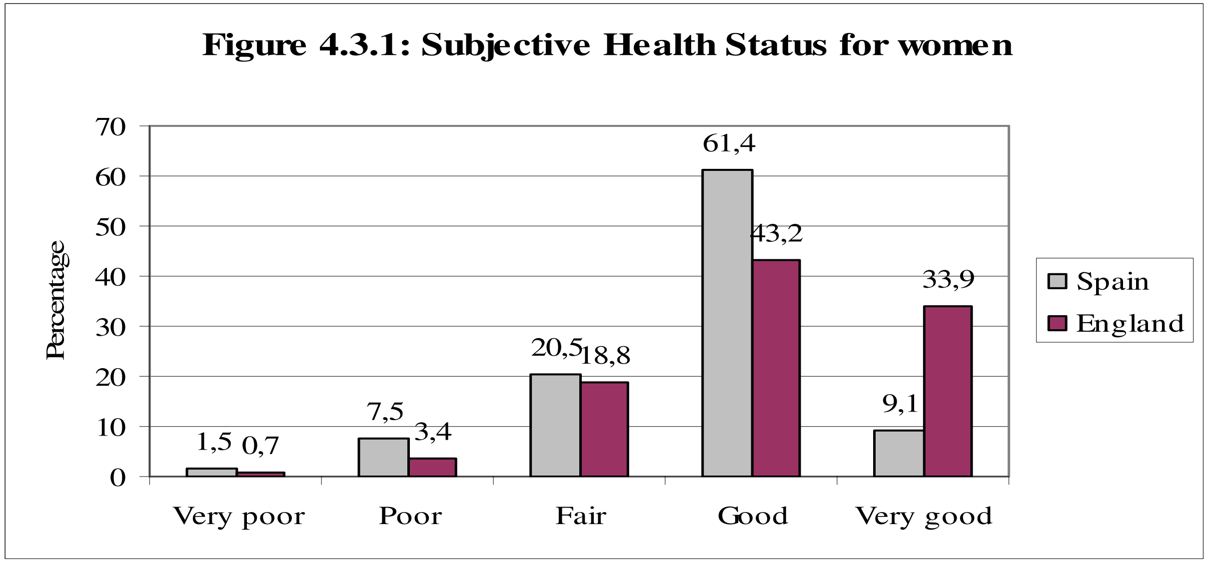


Figure 4.3.1: Subjective Health Status for women
Percentage
70
60
50
40
30
20
10
0
1,5
0,7
7,5
3,4
20,5
18,8
61,4
43,2
9,1
33,9
Very poor
Poor
Fair
Good
Very good
Spain
England

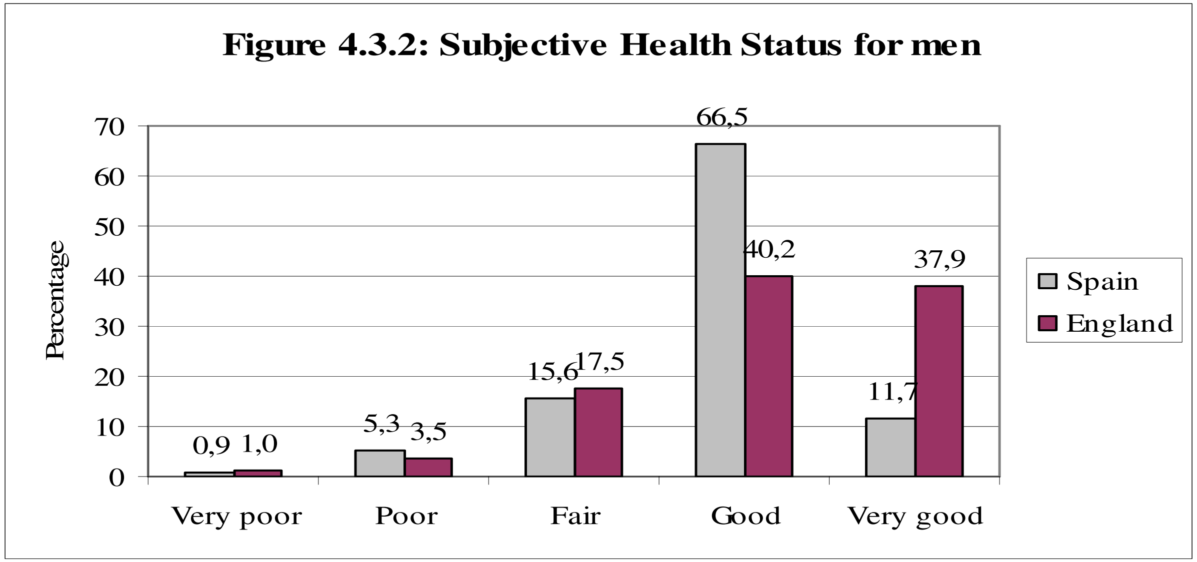


Figure 4.3.2: Subjective Health Status for men
Percentage
70
60
50
40
30
20
10
0
0,9
1,0
5,3
3,5
15,6
17,5
66,5
40,2
11,7
37,9
Very poor
Poor
Fair
Good
Very good
Spain
England

Table 4.3.1: Subjective Health Status for women, Spain (%)*

Social Class	Subjective health status				
	Very poor	**Poor**	**Fair**	**Good**	**Very good**
Class I: Higher grade professionals, administrators and managers	0.7 (-1.4)	4.1 (-2.6)	13.1(-3.5)	66 (2.4)	16.1 (4.9)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	3.8 (1)	3.8 (-0.7)	15.4 (-0.6)	57.8 (2.1)	19.2 (2.1)
Class IIIab: Higher-grade routine nonmanual employees	0.6 (-1.7)	2.6 (-4.1)	10.2 (-5.1)	72.4 (3.2)	14.2 (3.8)
Class IVabc: Small proprietors and employers and self-employed workers	1.9 (0.9)	7.4 (-0.1)	21.5 (0.6)	61.6 (0.1)	7.6 (-1.4)
Class V: Lower-grade technicians and supervisors of manual workers	0 (-1.2)	5 (-1.2)	11.3 (-2.3)	75.5 (2)	8.2 (-0.3)
Class VI: Skilled manual workers	1.2 (-0.9)	5.4 (-2)	16.4 (-2.5)	66.4 (1.7)	10.6 (1.3)
Class VIIab: Nonskilled manual workers and agricultural workers	2.4 (2.5)	9.34 (2.4)	22.7 (1.7)	58.5 (-1.3)	7.1 (-2.3)
Class VIII: Unemployed	0 (-1.5)	0.7 (-3.1)	10.9 (-2.7)	73.7 (-2)	14.7 (2.3)
Class IX: Full-time home-tasks makers	1.6 (0.6)	8.5 (2.5)	23 (3.7)	59.9 (-2.3)	7 (-4.7)

(*): Numbers in brackets are standardised residuals. N =9769
Pearson Chi-Square = 245.1; Degrees of freedom = 32; Significance value = 0.000

Table 4.3.2: Subjective Health Status for women, England (%)*

Social Class	Subjective health status Very poor	Poor	Fair	Good	Very good
Class I: Higher grade professionals, administrators and managers	0.11(-2.2)	1.5 (-3.1)	10.2 (-5.9)	39 (-2.9)	49.2 (7.8)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	0.6 (-1)	2 (-4.1)	15.2 (-4.5)	42.9 (-2)	39.3 (5)
Class IIIab: Higher-grade routine nonmanual employees	0.6 (-1.3)	2.8 (-2.4)	16.6 (-3.4)	45 (2)	35 (2.3)
Class IVabc: Small proprietors and employers and self-employed workers	0.42 (-1.1)	3.2 (-0.3)	16.6 (-1.4)	43.1 (0)	36.7 (1.3)
Class V: Lower-grade technicians and supervisors of manual workers	1.4 (1.1)	4.7 (1)	22.4 (1.2)	44.8 (0.4)	26.7 (-1.8)
Class VI: Skilled manual workers	0.9 (0.4)	6.2 (3.1)	26.8 (3.9)	42.3 (-0.3)	23.8 (-3.7)
Class VIIab: Nonskilled manual workers and agricultural workers	1.2 (2.9)	5.4 (6.9)	25.5 (9.9)	41.9 (-1.1)	26 (-8)
Class VIII: Unemployed	0 (-0.5)	2.8 (-0.2)	19.4 (0.2)	47.2 (0.5)	30.6 (-0.3)
Class IX: Full-time home-tasks makers	1.82 (2.3)	6.4 (2.9)	31.8 (5.4)	40.3 (-0.8)	19.7 (-4.4)

(*): Numbers in brackets are standardised residuals. N = 13776
Pearson Chi-Square = 509; Degrees of freedom = 32; Significance value = 0.000

Table 4.3.3: Subjective Health Status for men, Spain (%)*

Social Class	Subjective health status: Very poor	Poor	Fair	Good	Very good
Class I: Higher grade professionals, administrators and managers	0.9 (-0.1)	5.2 (-0.2)	12.3 (-2.7)	67.9 (2.5)	13.7 (2.2)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	1.3 (0.6)	5.2 (-0.2)	12.9 (-0.8)	61.9 (-0.7)	18.7 (2.6)
Class IIIab: Higher-grade routine nonmanual employees	0.1 (-2.1)	3.5 (-2.1)	10.9 (-3.5)	75.1 (2.7)	10.4 (-1)
Class IVabc: Small proprietors and employers and self-employed workers	0.5 (-1.6)	5.1 (-0.2)	17.7 (2.2)	66.2 (-0.3)	10.5 (-1.5)
Class V: Lower-grade technicians and supervisors of manual workers	1 (0.2)	1.7 (-2.7)	12.4 (-1.4)	70.8 (0.9)	14.1 (1.2)
Class VI: Skilled manual workers	1.25(2.1)	6.45 (2.7)	17.7 (2.8)	66 (-0.6)	8.6 (-4.9)
Class VIIab: Nonskilled manual workers and agricultural workers	1.45 (2.2)	7.3 (3.7)	19.1 (3.8)	62.6 (-2)	9.5 (-2.6)
Class VIII: Unemployed	0.75 (-0.2)	1.5 (-1.9)	6.7 (-2.6)	73.8 (1)	17.2 (1.9)
Class IX: Full-time home-tasks makers	3.6 (1.4)	7.1 (0.5)	17.9 (0.6)	60.7 (-0.6)	10.7 (-0.3)

(*): Numbers in brackets are standardised residuals. N = 9349
Pearson Chi-Square = 144.6; Degrees of freedom = 32; Significance value = 0.000

Table 4.3.4: Subjective Health Status for men, England (%)*

Social Class	Subjective health status Very poor	Poor	Fair	Good	Very good
Class I: Higher grade professionals, administrators and managers	0.3 (-3.5)	1.5 (-5.2)	10.5 (-8.4)	39.5 (-0.5)	48.2 (8.3)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	0.6 (-2)	2.5 (-2.5)	14.2 (-3.9)	39 (-0.8)	43.7 (4.2)
Class IIIab: Higher-grade routine nonmanual employees	0.6 (-1.2)	2.9 (-0.9)	14.7 (-2)	42 (0.9)	39.8 (0.9)
Class IVabc: Small proprietors and employers and self-employed workers	0.6 (-1.8)	3.6 (0.2)	18.6 (1.1)	41.1 (0.6)	36.1 (-1.1)
Class V: Lower-grade technicians and supervisors of manual workers	2.25 (3.7)	5.6 (3.4)	25.3 (5.7)	38.6 (-0.9)	28.2 (-4.8)
Class VI: Skilled manual workers	1.6 (2.5)	4.3 (2.2)	22.7 (5.9)	40.7 (0.4)	30.7 (-5.6)
Class VIIab: Nonskilled manual workers and agricultural workers	2 (5.2)	5.9 (5.4)	22.4 (4.9)	40.2 (0.1)	29.5 (-5.4)
Class VIII: Pensioners	8.3 (2.5)	16.7 (2.6)	41.7 (2)	16.7 (-1.3)	16.6 (-1.2)
Class IX: Unemployed	0 (-0.6)	4.8 (0.6)	14.7 (-0.4)	39 (-0.1)	41.5 (0.4)
Class X: Students	0 (-1.8)	0.3 (-3.1)	8.5 (-3.8)	43.5 (1)	47.7 (2.9)
Class XI: Full-time home-tasks makers	0 (-0.1)	0 (-0.3)	50 (1.1)	50 (0.2)	0 (-0.8)

(*): Numbers in brackets are standardised residuals. N = 12263
Pearson Chi-Square = 490; Degrees of freedom = 32; Significance value = 0.000

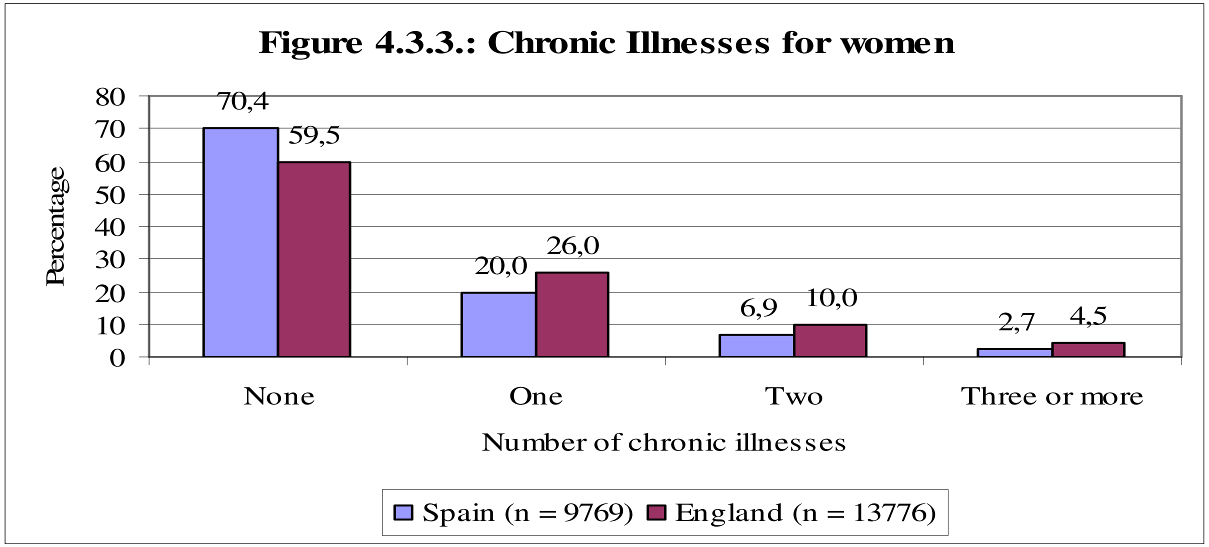


Figure 4.3.3.: Chronic Illnesses for women
Percentage
80
70
60
50
40
30
20
10
0
70,4
59,5
20,0
26,0
6,9
10,0
2,7
4,5
None
One
Two
Three or more
Number of chronic illnesses
Spain (n = 9769)
England (n = 13776)

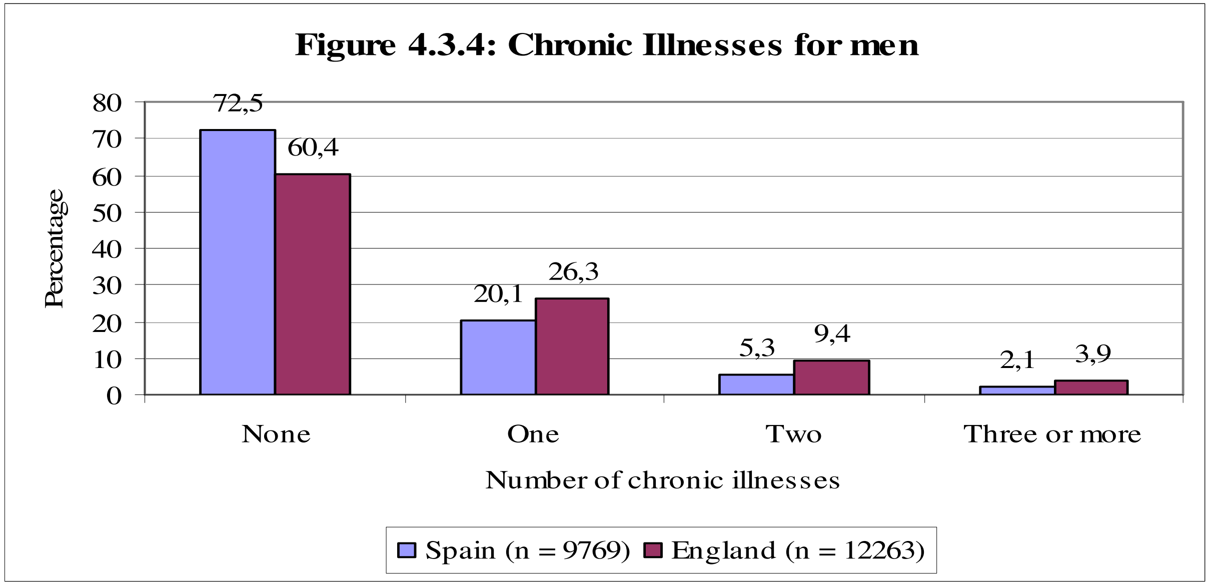


Figure 4.3.4: Chronic Illnesses for men
80
70
60
50
40
30
20
10
0
Percentage
72,5
60,4
20,1
26,3
5,3
9,4
2,1
3,9
None
One
Two
Three or more
Number of chronic illnesses
Spain (n = 9769)
England (n = 12263)

Table 4.3.5: Chronic Illnesses for women, Spain (%)*

Social Class	Number of chronic illnesses			
	None	**One**	**Two**	**Three or more**
Class I: Higher grade professionals, administrators and managers	82 (2.9)	15.5 (-2.1)	2.1 (-3.8)	0.5 (-2.9)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	76.9 (0.4)	23.1 (0.4)	0 (-1.3)	0 (-2.1)
Class IIIab: Higher-grade routine nonmanual employees	80.3 (2.7)	16.7 (-1.6)	2.8 (-3.5)	0.2 (-3.5)
Class IVabc: Small proprietors and employers and self-employed workers	65.6 (-1.5)	23.6 (2.1)	8.6 (1.7)	2.2 (-0.8)
Class V: Lower-grade technicians and supervisors of manual workers	77.6 (0.8)	17.3 (-0.6)	3.1 (-1.4)	2 (-0.4)
Class VI: Skilled manual workers	75 (1.5)	18 (-1.1)	4.5 (-2.5)	2.3 (0.7)
Class VIIab: Nonskilled manual workers and agricultural workers	71.5 (0.5)	17 (-2.3)	8 (1.5)	3.5 (2)
Class VIII: Unemployed	90.4 (3)	9.6 (-2.9)	0 (-3.3)	0 (-2.1)
Class IX: Full-time home-tasks makers	67.6 (-2.4)	21.7 (2.4)	7.6 (1.8)	3.2 (1.1)

(*): Numbers in brackets are standardised residuals. N = 8001
Pearson Chi-Square = 157.7; Degrees of freedom = 24; Significance value = 0.000

Table 4.3.6: Chronic Illnesses for women, England (%)*

Social Class	Number of chronic illnesses: None	One	Two	Three or more
Class I: Higher grade professionals, administrators and managers	63.3 (2.2)	25.7 (-0.2)	6.7 (-3.1)	6.7 (-3.1)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	61.2 (1.2)	25.3 (-0.7)	9 (-1.6)	4.5 (-0.2)
Class IIIab: Higher-grade routine nonmanual employees	60.5 (0.8)	26.5 (0.7)	9 (-1.9)	4 (-1.8)
Class IVabc: Small proprietors and employers and self-employed workers	59.7 (0.1)	27 (0.6)	7.5 (-2.1)	5.8 (1.6)
Class V: Lower-grade technicians and supervisors of manual workers	50.9 (-1.6)	26.6 (0.2)	17.8 (3.6)	4.7 (0.18)
Class VI: Skilled manual workers	54.4 (-1.4)	26.4 (0.2)	13.1 (2.1)	6.2 (1.6)
Class VIIab: Nonskilled manual workers and agricultural workers	55.5 (-3.1)	26.3 (0.5)	12.4 (4.6)	5.7 (3.4)
Class VIII: Unemployed	69.4 (0.8)	19.4 (-0.8)	11.1 (0.4)	0 (-1.3)
Class IX: Full-time home-tasks makers	56.1 (-0.8)	27 (0.4)	10.6 (0.4)	6.4 (1.5)

(*): Numbers in brackets are standardised residuals. N = 13398
Pearson Chi-Square = 113.6; Degrees of freedom = 24; Significance value = 0.000

Table 4.3.7: Chronic Illnesses for men, Spain (%)*

Social Class	Number of chronic illnesses: None	One	Two	Three or more
Class I: Higher grade professionals, administrators and managers	71 (-0.5)	21.5 (0.9)	4.8 (-0.6)	2.6 (1.3)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	69 (-0.5)	21.3 (0.3)	5.8 (0.3)	3.9 (1.7)
Class IIIab: Higher-grade routine nonmanual employees	74.4 (0.6)	19.2 (-0.6)	5.1 (-0.2)	1.2 (-2)
Class IVabc: Small proprietors and employers and self-employed workers	69.7 (-1.4)	21.5 (1.2)	6.1 (1.4)	2.7 (2.2)
Class V: Lower-grade technicians and supervisors of manual workers	70.1 (-0.5)	24.2 (1.5)	4.7 (-0.4)	1 (-1.2)
Class VI: Skilled manual workers	70.5 (-1.4)	21.9 (1.9)	5.4 (0.3)	2.2 (0.5)
Class VIIab: Nonskilled manual workers and agricultural workers	70.9 (-0.7)	20 (-0.3)	7 (3.1)	2.1 (0.4)
Class VIII: Unemployed	82.8 (1.4)	16.4 (-1)	0.7 (-2.3)	0 (-1.6)
Class IX: Full-time home-tasks makers	57.1 (-1)	28.6 (1)	10.7 (1.4)	3.6 (0.6)

(*): Numbers in brackets are standardised residuals. N = 8276
Pearson Chi-Square = 90.3; Degrees of freedom = 24; Significance value = 0.000

Table 4.3.8: Chronic Illnesses for men, England (%)*

Social Class	Number of chronic illnesses			
	None	**One**	**Two**	**Three or more**
Class I: Higher grade professionals, administrators and managers	61 (2)	27.2 (0.9)	8.4 (-1.6)	3.4 (-2)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	61.7 (2.8)	24.6 (-1.5)	8.7 (-1)	5 (2.3)
Class IIIab: Higher-grade routine nonmanual employees	64.7 (1.7)	25.7 (-0.3)	6.8 (-2.6)	2.7 (-2)
Class IVabc: Small proprietors and employers and self-employed workers	61.2 (0.5)	26.9 (1.4)	8.9 (-0.6)	3 (-1.9)
Class V: Lower-grade technicians and supervisors of manual workers	50.4 (-3.9)	28.6 (1.4)	14 (4.2)	7 (4.6)
Class VI: Skilled manual workers	59.3 (-0.6)	25.9 (-0.3)	11 (2.4)	3.7 (-0.5)
Class VIIab: Nonskilled manual workers and agricultural workers	56.9 (-2)	28.2 (1.6)	10.5 (1.5)	4.4 (2)
Class VIII: Unemployed	87.8 (2.3)	12.2 (-1.8)	0 (-2)	0 (-1.3)
Class IX: Full-time home-tasks makers	50 (-0.2)	50 (0.7)	0 (-0.4)	0 (-0.3)

(*): Numbers in brackets are standardised residuals. N = 12829
Pearson Chi-Square = 120.8; Degrees of freedom = 24; Significance value = 0.000

CHAPTER 5: ANALYSING THE LINKS BETWEEN SOCIAL CLASS AND HEALTH IN SPAIN

5.1. Introduction

This chapter begins the empirical analysis of the relationship between an individual's social class and her health status by focusing on the Spanish case. Chapter 6 will present a similar analysis of the British case. As I explained when describing the data sets in Chapter 3, the analysis is based on the study of the *Encuestas Nacionales de Salud* for the first half of the 1990s.

The chapter is organised as follows. In the second section I will discuss the methodology employed to analyse the health surveys. I will describe the empirical strategy adopted in this chapter, which is twofold: preparation of the health survey data and pooling the data. This section also describes how the analysis has been modelled. The British case has been analysed in a similar way; therefore, this explanation should be kept in mind when reading the following chapter. The third section will present the empirical findings. I will start by examining the objective dimension of health and its association with social class. I will present and discuss the linear regression models that I have constructed to study the association between social class and objective short- and long-term health. The rest of this section examines the subjective dimension of health. I will discuss the ordered probit models constructed in order to understand the relationship between social class and health[1]. The chapter will conclude with a summary of the main findings of the empirical work. Appendix D includes some further empirical analysis: (1) the results from the logit models applied to subjective health; and (2) some graphs that provide more in-depth analysis of the factors that mediate the association between social class and health, specifically, the mediating role of education.

5.2. Methodology

5.2.1. Data management

In this section I will explain the empirical strategy followed in order to analyse the Spanish health surveys. The empirical strategy followed comprises two phases. The first step concerns the management of the data and was explained in detail in Chapter 3. The second step involves pooling the data from the 1993 the 1995 National Health Surveys and is explained in more detail here.

The second step of the methodological strategy, that is, to pool the data from 1993 and 1995, reflects, as we saw in Chapter 3, two main objectives. These are, first, to analyse the state of health of the Spanish population during the first part of the decade of the 1990s and, second, to see if the mechanisms through which the social structure of a society influences health remain similar or vary over time. As argued in the explanatory framework, social class influences health through a number of variables that constitute complex mechanisms that do not vary across time. One way of testing to see if this is in fact the case, is by examining whether there are significant differences in the association between the explanatory variables and health in both points in

[1] I have checked the robustness of the results by comparing the results of the ordered probit models to those of OLS models and the results are similar.

time (i.e. 1993 and 1995). If there are significant differences in the association between the explanatory variables and the dependent variable, then the explanatory capacity of the theoretical framework would lose some of its strength.

The procedure I have adopted to test the adequacy of pooling the data is the following. I have analysed the differences between the surveys for each year conducting the Likelihood-ratio test (LR test). This test compares models estimated by maximum likelihood (Long, 1997:93-97). To compute the LR test I first run the pooled data in the unconstrained or full models, which are the models that include the explanatory variables, a dummy variable for each year (i.e. 1993 and 1995) and the interaction between the dummies and the explanatory variables. Then I run the constrained or nested models, which are those models that include the explanatory variables and a dummy variable for the year of the survey. The next step is to compute a test statistic, χ^2, which is equal to minus twice the difference between the log-likelihood of the constrained and the full model. This test statistic is then compared with a χ^2 distribution with degrees of freedom equal to the difference in the degrees of freedom of the constrained models and the unconstrained model (i.e. $\chi^2_{(df_c - df_u)}$).

The null hypothesis is that there are no significant differences between 1993 and 1995. This hypothesis cannot be rejected with a significance level of 95% for all the cases[2]. There is support,

[2] The following table summarises the values of the test statistic and the χ^2 values for all three indicators of health. The tests have been performed for women and men separately. They have also been carried out for all the explanatory models of the thesis, i.e. models (1) to (5). Here I provide the results of the test done for the final model for the three indicators of the dependent variable.

therefore, for pooling the data. It can also be concluded that there are no significant differences between years in the association between the independent variables and the dependent variable. In short, the mechanisms that relate the social structure of a developed society and its health status do not seem to vary across time, at least in the short term[3].

5.3. Explanation of the statistical modelling

5.3.1. The effect of social class on health

The strategy I have pursued to test for the effect of social class on individuals' health has two dimensions. First, I have fitted a model to capture the association between social class and health. The statistical method used to run this model does vary in accordance with the nature of the dependent variable (i.e. linear regression for the objective dimension of health and ordered probit for the subjective dimension of health). Secondly, I have rewritten the initial model to introduce measures of demographic characteristics, education, living habits and finally, only for the case of the subjective health dimension, objective health measures. The purpose of this strategy is to study the effect of introducing

Sample	**Health indicator**					
	Short-term objective health		Long-term objective health		Subjective health status	
	Test statistic (i.e. χ^2)	Critical value from the χ^2 distribution (i.e. $\chi^2_{(df_c - df_u)}$)	χ^2	$\chi^2_{(df_c - df_u)}$	χ^2	$\chi^2_{(df_c - df_u)}$
Women	42	47.4	43	47.4	38	49.8
Men	40.9		41.2		44	

[3] I found the same result when I carried out the LR test for the data pooled for three years (*Encuestas Nacionales de Salud* from 1993, 1995 and 1997). This result provides, therefore, further support for the argument that, in the short term at least, time does not have a significant effect on the relationship between the dependent and the independent variables of the study.

these variables on the parameters of the initial model. One important consequence of this approach is that it allows us to observe how the values of the coefficients of class change when introducing more independent variables in the model. If they tend to zero, the association between class and health would significantly weaken. If, on the contrary, their values are maintained, then the relation between these factors and health will not affect the association between class and health. The coefficients for the additional exploratory variables will show the strength of their association with health.

I have applied this method of analysis in the following way. First, I have included in the model the measure of social class. The value of the coefficients will supply us with information about the sign and strength of the link between an individual's social position and her health. Secondly, I have introduced individual socio-demographic characteristics such as age and civil status. A comparison between the parameters of the initial model and those of the new model will tell us the extent to which class differences in health status vary after controlling for demographic characteristics. Thirdly, I have controlled for education by introducing into the model the measure of education discussed in Chapter 3. The analysis of the parameters for the different levels of education and its comparison with the parameters of the initial model will make it possible to study the relative impact of education and socio-demographic characteristics on health (compared to that of social class). Fourthly, I control for the effect that individuals' lifestyles may have on health condition. Hence, the evaluation of the parameters of the initial model and of those of this augmented model will tell us the extent to which health inequalities arise from differences between social classes in terms of their members' socio-demographic characteristics, education and lifestyles.

Finally, in the models that study the subjective dimension of health, I control for the objective state of health measured in both its short- and long-term dimensions. Hence, it will be possible to observe the variations in class coefficients when taking into account individuals' age, civil status, education, lifestyles and objective condition. The results of this final model will also allow us to explore whether individuals associate their health more with their health status in the long run than with their health status in the short run. The class coefficients of the last model will show how much of the class effect is not mediated by individuals' age, civil status, education, lifestyles and objective health.

5.3.2. Variables mediating the effect of class on health

5.3.2.1. Mechanisms between class and health

As I argued when outlining the theoretical framework for this research, class affects health through a variety of variables as well as through the interaction between these variables (see Figure 2.3 in Chapter 2). As discussed in Chapter 2 the association between class and health could be the result of four main mechanisms. Briefly, the first one is the effect of employment conditions themselves on health[4]. The second is the impact of education on health. The third is the impact of both class and education on lifestyles. Finally, the fourth mechanism relates the social structure of a developed society with an individual's health outcome. As I discussed in Chapter 2, this thesis will provide relevant empirical evidence for an analysis of whether the second and the third mechanisms hold.

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[4] It should be recalled here that this mechanism is based on the argument that certain occupations are unhealthier than others since they involve performing tasks that are harmful to an individual's state of health (e.g. jobs which involve lifting heavy weights, or more generally all jobs that are physically very demanding). The effect of an occupation on health would include *both* the effect of the specific occupational risks and the effect of the class the occupation falls into. However, given the limitations of the available data (i.e. it is not possible to disaggregate classes down to occupations), I cannot analyse empirically this part of the class effect. Even if data on specific occupations were available I could not include it in the models that already contain the class variable since the class variable is a linear combination of the occupation variables.

Regarding the relationship between the theoretical model and the statistical model, the following point should be noted. The theoretical model explains how the effect of class is mediated through these four mechanisms. However, in the statistical model, class coefficients may be reduced through the variables associated with mechanisms two and three (i.e. education and lifestyles) but also through some other control variables (i.e. age and civil status). Figure 5.1 presents graphically the link that exists between the theoretical explanation of the thesis and the statistical models used to test it empirically. Thus, while the figure depicts represents the four mechanisms that connect class and health, it also shows the expected association between class and the control variables. The statistical model will test links B, C and D of Figure 5.1.

One way of testing for the adequacy of these explanatory mechanisms is by analysing the variation in the class effect when moving from model 1 to model 4 (when studying the objective dimension of health) or model 5 (when analysing the subjective dimension). If these mechanisms hold we will be able to observe some specific patterns. First, the coefficients of class in the initial model (i.e. the model that takes class as the only explanatory variable of health condition) will capture the effect of class on health. Second, when I introduce education into the model, the effect of mechanisms two and part of three will be eliminated from the class coefficients. Finally, when I introduce lifestyle into the model, the effects of class and education will be reduced. Thus, if the results conform to the expected patterns, the class effect on health will indeed partly be explained by the mechanisms presented in the theoretical chapter.

(See Figure 5.1. in separate file)

5.3.2.2. Empirical testing

I have tested if these mechanisms hold by computing the sheaf coefficients for the class and education coefficients in each model[5]. This measure aims to present the effect of class and education in single measures. The sheaf coefficient will make it possible to summarise the effect of the categories of class and education, which are both nominal variables[6]. I will now explain in more detail the process followed to compute this measure as well as its interpretation.

I have calculated *the standard deviation of the sheaf coefficients* (Heise, 1972; Whitt, 1986) in order to capture the effect of the class and education dummies in a single measure. I have done this for both measures of class employed in the analysis, namely, the nine class categories defined in Chapter 3 on the one hand, and Goldthorpe's usual seven classes on the other. If class has an impact on health, the greater the differences between classes in their class coefficients, the greater the difference between classes in their health. Thus, we need a measure based on some average gap among the class coefficients to provide some information on the average difference between classes in terms of their health. The sheaf coefficient[7] (SC) is a useful measure to

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[5] For a methodological discussion of the sheaf coefficient see Heise, 1972; Whitt, 1986 and Yamaguchi, 2002. These papers show that the sheaf coefficient estimates the combined direct effect of two or more measured variables. It can have wide applications as the variables whose effects are to be summarised may be categories of a nominal variable, multiple indicators of a single unmeasured dimension or different variables that have in common forming part of a block of variables.

[6] The sheaf coefficient has mainly been used in research in social sciences disciplines such as psychology, sociology and the political sciences. For examples of its wide possible applications see: Breen and Goldthorpe, 2002; Hagerty *et al.,* 1999; Coenders and Scheepers, 2003; and Eisinga *et al.,* 1991.

[7] The sheaf coefficient takes into account the size of each class or education category as it is calculated using the standardised coefficients. In other words, the sheaf coefficient takes into account the fact that each dummy variable applies to a different number of cases - i.e. it is not simply the un-weighted average of all the class coefficients. This means that if the parameter value for a class with a small

analyse the effect of class since it estimates the combined direct effect of all the categories of a nominal variable. It is computed using the standardised coefficients and the correlation coefficients of the independent variables in the following way (Heise, 1972: 158):

$$SC = \sqrt{\beta_1^2 + \beta_2^2 + \beta_3^2 + 2(\beta_1\beta_2 r_{12} + \beta_2\beta_3 r_{23} + \beta_1\beta_3 r_{13})}$$

where β_i are the standardised coefficients and r_{ij} are the correlation coefficients of variables x_i (e.g. class dummies) and x_j (e.g. education dummies) where index i,j=1, 2, 3.

The interpretation of the standard deviation of the sheaf coefficients across the models is as follows. The class effect (i.e. the average difference between social classes in their health status) depends on how different the class coefficients are. If all coefficients are the same, then there is no class effect. Hence, the larger the class effect, the bigger the differences between the class coefficients, and the bigger their variance. The standard deviation of the sheaf coefficient is therefore a summary measure of the effect of any variable on the dependent variable. We should interpret the value of this measure in the following way. If the effect of class on health were mediated through the remaining explanatory variables in the analysis we would expect the standard deviation of the sheaf coefficients to decrease when moving from the initial model to the last model. The value of this measure for the last model would capture the class effect that cannot be explained by the mediation of the combination of all the explanatory variables.

Thus, the standard deviation of the sheaf coefficients will measure the extent to which the class effect decreases when moving from the initial model to the final model –i.e. the percentage reduction of the class effect as a result of the inclusion of the explanatory variables-. The standard deviation of the sheaf coefficients for education should be interpreted in a similar way.

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number of cases changes, it will not have a disproportionately strong impact on the standard deviation of the sheaf coefficient

5.4. Empirical findings

5.4.1. The objective dimension of health

As argued in the section of Chapter 3 devoted to the definition and operationalization of the dependent variable, the objective dimension of health is formed by two elements. The first captures individuals' short-term health, the second their state of health in the long run. The strategy that I have pursued to study the relation between social class and these dimensions is as follows. I have run an initial model –model (1)- that takes social class as the only explanatory variable. I have then incorporated age and civil status as control variables in model (2). Model (3) accounts for the education of individuals. Finally, model (4) includes lifestyle habits. Given the nature of both dimensions –i.e. continuous variables- I have run regression models. The analysis has been performed for women and men separately. I will first discuss the results for the short-term dimension of health. Then, I will present the analysis of the long-term dimension. I will conclude this section with a brief summary of the main findings.

5.4.1.1. Objective short-term health

The methodological chapter presented the detailed computation of this dimension. However, before examining the results, it is necessary to recall, very briefly, that this is a factor formed by three variables whose content is related to individuals' health in the two weeks prior to the survey. More specifically, the variables measure: (1) number of days with health-related limitations on performing principal activity; (2) number of days in bed due to health problems; and (3) total number of pains or symptoms affecting spare-time activities[8].

[8] It should be remembered that given the meaning of the variables, a negative coefficient would imply a positive association between the variable and enjoying good short-term health. A positive coefficient would imply the contrary.

Tables 5.1, 5.2 and 5.3 present the results for women. The impact of social class on this dimension of health is significant and of the sign that we would expect if there were a social gradient. In general, although the class effect is significant, its strength is moderate, especially, as we will see, when compared to both the objective long-term dimension of health and the subjective dimension of health.

The occupied social classes appear to enjoy better health. Class IIIab (the higher-grade routine non-manual employees) registers the highest score compared to the reference class, although it should be noted that the difference in the value of the coefficient between this category and the other class categories is rather small. Among the non-occupied classes, the state of health of full-time homemakers does not seem to be statistically different to that of the reference category. The unemployed, on the other hand, display better health than the reference category.

Women's age and civil status -model (2)- show a notable association with the dependent variable. Age does not seem to have an association with health until the age of 45, which marks a turning point. The positive and increasing values of the coefficients show that women over 45 years old face increasing health-related difficulties when it comes to satisfactorily carrying out their normal daily activities. In terms of civil status, all categories of women, whether married or cohabiting, separated, divorced or widowed, have worse health than single women. This gap is especially pronounced for separated and divorced women.

Regarding the controlling effect of these variables on the association between class and health, we can see that the variation among social classes with respect to their short-term health diminishes. In general, the value of the class coefficients declines and some of them lose their statistical significance (i.e. class I and class II). In relation to the non-occupied categories, the effect of unemployment drops to almost zero and becomes insignificant.

In other words, lower scores on the dependent variable imply good short-term health.

The coefficient of the full-time homemakers, on the other hand, increases and becomes significant. Thus, once we consider both the age and civil status of women in this category, their health status becomes statistically significant and their health becomes worse than that of the reference category.

The analysis of the standard deviation of the sheaf coefficients serves to examine the variation of the total effect of class on health across models. As I argued above, the examination of this measure is therefore relevant in analysing the mechanisms of explanation that link social class and health. That is, the study of the variation that the class coefficients present among models allows us to partly evaluate the theoretical framework presented in Chapter 2. The changes across models of the standard deviation will reveal the magnitude of the class effect that is explained by the independent variables of the explanatory framework. We can begin this analysis by examining the change in the value of the standard deviation of the sheaf coefficients when age and civil status are introduced into the model. We can see that the standard deviation of the sheaf coefficient diminishes for the nine categories operationalization from 0.9 to 0.064 and for the seven-class variable from 0.7 to 0.057. Thus, the effect of class as a whole on the dependent variable is reduced by 28.88% when all class categories are considered, but by 18.57% when only the occupied categories are taken into account. Women's age and civil status therefore, can control for part of the class effect on short-term health, especially when all classes are considered.

The inclusion of education in the regression in model (3) leads to a further reduction in the impact of class on the dependent variable. It also results in a decrease in the class effect as a whole on the score of health status in the short term (see column 2 Table 5.2). Some 31% of the effect of class as a whole is explained by the educational level of women, after controlling for their age and civil status (column 2 Table 5.3). As regards the examination of the link between education and short-term health, it is interesting to note that the association between women's level of education and objective short-term health is significant and of the expected sign. Hence, education has a positive association with a woman's health outcome. Moreover, the benefits of education are larger and stronger as education increases.

Finally, when we consider the role of certain types of behaviour in explaining inequalities, the effect of class taken as a whole slightly increases. Hence, we observe that the value of the standard deviation of the sheaf coefficients increases to some extent for class in both the nine and seven categories typologies. The percentage reduction of the class effect is consequently lower than that registered in the previous model. Accordingly, the individual class coefficients increase a little, especially those of classes IIIab and IVabc. Women's lifestyles also have some influence on the association between education and short-term objective health. The effect of education loses some of its strength but maintains its statistical significance. Hence, education coefficients decrease slightly and the standard deviation of the sheaf coefficients decreases as well. Education coefficients show a similar decline. The inclusion of lifestyle or habits reduces the total education effect by some 12%.

The impact of lifestyles themselves on health is as we would expect. Hence, the more a woman smokes or drinks or the less physical activity she engages in the worse her health will be in the short-term. The association between weight and height does not seem to be significant in influencing women's health.

A closer examination of the value of the class coefficients across models supplies further significant information on the link between class and health and, more specifically, on the concrete effect of mediating factors. Higher-grade routine non-manual employees register the best health score and full-time homemakers the worst, both compared to the reference category of unskilled or nonskilled manual and agricultural workers. Table 5.1 shows that socio-demographic characteristics significantly control for part of the class effect for many of the coefficients. Education operates in a similar way, especially for the occupied class categories, although the size of the coefficients diminishes remarkably less than those of the class categories. The last column of the model shows the increasing scant impact that habits have, especially on the occupied categories. After controlling for all explanatory variables, a number of the class categories (classes V, VI, and VIII) approach the value zero, implying that their initial effect on short-term health, compared to that of class VII, is explained by the combination of all mediating variables. It is worth noting that although some categories (such as the higher-grade routine non-manual employees and the higher-grade professionals) show lower coefficients in the last model in comparison to the initial model, the decrease is small. In the final model, small proprietors and employers and self-employed workers (i.e. class IVabc) present the best score in health, with a slightly higher coefficient than the one in the original model. Full-time homemakers continue to show the worst health.

It seems, therefore, that the evidence presented for women supports the argument that their social class influences women's objective health in the short-term although class differences are quite small. It can also be noted that after controlling for socio-demographic characteristics, education and lifestyle factors play a significant mediating role in this relation. Lifestyle habits are also a significant intervening variable in the association between education and health. However, as the small variation in the value of the standard deviation of the sheaf coefficients from model 2 onwards shows, the explanatory effect of lifestyle habits is very small.

Similarly to the case of women, the association between men's social class and short-term health (Tables 5.4 to 5.6) is significant. As we will see in the next sections, it is also the case that the strength of this association is weaker than the one found either for the objective long-term dimension or for the subjective dimension of health. The values of the coefficients also show that men's social class has a smaller impact on objective health in the short term than women's class does. Hence, class has a stronger impact on women's health status in the short run than it has on men's health. All occupied categories have a very similar effect on health, although this is slightly smaller than that of the non-occupied categories.

Table 5.1: Linear regression for the short-term dimension of health. Coefficients for models fitted to women, (standard errors in parentheses). Number of observations: 5777. Reference categories (RC) in parenthesis.

Model	(1)	(2)	(3)	(4)
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.12**	-0.072	-0.108	-0.11
	(0.06)	(0.06)	(0.08)	(0.06)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**-0.17**	-0.204	-0.2	-0.23
	(0.8)	(0.21)	(0.21)	(0.21)
Class IIIab: Higher-grade routine nonmanual employees	**-0.195**	**-0.17**	**-0.099**	**-0.186**
	(0.05)	(0.06)	(0.06)	(0.06)
Class IVabc: Small proprietors and employers and self-employed workers	**-0.15**	**-0.211**	**-0.207**	**-0.21**
	(0.05)	(0.06)	(0.06)	(0.05)
Class V: Lower-grade technicians and supervisors of manual workers	-0.01	0.012	-0.001	-0.03
	(0.11)	(0.12)	(0.1)	(0.13)
Class VI: Skilled manual workers	-0.063	-0.008	0.003	-0.01
	(0.05)	(0.06)	(0.05)	(0.06)
Class VIII: Unemployed	**-0.139**	0.03	0.02	-0.007
	(0.06)	(0.19)	(0.19)	(0.19)
Class IX: Full-time homemakers	0.054	**0.123**	**0.121**	**0.122**
	(0.03)	(0.03)	(0.04)	(0.03)
Age (RC: 25-34 age group)				
35-44 age group		0.026	-0.023	0.024
		(0.04)	(0.04)	(0.04)
45-54 age group		**0.12**	**0.103**	**0.102**
		(0.04)	(0.04)	(0.04)
55-65 age group		**0.21**	**0.168**	**0.153**
		(0.04)	(0.04)	(0.04)
Civil status (RC: Single)				
Married or cohabiting		**0.119**	**0.12**	**0.136**
		(0.03)	(0.05)	(0.04)
Separated or divorced		**0.201**	**0.2**	**0.205**
		(0.08)	(0.08)	(0.08)
Widowed		**0.198**	**0.19**	**0.205**
		(0.08)	(0.08)	(0.08)
Education (RC: Level 1a: Inadequately completed General Elementary Education)				
Level 1bc: General Elementary Education or Basic Vocational			**-0.173**	**-0.154**
			(0.03)	(0.04)
Level 2ab: Intermediate Vocational or Intermediate General Education			**-0.174**	**-0.142**
			(0.05)	(0.06)

Level 3ab: Lower-level Tertiary Certificate	**-0.213** (0.05)	**-0.189** (0.07)
Level 3c: Higher education –Upper Tertiary Certificate-	**-0.225** (0.06)	**-0.21** (0.06)
Smoke (RC: Non-smoker)		
Light smoker		0.03 (0.03)
Moderate smoker		**0.074** (0.03)
Heavy smoker		-0.094 (0.05)
Drink (RC: Non-drinker)		
Very low		0.033 (0.03)
Low		**0.058** (0.02)
Moderate		**0.077** (0.03)
Fairly high		**0.181** (0.07)
High		0.271 (0.2)
Very high		0.19 (0.3)
Physical exercise (RC: No activity)		
Light activity		**-0.187** (0.02)
Moderate activity		**-0.217** (0.05)
Vigorous activity		0.112 (0.13)
Relation between weight and height (BMI) (RC: Normal)		
Underweight		-0.037 (0.04)
Overweight		0.041 (0.02)
Obese		0.013 (0.03)

Table 5.2: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 5.1				
Model	**1**	**2**	**3**	**4**
Class (nine categories)	.09	.064	.062	.066
Class (seven categories)	.07	.057	.052	.055
Education	-	-	0.085	0.075

Table 5.3: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3 and 4 in Table 5.1			
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**
Class (nine categories)	28.88	31.1	26.6
Class (seven categories)	18.57	25.7	21.4
Education	-	-	11.76

It is interesting to observe that the introduction of men's age and civil status results in a general decline in the strength of the association between class and health. Differences among the social classes in terms of their effect on men's health slightly diminish, and the effect of class as a whole also drops. Thus, controlling for men's age and civil status results in a weakening of the class effect on health (around 8% for the nine categories variable and 6% for the occupied categories) as well as of part of the divergence among social classes in terms of health. However, the effect of age and civil status on the short-term dimension of health is limited. Men's socio-demographic characteristics do not have a major impact on their objective short-term health. Although as expected, the association between age and a healthy status is negative, there are no significant differences in the probability of being healthy of the youngest age group and any other age group. The association between civil status and objective health follows a similar pattern to the one we will see for the subjective dimension. That is, widowed men enjoy worse health than single men, while neither married, nor separated, nor divorced men are more likely to have worse short-term health than single men.

The inclusion of men's education in the third model has two main effects on class. First, it (after the control for age and civil status) reduces the class effect by about 23% when all categories of class are considered and by approximately 12% when only the occupied categories are considered (column 2 Table 5.6). Second, the incorporation of education leads to a general decline in the differences among social classes in terms of the probability of being healthy with respect to the reference class category (column 3 Table 5.4).

As for the general association between a man's level of education and his objective health, this is significant albeit weak. Similarly to women, men's level of education is positively related to health (see Figure 5.2). The peak of the association for both men and women is in the fifth level of education, namely, higher education. Hence, the positive effect that education has on health increases steadily and progressively. In other words, the beneficial impact of education on short-term health rises together with the level of qualifications and shows no turning point. For all categories, it is interesting to note that women present a stronger effect of education on the dependent variable than men do.

The last column in Table 5.4 allows us to examine how the relationship between class and health varies as we add men's lifestyles and habits into the explanation. Smoking does not significantly affect men's health; dissimilarities between the social classes in this respect do not seem to explain differences in their health status. Drinking behaviour, on the other hand, has some effect on men's health in the short term. The sign of the association with health is the expected one: the higher the level of alcohol consumption the lower the probabilities of having good health. The two highest levels of drinkers are much less likely to enjoy good health than non-drinkers. Figure 5.3 summarises this pattern for both men and women.

(See Figure 5.2 in separate file)

(See Figure 5.3 in separate file)

Coefficients from model (4) show that leading a physically active life has a positive influence on men's health. They also show that this factor does explain part of the health differences among social classes. As regards the BMI, underweight men suffer from worse health than those with a normal association between their height and weight. Overweight and obese men do not present a significantly different effect on the short-term health than men with a normal BMI.

The impact of living habits on the link between social class and short-term objective health is clear. Class coefficients slightly increase, as does the standard deviation of the sheaf coefficients. The percentage reduction in the class effect is therefore lower than that achieved by the combination of socio-demographic characteristics and education (18% as opposed to 23.07% for the nine categories, 9.1% as opposed to 12.1% for the seven categories). In other words, class differences in short-term health are greater when we control for lifestyle. The effect of lifestyles on the association between education and health operates in the opposite direction: the standard deviation of the sheaf coefficients of the education dummies declines and, consequently, so does the percentage reduction of the effect of education on health.

The variation registered by the class coefficients across the models provides evidence in favour of the significant explanatory role of education, and lifestyle factors. In general, class coefficients are smaller in the final model in comparison to the initial model. The coefficient of the unemployed loses its statistical significance and strength once we control for age and civil status. Therefore, the non-occupied classes present the highest explanation of their coefficients in the movement from model (1) to model (2). Most of the occupied categories, however, present the highest explanation once education is included in the explanation. It should be noticed that almost all classes present a coefficient very close to zero in the last model. Hence, the initial class effect is mostly explained by the combined impact of men's education and lifestyles. However, it should also be emphasised that, as we will see in the next sections, the initial class effect although significant is smaller than the one presented for both subjective health and the long-term objective health.

Table 5.4: Linear regression for the short-term dimension of health. Coefficients for models fitted to men, (standard errors in parentheses). Number of observations: 5883. Reference categories (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.066**	**-0.062**	-0.02	-0.03
	(0.03)	(0.03)	(0.04)	(0.04)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	0.054	0.09	0.126	0.115
	(0.07)	(0.07)	(0.14)	(0.04)
Class IIIab: Higher-grade routine nonmanual employees	-0.06	-0.034	-0.008	-0.045
	(0.04)	(0.04)	(0.05)	(0.04)
Class IVabc: Small proprietors and employers and self-employed workers	**-0.064**	**-0.086**	**-0.074**	**-0.064**
	(0.03)	(0.03)	(0.03)	(0.03)
Class V: Lower-grade technicians and supervisors of manual workers	-0.062	-0.059	-0.038	-0.04
	(0.05)	(0.06)	(0.05)	(0.05)
Class VI: Skilled manual workers	**-0.065**	**-0.067**	**-0.053**	**-0.056**
	(0.02)	(0.02)	(0.02)	(0.02)
Class VIII: Unemployed	**-0.14**	-0.098	-0.08	-0.087
	(0.07)	(0.19)	(0.07)	(0.08)
Class IX: Full-time homemakers	-0.028	-0.142	-0.127	-0.1
	(0.165)	(0.2)	(0.2)	(0.2)
Age (RC: 25-34 age group)				
35-44 age group		-0.023	-0.027	-0.029
		(0.03)	(0.04)	(0.04)
45-54 age group		0.03	0.016	0.017
		(0.03)	(0.04)	(0.04)
55-65 age group		0.076	0.052	0.044
		(0.03)	(0.04)	(0.04)
Civil status (RC: Single)				
Married or cohabiting		0.039	0.04	0.039
		(0.02)	(0.03)	(0.03)
Separated or divorced		0.014	0.014	0.016
		(0.08)	(0.09)	(0.08)
Widowed		**0.195**	**-0.13**	-0.035
		(0.06)	(0.06)	(0.11)
Education (RC: Level 1a: Inadequately completed General Elementary Education)				
Level 1bc: General Elementary Education or Basic Vocational			**-0.121**	**-0.12**
			(0.04)	(0.04)
Level 2ab: Intermediate Vocational or Intermediate General Education			**-0.125**	**-0.124**
			(0.03)	(0.04)

Level 3ab: Lower-level Tertiary Certificate	**-0.151** (0.04)	**-0.153** (0.05)
Level 3c: Higher education –Upper Tertiary Certificate-	**-0.153** (0.04)	**-0.134** (0.06)
Smoke (RC: Non-smoker)		
Light smoker		0.012 (0.03)
Moderate smoker		0.023 (0.03)
Heavy smoker		-0.0 (0.04)
Drink (RC: Non-drinker)		
Very low		0.007 (0.03)
Low		**0.104** (0.02)
Moderate		0.033 (0.03)
Fairly high		0.053 (0.08)
High		**0.51** (0.15)
Very high		**0.41** (0.2)
Physical exercise (RC: No activity)		
Light activity		**-0.09** (0.02)
Moderate activity		**-0.088** (0.03)
Vigorous activity		**-0.089** (0.4)
Relation between weight and height (BMI) (RC: Normal)		
Underweight		**0.077** (0.03)
Overweight		0.012 (0.01)
Obese		0.06 (0.1)

Table 5.5: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 5.4				
Model	**1**	**2**	**3**	**4**
Class (nine categories)	.039	.033	.03	.032
Class (seven categories)	.033	.031	.029	.03
Education	-	-	0.066	0.058

Table 5.6: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3 and 4 in Table 5.4			
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**
Class (nine categories)	15.4	23.07	18
Class (seven categories)	6.06	12.1	9.1
Education	-	-	12.12

To sum up the findings on short-term health, the statistical analysis presented here shows that individuals' objective short-term health is indeed related to social class. Education and living habits are variables that significantly mediate the association between class and health for both men and women, even after we control for age and civil status. Irrespective of gender, and after controlling for the combination of socio-demographic characteristics, education is the factor that leads to the greatest reduction in the class effect. Lifestyles do influence health, although they have a mixed impact in the models. On the one hand, lifestyles result in a slightly greater class effect on objective health for all individuals. On the other hand, they significantly mediate the link between education and health, although this mediation effect is small. Thus, controlling for lifestyle makes the class effect slightly more pronounced, while personal habits mediate some of the education effect on health.

Hence, we have seen that although the effect of class on short-term health is significant it is quite small. In relation to the explanation of this effect, the evidence provides partial support for the second mechanism of explanation of the research, that is education, which slightly mediates the effect of class on short-term health; after including education in the model about three quarters of the class effect remains unexplained. The evidence in support of the third mechanism –i.e. class and education both have a significant effect on health through lifestyles- is even weaker as lifestyles slightly increase the impact of class on health. It has also been observed that the models explain to a greater extent the class effect when it takes into account all class categories, as opposed to just the occupied categories.

Graphs 5.1 and 5.2 provide a graphical representation of these findings for women and men respectively. We observe how, in general, the size of the class coefficients decreases as age and civil status are controlled for in model (2); that they continue to decline when education is included in model (3); and that they slightly increase when individuals' lifestyles are incorporated into the explanation in the final model. The full-time homemakers category, however, experiences a significant increase in model (2) for both women and men. Thus, once age and civil status are considered, the effect of this category on health increases especially for women. The graphs also show that the class effect slightly declines more across models for women than for men.

(See Graph 5.1 in separate file)

(See Graph 5.2 in separate file)

5.4.1.2. Objective long-term health

In the methodological chapter I included a full definition of the long-term dimension of objective health. Put simply, this dimension measures the number of chronic diseases that an individual suffers from. The chronic nature of these diseases normally limits individuals' capacity to carry out their everyday activities[9]. Maintaining the order and structure of the previous section, here I will first present the results for women and then those for men.

The analysis of the relationship between women's social class and long-term health is presented in Tables 5.7, 5.8 and 5.9. The effect of class on the dependent variable is significant and robust. In general, it is stronger than that of class on short-term objective health and, as we will see in the next section, weaker than the impact of social class on the subjective dimension of health. Occupied categories follow a social gradient in the strength of the link between class and health. The examination of the results from models (2), (3) and (4) will provide us with some information about the variables that explain the class effect on health.

The first set of independent variables I analyse, as was the case when examining short-term health above, are socio-demographic characteristics. As was expected, older age groups enjoy poorer health than the youngest age group, which is especially significant for the oldest age group. In relation to women's civil status, both separated or divorced and widowed women have worse long-term health than single women do. Married or cohabiting women, on the other hand, do not show statistically significant differences in this respect to single women.

The magnitude of the class effect decreases very significantly when socio-demographic variables are included, especially among

[9] Since the variable measures the number of chronic diseases an individual has, a negative coefficient of any explanatory variable would imply that the variable has a positive association with long-term good health. A positive coefficient would therefore indicate the contrary. In other words, lower scores on the dependent variable imply good long-term health.

women from the non-occupied class categories. As a result of the inclusion of these variables, the impact of full-time homemakers on the dependent variable largely declines, and the unemployed do not have significantly different long-term health to that of non-skilled manual and agricultural workers. The standard deviation of the sheaf coefficients drops accordingly (from 0.1 to 0.03 for class with nine categories and from 0.08 to 0.037 for class with seven categories). Thus, the effect of class as a whole is reduced by 70% for the nine class categories and by approximately 54% for the occupied class categories. These results show the major importance of socio-demographic variables, and above all age, when analysing long-term health.

The general effect on class of including education is to diminish the value of its coefficients, that is, the effect of class on long-term health is to a large extent explained by women's educational achievements, after controlling for age and civil status. The size of the coefficients shows that there is an increasing effect of education on health. The association between education and health is, as in the case of the short-term health dimension, positive and the effect of education on health also rises as educational achievement rises. Education has, therefore, positive impact on health in the long run and its effect becomes stronger as we move from the lowest to the highest educational level.

Tables 5.8 and 5.9 show that education, age and civil status result in a further decline in the standard deviation of the sheaf coefficients. Education, after controlling for age and civil status, is able to explain a large proportion of the class effect (around 77% for the nine categories variable and 67.5% for the seven categories variable). Health is therefore better explained when we have taken into account women's educational level.

Finally, model (4) presents the effect of women's living habits on their long-term health. Smoking behaviour does not seem to be relevant for long-term health. Most of the drinking behaviour categories, on the other hand, are statistically significant and have the expected sign. A physically active life does make good health more likely. Finally, the association between a woman's height and weight does not explain her long-term health.

As regards the impact of a woman's lifestyle or behaviour on the association between class and health, the association is almost unchanged although there is a generalised but slight increase in the value of the class coefficients. This rise is not large, and it does not change the status of significance of the coefficients, that is, all coefficients remain non-significant except the coefficient for class I which maintains its significance. The class effect as a whole reflects the variation in the magnitude of the coefficients. Compared to the previous model, the reduction in the class effect is one percentage point larger for class with nine categories and around four percentage points lower when class is considered with the first seven categories. The levels of explanation of the class effects in the final model are however very large (78% for the nine categories and 63.75% for the occupied categories).

Lifestyle and behaviour also have a significant although limited impact on the link between women's education and long-term health. The coefficients of education slightly decrease and the standard deviation of the sheaf coefficients also declines suggesting a small reduction in the effect of education as a whole. Specifically, the percentage reduction of the effect of education on health is 6%. This finding implies that there is only limited support for the hypothesis presented in the third mechanism, namely, that the effect of education on health is partly mediated by lifestyle.

In short, the analysis of the results of the models computed for the long-term health of women reveals the relevance of social class in determining their health. We have seen that the effect of class is significant and larger than in the case of individuals' short-term objective health. The evidence also shows that, after controlling for age and civil status, education and lifestyle are significant mediators in this relationship, and that this mediation is greater than in the case of objective short-term health. We have seen that the effect of class as a whole is explained largely by these variables (i.e. 78% for class with nine categories and 64%

for class with seven categories), although we should note the major control effect that age and civil status have in the second model. It is interesting to see that individually, most class coefficients also drop significantly between the original and the final model. In fact, all class coefficients, except those of class I and class V, fall to almost zero. In the final model, the first class, the higher-grade professional, administrators and managers has the best score in health, which is statistically significant. The other classes do not present significant differences in their health status with respect to the reference category. Moreover, the value of the coefficients is very similar across classes; thus, there are no significant differences among classes.

I turn now to the analysis of men's long-term dimension and its association with health. Tables 5.10, 5.11 and 5.12 present the results of the statistical analysis. The class effect on men's long-term health is significant. It is stronger than the class impact on short-term health and, as we will see in the next section, weaker than the effect class has on the subjective dimension of health. As in the case of women, the association between class and long-term health displays some similarities with that of the other dimensions of health. For instance, concurring with the findings for both the short-term objective dimension and the subjective dimension, the effect of class is greater in the case of class with nine categories than in the case of the occupied classes (column 1 Table 5.11). The value of the coefficient for the unemployed is large and, when age and civil status are controlled for, it declines significantly. The class position that a man occupies is of some relevance for understanding his long-term health.

As regards the impact of the socio-demographic variables included in model (2) on health, age presents the expected association with long-term health, that is, the older a man the unhealthier he will be in comparison to the youngest age group. The effect of age increases considerably as we move from one category to another, men aged between 55 and 65 years enjoying much worse health than any younger age group. In this case, the impact of civil status is slightly different to that found in relation to other dimensions of health long-term health, both married and widowed men suffer from worse long-term health than single men.

Table 5.7: Linear regression for the long-term dimension of health. Coefficients for models fitted to women, (standard errors in parentheses). Number of observations: 5923. Reference categories (RC) in parenthesis.

Model	(1)	(2)	(3)	(4)
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.25**	**-0.127**	**-0.103**	**-0.107**
	(0.04)	(0.04)	(0.04)	(0.04)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	-0.23	-0.083	-0.03	-0.04
	(0.15)	(0.14)	(0.14)	(0.14)
Class IIIab: Higher-grade routine nonmanual employees	**-0.241**	**-0.2**	0.005	-0.018
	(0.04)	(0.04)	(0.04)	(0.04)
Class IVabc: Small proprietors and employers and self-employed workers	0.023	**-0.072**	**-0.06**	-0.05
	(0.03)	(0.03)	(0.03)	(0.03)
Class V: Lower-grade technicians and supervisors of manual workers	**-0.164**	-0.063	-0.097	-0.102
	(0.08)	(0.07)	(0.08)	(0.08)
Class VI: Skilled manual workers	**-0.122**	-0.04	-0.014	-0.018
	(0.03)	(0.03)	(0.03)	(0.03)
Class VIII: Unemployed	**-0.372**	-0.08	-0.04	-0.08
	(0.06)	(0.06)	(0.06)	(0.05)
Class IX: Full-time homemakers	0.021	-0.043	-0.033	-0.035
	(0.02)	(0.03)	(0.02)	(0.03)
Age (RC: 25-34 age group)				
35-44 age group		**0.053**	**0.042**	**0.041**
		(0.02)	(0.02)	(0.02)
45-54 age group		**0.272**	**0.24**	**0.24**
		(0.03)	(0.03)	(0.02)
55-65 age group		**0.629**	**0.57**	**0.56**
		(0.03)	(0.03)	(0.03)
Civil status (RC: Single)				
Married or cohabiting		0.005	-0.009	0.006
		(0.03)	(0.03)	(0.02)
Separated or divorced		**0.12**	**0.13**	**0.111**
		(0.05)	(0.05)	(0.05)
Widowed		**0.092**	0.05	0.058
		(0.03)	(0.05)	(0.03)
Education (RC: Level 1a: Inadequately completed General Elementary Education)				
Level 1bc: General Elementary Education or Basic Vocational			**-0.158**	**-0.15**
			(0.02)	(0.02)
Level 2ab: Intermediate Vocational or Intermediate General Education			**-0.217**	**-0.2**
			(0.03)	(0.02)

Level 3ab: Lower-level Tertiary Certificate	**-0.22**	**-0.213**
	(0.03)	(0.05)
Level 3c: Higher education –Upper Tertiary Certificate-	**-0.251**	**-0.241**
	(0.04)	(0.04)
Smoke (RC: Non-smoker)		
Light smoker		-0.011
		(0.02)
Moderate smoker		0.006
		(0.02)
Heavy smoker		0.016
		(0.03)
Drink (RC: Non-drinker)		
Very low		0.008
		(0.03)
Low		**0.035**
		(0.02)
Moderate		**0.033**
		(0.02)
Fairly high		**0.194**
		(0.06)
High		-0.13
		(0.1)
Very high		**0.587**
		(0.18)
Physical exercise (RC: No activity)		
Light activity		**-0.05**
		(0.01)
Moderate activity		**-0.07**
		(0.03)
Vigorous activity		-0.05
		(0.1)
Relation between weight and height (BMI) (RC: Normal)		
Underweight		-0.045
		(0.03)
Overweight		-0.002
		(0.01)
Obese		-0.024
		(0.02)

Table 5.8: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 5.7				
Model	**1**	**2**	**3**	**4**
Class (nine categories)	.1	.03	.023	.022
Class (seven categories)	.08	.037	.026	.029
Education	-	-	0.05	0.047

Table 5.9: Percentage reduction of the class and education effects when moving from model 1 to model 4 in Table 5.7			
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**
Class (nine categories)	70	77	78
Class (seven categories)	53.75	67.5	63.75
Education	-	-	6

As the value of the coefficients from model (2) shows, the inclusion of age and civil status in the model leads to a large decline of the effect of class on the dependent variable. As a result of this controlling effect only one class category, class IVabc, remains statistically significant. In relation to the class effect as a total, the standard deviation of the sheaf coefficients significantly diminishes, especially for the nine-category class variable (from 0.05 to 0.03 for class with nine categories and from 0.026 to 0.022 for class with seven categories).

The introduction of education into the explanation in model (3) accounts for part of the relation between class and health. Hence, most of the class coefficients decline, especially those of the occupied categories, although it should be noted that only one coefficient is statistically significant. The standard deviation of the sheaf coefficient also decreases. The percentage reduction of the class effect is around 46% for the nine class categories and 31% for the first seven categories.

In relation to the specific impact of education on long-term health, it is positive and, as in the case of women, gradually increases as educational achievement rises. Education has a similar impact on men's health as it does for women: it shows, as we will see, its highest values on the subjective dimension and the lowest ones on the short-term objective dimension. Figure 5.4 summarises the association between education and long-term health for both women and men. We can see, on the one hand, that the effect of education on health is larger for women than for men and, on the other hand, that the shape of the association between both variables is similar for both genders (i.e. the higher the level of education, the better the long-term health).

As we can see from the final column in Tables 5.10, 5.11 and 5.12, men's lifestyle and habits also make up part of the explanation for health inequalities among the social classes, although the explanatory capacity of these factors is very limited, especially when we employ a nine-category class model. The effect of these variables on long-term health is similar to the one they have on the other dimensions of health. Thus, smoking does not seem to affect how men's objective health is in either of the health dimensions. Drinking behaviour has a negative and increasing association with good health. Physical activity has an increasingly positive effect on long-term health. The BMI categories do not present statistically significant differences on how they influence long-term health.

The impact of lifestyle and behaviour on the effect of class on health is very limited. The class effect as a whole increases slightly. However, the effect on the individual class coefficients is mixed: the non-occupied categories register smaller coefficient while some of the occupied categories show a larger coefficient. This trend is reflected in the increase in the standard deviation of the sheaf coefficients, which is positive although very close to zero for class, regardless of whether this has nine (0.0001) or seven categories (0.002). The influence of personal behaviour on the association between class and health is therefore very small, but its direction is not the expected one, as it does not mediate the class effect on health, at least, not for all the class categories. The evidence does not, therefore, support this part of mechanism (3).

Lifestyles also have some effect on the association between men's educational achievements and long-term health. Thus, we can see that the value of the total effect of education decreases by around 12% when we account for men's drinking and smoking behaviour, physical exercise habits and BMI (column 4 Table 5.11). It can be seen that all the different categories of education decline. Lifestyles, therefore, have a significant, albeit limited, impact on the relation between a man's educational level and his long-term health. The effect is of the expected sign: the higher the educational achievement the better the health outcomes.

The examination of the variation of the class coefficients across models offers greater insights into the specific effect of the explanatory variables in each class category. In general, all class coefficients decline when moving from the initial to the last model. More specifically, the shift from model (1) to model (2) implies a general decline in the coefficients; the movement from the second to the third model implies a further decline; while the movement from model (3) to the last model means a slight increase of the coefficients. However, it should be noted that the statistical significance of the coefficients hardly varies from the second model onwards. Hence, we can see that model (2) makes most of the class coefficients non-significant. Thus, classes I, IIIab, VI and VIII lose their significance once age and civil status are included in the model. In relation to the explanatory capacity of the sequence of models, we can see that the value of most of the coefficients is close to zero in the final model. However, it should be emphasised that the initial influence of class, although stronger than in the case of short-term health, is not very great and certainly smaller than in the case of the subjective dimension of health.

(See Figure 5.4. in separate file)

Table 5.10: Linear regression for the long-term dimension of health. Coefficients for models fitted to men, (standard errors in parentheses). Number of observations: 5977. Reference categories (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.053**	-0.027	-0.01	-0.03
	(0.02)	(0.02)	(0.03)	(0.03)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	0.047	0.069	0.087	0.08
	(0.05)	(0.05)	(0.05)	(0.05)
Class IIIab: Higher-grade routine nonmanual employees	**-0.085**	-0.035	-0.016	-0.061
	(0.03)	(0.03)	(0.03)	(0.04)
Class IVabc: Small proprietors and employers and self-employed workers	**-0.06**	**-0.051**	**-0.046**	-0.044
	(0.02)	(0.02)	(0.02)	(0.03)
Class V: Lower-grade technicians and supervisors of manual workers	-0.055	-0.036	-0.017	**-0.081**
	(0.04)	(0.04)	(0.04)	(0.04)
Class VI: Skilled manual workers	**-0.04**	-0.022	-0.017	-0.024
	(0.02)	(0.02)	(0.02)	(0.02)
Class VIII: Unemployed	**-0.242**	0.102	0.111	-0.098
	(0.06)	(0.14)	(0.1)	(0.14)
Class IX: Full-time homemakers	0.165	0.147	0.163	0.15
	(0.13)	(0.12)	(0.14)	(0.12)
Age (RC: 25-34 age group)				
35-44 age group		**0.074**	**0.07**	**0.06**
		(0.02)	(0.02)	(0.02)
45-54 age group		**0.27**	**0.26**	**0.255**
		(0.03)	(0.02)	(0.03)
55-65 age group		**0.53**	**0.523**	**0.5**
		(0.03)	(0.03)	(0.02)
Civil status (RC: Single)				
Married or cohabiting		**0.05**	**0.05**	**0.044**
		(0.02)	(0.02)	(0.02)
Separated or divorced		-0.027	-0.02	-0.028
		(0.06)	(0.06)	(0.06)
Widowed		**0.08**	0.008	0.022
		(0.04)	(0.05)	(0.04)
Education (RC: Level 1a: Inadequately completed General Elementary Education)				
Level 1bc: General Elementary Education or Basic Vocational			**-0.15**	**-0.11**
			(0.02)	(0.03)
Level 2ab: Intermediate Vocational or Intermediate General Education			**-0.19**	**-0.12**
			(0.04)	(0.02)
Level 3ab: Lower-level Tertiary Certificate			**-0.21**	**-0.18**
			(0.03)	(0.05)
Level 3c: Higher education –Upper Tertiary Certificate-			**-0.23**	**-0.2**
			(0.06)	(0.03)

Smoke (RC: Non-smoker)	
Light smoker	0.02 (0.02)
Moderate smoker	0.009 (0.01)
Heavy smoker	0.027 (0.03)
Drink (RC: Non-drinker)	
Very low	0.037 (0.02)
Low	**0.052** (0.01)
Moderate	**0.09** (0.02)
Fairly high	**0.112** (0.04)
High	0.072 (0.11)
Very high	**0.3** (0.18)
Physical exercise (RC: No activity)	
Light activity	**-0.099** (0.01)
Moderate activity	**-0.11** (0.02)
Vigorous activity	**-0.114** (0.3)
Relation between weight and height (BMI) (RC: Normal)	
Underweight	0.017 (0.02)
Overweight	0.001 (0.01)
Obese	0.048 (0.02)

In short, the impact that social classes have on men's long-term health is significant but moderate in magnitude. Possible paths of explanation for the class differences in both their impact on health and their actual health condition have been examined and tested. In general, a man's education and lifestyle, after controlling for age and civil status, can account for a large part of the variations among classes in terms of their different association with health. These explanatory variables account for about 50% of the class effect when class is measured in nine categories. The reduction of the class effect is much lower (23%) if we only consider the occupied categories of class.

Table 5.11: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 5.10

Model	1	2	3	4
Class (nine categories)	.05	.03	.027	.0271
Class (seven categories)	.026	.022	.018	.02
Education	-	-	0.04	0.035

Table 5.12: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3 and 4 in Table 5.10

Model change	From 1 to 2	From 1 to 3	From 1 to 4 for class From 3 to 4 for education
Class (nine categories)	40	46	45.8
Class (seven categories)	15.38	30.76	23.1
Education	-	-	12.5

The analysis of the models presented in the section has shown that an individual's social class has a significant effect on her long-term health. However, we have seen that this effect is significantly reduced when models are adjusted for an individual's age and civil status. The explanatory variables of the model, namely, education and living habits, have a moderate mediating effect on the relation between class and health. An examination of the long-term objective health dimension provides some support for the mechanisms put forward in the theoretical framework.

Thus, we have seen that there is some evidence in favour of mechanism (2) (i.e. education has a mediating effect between class and health) but only limited support for part of mechanism (3) (i.e. lifestyles have an effect on health as they mediate the impact of education on health but not the influence of class on health).

We have seen that the influence of the explanatory variables on health is similar for men and women. The association between class and health also shows many similarities between both sexes. The pattern of explanation presented by the variables is comparable for men and women, except for one minor difference in relation to the influence of lifestyles. More specifically, first, socio-demographic characteristics significantly diminish the class effect, producing a reduction that is greater for the nine categories of class than for the occupied categories. Second, in all cases education accounts for part of the class effect. Finally, controlling for lifestyles is significant although small, as it leads to a minor increase in the class effect as a whole for men, whereas for women it implies a small decrease when class is measured though nine categories. It is interesting to note that although the variation of the class effect as a whole is slightly different for men and women, the sign of the change experienced by the class categories individually is similar. Thus, for all individuals, the inclusion of lifestyle means a small decrease in the coefficients of classes II, IVabc, VIII and IX whereas the coefficients of classes I, IIIab, V and VI increase. Lifestyles therefore seem to have a similar mediating impact on the association between the research variables for both men and women.

As for the explanatory capacity of the models, the inclusion of education after controlling for socio-demographic characteristics explains the greatest percentage of the class effect for men in all cases, and for women in the case of class with nine categories. The explanation of the effect of class as measured through the traditional Goldthorpe schema on women's health is greatest when, in addition to age, civil status and education, we include women's lifestyles. The findings summarised so far are represented graphically in graphs 5.3 and 5.4. We can see how the class coefficients gradually cluster around zero as we move from the initial to the final model. The greatest decline in the coefficients is found between model (1) and model (2). The inclusion of education takes the coefficients closer to zero, whereas lifestyles in model (4) lead to a slight movement away from zero. The slight difference between men and women is that, in the case of the former, the final model implies a slightly greater dispersion of the coefficients around zero, whereas for the latter the approximation to zero continues and reaches its maximum level. In any case, the difference is very small and difficult to observe.

Another similarity between men and women with respect to the explanation for the effect of class as a whole on health is that the impact of class with nine categories is always explained more than that of class with seven categories. This might be the result of age and civil status being correlated with class VIII and IX, since most unemployed individuals are in the younger age groups and most married women form part of class IX (i.e. they are full-time homemakers). This trend has also been seen in the case of objective short-term health and will be observed for the subjective dimension of health. It is interesting to note that this gap is more pronounced with respect to long-term health.

If we compare the class effect for men and women at the class categories level, we can clearly see that the models explain better the effect of both the nine and seven class operationalization for women than for men. When we consider class with both the occupied and the non-occupied categories, over two thirds of the class influence are account for in the case of women, whereas for men half of the effect is explained. If we focus on class with seven categories, the gap in explanatory capacity is even greater: the reduction of the class effect is around 63% for women whereas for men it is equal to 23%.

(See Graph 5.3 in separate file)

(See Graph 5.4 in separate file)

Finally, we should note the size and significance of the class coefficients from the final model, as they show the class effect that remains unexplained after the inclusion of the control and explanatory variables. Thus, we can observe that the coefficients of almost all classes approach zero and are not statistically significant. Specifically, for men, all coefficients except the coefficient for class IX stand at almost zero; for women, all coefficients except the one for class I have a value of around zero. In terms of the significance of the coefficients, the difference between women and men is the coefficient of class I that remains significant only for women and the coefficient of class V which maintains its significance for men only.

5.4.2. The subjective dimension of health

The results of fitting these models for the subjective dimension of health[10] are presented in Tables 5.13 and 5.16. I have fitted them for women and men separately. In each of these tables, model (1) presents the coefficients of class; model (2) shows the results of the model when age and civil status are introduced; the third model includes the results when controlling for education; model (4) the results after taking lifestyles and personal behaviour into account; and model (5) the results when individuals' objective health is included. I will first discuss the results for women and then those for men.

5.4.2.1. Women's subjective health

We can see in Table 5.13 that model (1) tests for the association between a woman's class and her perceived health.

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[10] It should be remembered here that subjective health status is measured through the following question: "How do you think your health has been during the last twelve months? Very bad, bad, fair, good or very good". Thus, high scores mean better subjective health.

The coefficients of the first column show that the relationship is significant and of the sign and direction that we would expect if there were a social gradient in health outcomes. The magnitude of the class coefficients is considerable, suggesting that a woman's social class has a major impact on her subjective health, and one which is stronger than in the case of the objective dimension of health.

When analysing the impact of class on health in more detail we must distinguish between the first seven classes and the other classes. Of Goldthorpe's usual classes, we can see that professionals and the routine non-manual employees are those which show the greatest difference in the probability of being healthy with respect to the reference category. Among non-occupied women, class VIII (i.e. the unemployed) reports better subjective health than the reference category (i.e. the non-skilled manual workers). As we have seen in the previous sections, this is an association that we also found for men for the objective dimension of health and, as we will see below, it also appears to exist in the subjective dimension. In all cases, the significance of the coefficient disappears once we take individuals' age and civil status into account. In model (1) the only two categories that do not differ from the reference category in terms of their probability of being healthy are categories IV –small proprietors and employers and self-employed workers- and class IX –full-time homemakers.

As I explained in the methodological section, and have done in the previous sections, I have calculated the standard deviation of the sheaf coefficients in order to cast further light on the relationship between class and health. I have computed these magnitudes for social class, first taking Goldthorpe's seven categories and then the nine-category class schema. I have also calculated the standard deviation of the sheaf coefficients for education. Tables 5.14 and 5.15 present these results. The first column of Table 5.14 shows that the standard deviation of the sheaf coefficients is very similar for the both class schema, albeit slightly larger in the case of the former.

The analysis of the evolution of the standard deviation of the sheaf coefficient makes it possible to consider the effect of including age and civil status on the influence of class as a whole on subjective health. We can see that the variation among social classes in their probabilities of being healthy drops considerably when these variables are introduced. Below I will explain in detail the effect of subsequent introductions of variables on the sheaf coefficients. However, it should be noted here that this trend is clearly maintained for all the explanatory variables in the model, with the exception of lifestyle. The introduction of lifestyle results in a slight increase in the class divergence suggesting that personal behaviour does not mediate between class and health.

The first set of variables included in the model consists of control variables that measure some of the individual's socio-demographic characteristics (i.e. age and civil status). The values of the second column of Table 5.10 lead us to conclude that a woman's age and civil status do control for part of the relation between her social class and her health condition, as in general, the class coefficients become smaller when these variables are controlled for. The association between age and health is as expected (i.e. negative and with a gradually increasing effect). In relation to civil status, both married and cohabiting and widowed women report worse health than the reference category (i.e. single women). Separated or divorced women are not significantly more likely to consider themselves with a different health status than single women do.

Regarding the variation experienced by class coefficients when a woman' age and civil status are considered, we see that there is a decline in the dispersion of the coefficients both in the case of the nine class categories and in that of the occupied categories, the former being greater than the latter. The percentage reduction in the class effect is large: in the case of the nine categories, 42.48% of the variation in the subjective health of women of different classes is reduced when their age and their civil status are considered, a figure which drops to 19.47% for the seven categories. Similarly to our findings for the two indicators of objective health, the class coefficients that change most significantly as the result of introducing socio-demographic measures are those of class VIII -the unemployed-, class IVabc – small proprietors and employers and self-employed workers- and class IX –full-time homemakers-. The coefficients for class IVabc and IX become significant whereas the coefficient for class VIII loses its statistical significance. Most unemployed women belong to the youngest age category; therefore, it is not surprising that once age is included in the model the class coefficient becomes non-significant.

When education is included into the explanation, the discrepancies between the social classes in terms of their probabilities of having a good health diminish (by two thirds compared to the initial model when class has nine categories, and by about half when class has seven categories). This trend is mirrored in the decrease in the class coefficients (see column 3 Table 5.10). The coefficients of the non-occupied categories drop less than those of the occupied categories. Of the occupied classes, the ones that show the largest declines are classes I, II and IIIab. These categories contain some occupations that require heavy investment in training as well as specialised education.

Thus, the evidence shows that the different subjective health declared by women, who form part of distinct social classes, can partly be explained by their levels of education, the association between education and subjective health being positive. Hence, the social class of a woman will have an effect on her health, effect that will vary according to her level of education. In general, young and single women from classes I, II, IIIab and IVabc will enjoy a better state of health than their counterparts from class VII.

Model (4) introduces into the analysis variables that measure personal behaviour. As in previous models, this set of variables – smoking and drinking behaviour, the practice of physical exercise, and the relation between weight and height measured by the BMI- has been introduced with a double objective. This is, first, to analyse their impact on the state of health and, second, to examine their impact on the association between class and health. The sign and value of the coefficients are as expected. That is, a woman will have a worse health condition the more she smokes or drinks, the less sport she does, or the more her BMI differs from the normal value.

The gap among social classes in terms of their subjective health increases slightly as a result of introducing lifestyles variables into the model. In the case of the seven-category class classification, the percentage reduction of the class effect is around 46% when moving from the initial model to this model. The percentage reduction of the effect for class with nine categories is around 53%. If we compare these figures to those of the previous model we can see that personal lifestyle variables do not act as a mediator between class and health. Thus, regarding the explanatory capacity of model (4), when we control for women's age, civil status, education and personal habits, about half the divergence in health among social classes is explained. This suggests that differences in the values of these independent variables between social classes partly determine their dissimilar subjective health.

Finally, in model (5) I control for women's objective health[11]. The rationale behind the inclusion of this objective measures is to analyse whether the self-perception of health depends on the individual's objective health. The sign and the value of these coefficients are, as argued in Chapter 3, as I would expect. Thus, how women describe their health is dependent on how healthy they objectively are. There is a clear link between the objective state of a woman's health and her subjective evaluation of it. Hence, this finding does provide support for the way the dependent variable has been operationalised throughout the research. The coefficients of class decline moderately for most categories, although most of those which were statistically significant remain so. Thus, differences in how women from

[11] In order to interpret the coefficients correctly it should be remembered here that, given the definitions of the objective measures (see Chapter 3), the higher the values of the objective measures the unhealthier a person is.

different social classes perceive their health are partly explained by how their health is in objective conditions. The last columns of Tables 5.14 and 5.15 show that health divergence among social classes is further reduced when including the objective dimension of health. The model proposed explains about 66% of the difference in health status among all classes (53.7% for the first seven classes).

In order to better understand the specific role of each explanatory variable in the class effect, I will now analyse in more detail the change in the value of the class coefficients when moving from the original to the final model. Table 5.10 reveals that almost all class coefficients fall considerably, dropping by around 50% in most cases. The exception to this pattern are the small proprietors and employers, and the self-employed (i.e. class IVabc) and the full-time homemakers. The coefficients for these class categories increase, suggesting that the explanatory variables of the model accentuate differences between these categories and the reference class in their probability of being healthy. After controlling for age and civil status, the combination of education, living habits and objective health has the greatest explanatory power for the class effect for most of the categories, and certainly for class taken as a whole in its two operationalizations. The class categories that appear to be almost entirely explained by the model are class I and class II (i.e. higher grade and lower-grade professionals).

The examination of the percentage of the education effect explained by lifestyle variables provides further evidence to test for the adequacy of the third theoretical mechanism explained in Chapter 2 (i.e. the impact of both class and education on health is mediated by lifestyle). The fourth column of Table 5.14 and the third column of Table 5.15 provide very weak support for this mechanism, since only 2.5% of the education effect on health disappears when the lifestyle variables are included.

Table 5.13: Ordered probit for perceived health status. Coefficients for models fitted to women, (standard errors in parentheses).
Number of observations: 5742. Reference categories (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Log-likelihood	-8594.9	-5812.6	-5765.6	-5685.4	-5347.9
Log-likelihood change		2782.3	47	80.2	337.6
***P*-value for the approx. likelihood ratio test of the parallel regression assumption**	0.52	0.43	0.41	0.27	0.1
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)					
Class I: Higher grade professionals, administrators and managers	**0.525**	**0.411**	**0.236**	0.153	0.088
	(0.06)	(0.06)	(0.07)	(0.09)	(0.3)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**0.442**	0.293	0.136	0.139	0.01
	(0.22)	(0.22)	(0.22)	(0.22)	(0.23)
Class IIIab: Higher-grade routine nonmanual employees	**0.579**	**0.391**	**0.199**	**0.318**	**0.276**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Class IVabc: Small proprietors and employers and self-employed workers	0.089	**0.238**	**0.253**	**0.256**	**0.175**
	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)
Class V: Lower-grade technicians and supervisors of manual workers	**0.441**	**0.328**	0.132	0.14	0.165
	(0.12)	(0.12)	(0.14)	(0.12)	(0.12)
Class VI: Skilled manual workers	**0.309**	**0.216**	**0.174**	**0.194**	**0.206**
	(0.05)	(0.05)	(0.06)	(0.05)	(0.07)
Class VIII: Unemployed	**0.656**	0.277	0.105	0.191	0.166
	(0.09)	(0.21)	(0.21)	(0.22)	(0.22)
Class IX: Full-time homemakers	0.037	**0.17**	**0.169**	**0.178**	**0.146**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Age (RC: 25-34 age group)					
35-44 age group		**-0.184**	**-0.144**	**-0.143**	**-0.129**
		(0.05)	(0.05)	(0.0)	(0.05)
45-54 age group		**-0.459**	**-0.366**	**-0.361**	**-0.274**
		(0.05)	(0.05)	(0.0)	(0.05)
55-65 age group		**-0.735**	**-0.592**	**-0.584**	**-0.386**
		(0.04)	(0.05)	(0.0)	(0.05)
Civil status (RC: Single)					
Married or cohabiting		**-0.163**	**-0.131**	**-0.199**	**-0.168**
		(0.04)	(0.04)	(0.04)	(0.04)
Separated or divorced		-0.152	-0.118	-0.111	-0.087
		(0.09)	(0.1)	(0.25)	(0.08)
Widowed		**-0.258**	**-0.178**	**-0.204**	-0.126
		(0.05)	(0.05)	(0.05)	(0.09)
Education (RC: Level 1a: Inadequately completed General Elementary Education)					
Level 1bc: General Elementary Education or Basic Vocational			**0.304**	**0.283**	**0.211**
			(0.03)	(0.03)	(0.03)
Level 2ab: Intermediate Vocational or Intermediate General Education			**0.51**	**0.485**	**0.408**
			(0.04)	(0.0)	(0.04)

Level 3ab: Lower-level Tertiary Certificate	**0.605**	**0.586**	**0.499**
	(0.06)	(0.08)	(0.08)
Level 3c: Higher education –Upper Tertiary Certificate-	**0.639**	**0.656**	**0.613**
	(0.06)	(0.08)	(0.08)
Smoke (RC: Non-smoker)			
Light smoker		-0.026	-0.017
		(0.03)	(0.81)
Moderate smoker		**-0.061**	-0.051
		(0.03)	(0.24)
Heavy smoker		**-0.11**	-0.081
		(0.05)	(0.23)
Drink (RC: Non-drinker)			
Very low		**-0.124**	**-0.128**
		(0.03)	(0.01)
Low		**-0.292**	**-0.288**
		(0.02)	(0.0)
Moderate		**-0.392**	**-0.393**
		(0.04)	(0.0)
Fairly high		**-0.596**	**-0.542**
		(0.08)	(0.0)
High		**-0.61**	**-0.425**
		(0.17)	(0.06)
Very high		**-0.912**	**-0.823**
		(0.29)	(0.3)
Physical exercise (RC: No activity)			
Light activity		**0.18**	**0.09**
		(0.02)	(0.03)
Moderate activity		**0.227**	**0.16**
		(0.04)	(0.04)
Vigorous activity		0.17	0.145
		(0.14)	(0.14)
Relation between weight and height (BMI) (RC: Normal)			
Underweight		0.059	0.043
		(0.17)	(0.04)
Overweight		**-0.059**	-0.024
		(0.02)	(0.46)
Obese		**-0.085**	**-0.104**
		(0.04)	(0.04)
Short term dimension of objective health			**-0.262**
			(0.01)
Indicator of long term objective health			**-0.355**
			(0.01)

Note: The p-value for the approximate likelihood ratio test of the parallel regression assumption indicates whether the assumption has been violated. If it is less than 0.05 the parallel regression assumption is violated and can be rejected at the 0.05 level.

In short, class differences in women's subjective health are cut by more than half when educational level, lifestyle variables, and objective health are taken into account. All these variables together explain much of the variation among classes with respect to their probability of being healthy (see especially column 5 in Table 5.14). Two thirds of the class effect are explained by these mechanisms (half when we only consider the occupied categories), leaving therefore about a third of the effect unexplained. It should be noted that living habits are of little importance, as they produce only a slight increase in class differences and only a minor decline in the educational effect on health. Education, on the other hand, is an important factor to understand the class effect, especially for the occupied class categories.

Table 5.14: Standard deviation of the sheaf coefficients for the social class and education Dummies from Table 5.13

Model	1	2	3	4	5
Class (nine categories)	.193	.111	.074	.09	.065
Class (seven categories)	.19	.153	.093	.103	.088
Education	-	-	0.164	0.16	0.13

Table 5.15: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table 5.13

Model change	From 1 to 2	From 1 to 3	From 1 to 4 for class From 3 to 4 for education	From 1 to 5 for class From 3 to 5 for education
Class (nine categories)	42.48	61.65	53.36	66.32
Class (seven categories)	19.47	51.05	45.8	53.7
Education	-	-	2.5	20.7

5.4.2.2. Men's subjective health

I will turn now to the analysis of the models fitted for men, which are included in Tables 5.16, 5.17 and 5.18. They have been organised in a similar way to those analysed for women. Thus, model (1) examines the effect of social class on the dependent variable, model (2) introduces age and civil status as control variables, model (3) brings education into the explanation, model (4) includes living habits as explanatory variables, and model (5) controls for the possible explanatory capacity of objective health status.

The coefficients of the first column of Table 5.16 show the strength and direction of the association between social class and health. Men from categories, I, II, IIIab, IVabc, V and VIII enjoy statistically better subjective health than the reference class (i.e. class VII). Men from categories VI and IX do not present a significant different probability of being healthy than that of men from the reference category. The value and sign of the coefficients reveal that the general impact of social class on health is significant and strong. The unemployed form the class category with the highest subjective health as compared to that of the reference category. As for the impact of class as a whole on health, the value of the standard deviation of the sheaf coefficients (0.2 for the nine categories and 0.13 for the seven categories) shows that class has a substantial effect. It should be noted that for the seven class categories the impact is smaller for men than for women, suggesting that class inequalities have a greater impact on women's than men's health.

Table 5.16: Ordered probit for perceived health status. Coefficients for models fitted to men, (standard errors in parentheses).
Number of observations: 5837. Reference categories (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Log-likelihood	-8335.9	-5534.9	-5507	-5424.4	-5115.1
Log-likelihood change		2801	27.9	82.6	309.3
***P*-value for the approx. likelihood ratio test of the parallel regression assumption**	0.33	0.21	0.15	0.12	0.09
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)					
Class I: Higher grade professionals, administrators and managers	**0.27**	**0.26**	**0.121**	**0.155**	**0.137**
	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**0.346**	**0.3**	**0.273**	**0.27**	**0.295**
	(0.09)	(0.1)	(0.1)	(0.09)	(0.1)
Class IIIab: Higher-grade routine nonmanual employees	**0.303**	**0.25**	**0.14**	**0.166**	**0.145**
	(0.05)	(0.06)	(0.06)	(0.07)	(0.06)
Class IVabc: Small proprietors and employers and self-employed workers	**0.129**	**0.11**	**0.18**	**0.176**	**0.15**
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Class V: Lower-grade technicians and supervisors of manual workers	**0.367**	**0.34**	**0.242**	**0.254**	**0.242**
	(0.07)	(0.08)	(0.07)	(0.09)	(0.09)
Class VI: Skilled manual workers	0.036	0.051	-0.022	-0.01	-0.038
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Class VIII: Unemployed	**0.547**	-0.091	-0.243	-0.276	-0.3
	(0.1)	(0.2)	(0.2)	(0.2)	(0.26)
Class IX: Full-time homemakers	-0.027	0.191	0.115	-0.093	0.138
	(0.2)	(0.26)	(0.2)	(0.26)	(0.2)
Age (RC: 25-34 age group)					
35-44 age group		**-0.176**	**-0.109**	**-0.103**	**-0.094**
		(0.05)	(0.05)	(0.04)	(0.03)
45-54 age group		**-0.382**	**-0.268**	**-0.29**	**-0.203**
		(0.05)	(0.05)	(0.05)	(0.05)
55-65 age group		**-0.648**	**-0.525**	**-0.49**	**-0.316**
		(0.05)	(0.05)	(0.05)	(0.05)
Civil status (RC: Single)					
Married or cohabiting		-0.072	0.019	-0.02	-0.056
		(0.04)	(0.03)	(0.04)	(0.04)
Separated or divorced		-0.08	-0.08	-0.08	-0.09
		(0.1)	(0.1)	(0.1)	(0.1)
Widowed		**-0.21**	-0.159	-0.13	-0.154
		(0.09)	(0.1)	(0.1)	(0.1)
Education (RC: Level 1a: Inadequately completed General Elementary Education)					
Level 1bc: General Elementary Education or Basic Vocational			**0.215**	**0.22**	**0.216**
			(0.04)	(0.05)	(0.04)

Level 2ab: Intermediate Vocational or Intermediate General Education	**0.375**	**0.39**	**0.375**
	(0.04)	(0.06)	(0.05)
Level 3ab: Lower-level Tertiary Certificate	**0.456**	**0.479**	**0.472**
	(0.06)	(0.06)	(0.07)
Level 3c: Higher education –Upper Tertiary Certificate-	**0.494**	**0.55**	**0.546**
	(0.07)	(0.07)	(0.08)
Smoke (RC: Non-smoker)			
Light smoker		**-0.12**	**-0.121**
		(0.04)	(0.05)
Moderate smoker		-0.06	-0.074
		(0.34)	(0.03)
Heavy smoker		**-0.187**	**-0.189**
		(0.05)	(0.05)
Drink (RC: Non-drinker)			
Very low		**-0.111**	**-0.109**
		(0.04)	(0.04)
Low		**-0.289**	**-0.257**
		(0.03)	(0.03)
Moderate		**-0.369**	**-0.348**
		(0.05)	(0.04)
Fairly high		**-0.483**	**-0.466**
		(0.1)	(0.1)
High		**-0.486**	-0.396
		(0.3)	(0.2)
Very high		**-1.09**	**-0.99**
		(0.4)	(0.3)
Physical exercise (RC: No activity)			
Light activity		**0.122**	**0.07**
		(0.03)	(0.03)
Moderate activity		**0.188**	**0.119**
		(0.04)	(0.04)
Vigorous activity		**0.242**	**0.175**
		(0.05)	(0.05)
Relation between weight and height (BMI) (RC: Normal)			
Underweight		0.075	0.063
		(0.04)	(0.04)
Overweight		**-0.061**	-0.04
		(0.02)	(0.02)
Obese		-0.025	-0.003
		(0.04)	(0.04)
Short term dimension of objective health			**-0.263**
			(0.01)
Indicator of long term objective health			**-0.399**
			(0.02)

Note: The p-value for the approximate likelihood ratio test of the parallel regression assumption indicates whether the assumption has been violated. If it is less than 0.05 the parallel regression assumption is violated and can be rejected at the 0.05 level.

When we include men's socio-demographic characteristics (i.e. age and civil status) as control variables, the class effect as a whole diminishes, especially among the nine categories as opposed to the seven categories. The value of the class coefficients reflects this trend, since the coefficients of the occupied categories decrease while the coefficient for unemployed men, a non-occupied category, decreases significantly, probably as a result of the fact that most unemployed men belong to the younger age groups. Class coefficients maintain their levels of significance.

Table 5.17: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 5.14

Model	1	2	3	4	5
Class (nine categories)	.2	.12	.092	.111	.105
Class (seven categories)	.13	.114	.084	.09	.08
Education	-	-	0.132	0.141	0.13

Table 5.18: Percentage reduction in the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table 5.14

Model change	From 1 to 2	From 1 to 3	From 1 to 4 for class From 3 to 4 for education	From 1 to 5 for class From 3 to 5 for education
Class (nine categories)	35.92	55.3	46.1	49
Class (seven categories)	12.3	27.58	22.41	38.4
Education	-	-	-6.8	1.5

As for the effect of socio-demographic characteristics on the variation of the class effect on health, column 2 in Table 5.17 shows that the class effect does decrease among occupied and non-occupied men taken all together, and that it decreases to a lower extent among the occupied categories. The percentage reduction of the class effect on health (see column 1 Table 5.18) provides further evidence showing that the controlling effect of age and civil status is greater for the nine-category version of social class than for the seven-category classification. The effect of class is reduced by around a third when used with nine categories, and by about 12 percentage points when operationalised with seven categories.

In relation to the specific effect of age and civil status on health, the sign and value of the age coefficients shows that, as we would expect, the older a man the less his probability of being healthy compared to that of the youngest group age. With respect to civil status, all categories report worse subjective health than single individuals, although only in the case of widowed is this statistically significant. This finding contrasts with that for women as for them all categories except divorced or separated women have a significant worse health condition than that of single women.

When education is brought into the explanation (see column 3 in Tables 5.16 and 5.17 and column 2 in Table 5.18) the effect of social class on health diminishes significantly, above all for the first seven social classes. These results show that education explains only a small part of the health gap among social classes and that this explanation, as would be expected, is greater among occupied men.

The impact of education on the subjective condition of health is summarised in Figure 5.5, which presents the education coefficients of model (3) for both men and women. We can observe that for both sexes, the relevance of education is very high. For all individuals the effect of education is increasing in each category. Thus, the difference in the probability of having a good subjective health increases as we move to the right of the education axis: the more educated an individual is, the better her self-perceived health will be. The rise is constant and steep; hence individuals with all the consecutive levels of educational achievement are more likely to report better subjective health than the reference category. The trend increases linearly.

If we move to the analysis of lifestyle variables (column 4 in Table 5.16, column 4 in Table 5.17 and column 3 in Table 5.18) we can see that the effect of class on subjective health increases slightly. Thus, the impact of the class categories on health is reinforced when we take drinking, smoking, sport practises and BMI into account. There is a very small effect on the coefficients of both class and education, which slightly increase. The variation of the impact of class on the dependent variable from the initial model to this model is approximately 46% for the nine-category class variable (and around a fifth in the seven category variable). The impact of personal behaviour on education is similar to the effect on class, that is, the education coefficients increase slightly. The impact of education as a whole also increases slightly as the value of the standard deviation of the sheaf coefficients shows. We do not find, therefore, any support for the third explanatory mechanism: lifestyles do not act as mediators neither between class and health, nor between education and health. In other words, individuals' lifestyles do not seem to explain class differences in the health gap.

It is also interesting to analyse the effect of lifestyles on health itself, as well as to compare this with that for women. Figures 5.6, 5.7, 5.8 and 5.9 graph the coefficients of these variables from model (4) for both men and women. We can see that the negative effect of smoking is greater for men than for women and that the association between smoking and health is linear for women but not for men. In contrast, the negative impact of drinking on health is more harmful for women than for men. The association between this behavioural variable and health follows an almost perfect linear trend for all individuals. In general, the practice of physical exercise is more beneficial for women than for men. Finally, the association between the BMI and health is linear and of a positive sign.

In the last model we introduce the objective dimension of health. The strength and sign of the link are the expected ones and similar to those for women. It should be noted that, as we would expect, the association of the long-term dimension of health with subjective health is stronger than that of the short-term dimension[12]. This finding provides further support for the importance of the subjective dimension of health when accurately evaluating measuring an individual's health. The value of the class coefficients decreases slightly, suggesting that the effect of class categories on subjective health with respect to that of category VII is partly explained by the objective dimension of health. Table 5.18 shows that the final model is able to explain half of the class effect for the first version of class and around 40% for the second version of this variable. Thus, half of the effect of class on health is explained by the explanatory variables of the model after adjusting for socio-demographic characteristics. It seems clear, therefore, that in order to understand the health gap among male social classes we need to know a man's age, civil status, level of education, smoking and drinking behaviour, physical activity level, his BMI and his objective dimension of health.

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[12] Long-term and short-term health are not measured on the same scale. In order to make the results comparable I have conducted the following analysis (results not shown here). Firstly, I have re-estimated the models introducing both variables measured on a comparable scale. The results show that the association between long-term health and subjective health is even greater than that reported in the models, and that it is stronger than that between the short-term and the subjective dimension of health. I have also computed predicted probabilities for each value of the dependent variable keeping all the explanatory variables at their mean and the results show that the association between long-term health and subjective health is stronger for every value of subjective health than that between the short-term dimension and subjective health (i.e. the slope of the predicted probabilities curve is steeper for the long-term health for each category of subjective health).

(See Figure 5.5 in separate file)

(See Figure 5.6 in separate file)

(See Figure 5.7 in separate file)

(See Figure 5.8 in separate file)

(See Figure 5.9 in separate file)

A detailed examination of the value of the class coefficients across models is useful to further understand the explanatory weight of each variable. Class coefficients in general decline around 40% from the first to the last model. After we have controlled for socio-demographic characteristics, education has the greatest explanatory power for the class effect for occupied and non-occupied class categories taken together. For the occupied class categories, on the other hand, controlling for age, civil status and then including education, lifestyle and objective health, produces the greatest decline in the variance among social classes. It should be noted that the class categories with the lowest coefficient in the final model –that is, those whose effect on health is better explained by the sequence of models- are class I, class III, class V and the unemployed. On the other hand, the class categories whose effect is least explained are class II, class IV, class VIII and class IX.

Similarly to women, from model 2 onwards, the standard deviation of the sheaf coefficients is very similar for both class measures, which could suggest a specific effect: most unemployed men are included in the young age category.

The analysis of the models computed for the subjective dimension of health has revealed that individuals' social class is linked to their health. It has been shown that an individual's age, civil status, education, living habits and objective health help to account for part of the health gap among classes. We have also seen that education partly mediates this link, and that lifestyle variables have almost no significant explanatory capacity. For both women and men, the mediator role of the explanatory variables is greater for all the class categories taken as a whole as compared to that of the occupied categories (i.e. 66.32% as opposed to. 53.7% for women and 49% as opposed to 38.4% for men). Another similarity between men and women is the specific explanatory capacity of the independent variables. For all individuals, except for class with nine categories for men, the combination of education, lifestyles and objective health has the greatest explanatory power for the class effect.

The Graph 5.5 and 5.6 below represent the class coefficients from Tables 5.13 and 5.16. They show graphically how the class coefficients for women and men vary as the independent variables are incorporated into the model. The coefficients from the first model show the net class effect. If the explanatory variables link the association between class and health we would expect that the coefficients would cluster closer to zero as we move from models (2) to (5). The graphs show that that is indeed the case. For both women and men, coefficients significantly decrease when age and civil status are controlled for, continue to fall when education is incorporated, slightly increase when living habits are controlled for, and slightly decline again when we include objective measures of health. The combination of socio-demographic variables, education, living habits and objective indicators of health is the one that takes the coefficients closest to zero for both operationalizations of class except the nine-category classification in the case of men.

The evidence from this section provides some backing, therefore, for the second explanatory mechanism, insofar as education helps to account for the health gap among classes. However, there is almost no support for mechanism (3), as lifestyles bring about a decline in the percentage of explanation of the class effect and only provide a small part of explanation of the education effect on class for women[13].

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[13] Appendix D includes the results of the models that I have computed for subjective health recoded as a binary variable (i.e. the values very poor, poor and fair health have been recoded as "not good health" and the values good and very good health as "good health"). The distribution of the answers of the binary health variable is similar to that of the British data (i.e. 25.71% report poor health and 74.29% good health). In general, the logit models produce similar results to the ordered probit models. It can be seen that for both men and women class has a major and significant impact on health. The effect of class as a whole on health doubles that identified though the ordered probit models. This divergence may be the result of the re-codification of health status. The magnitude of the class effect that is reduced by the explanatory framework is similar for women when comparing ordered probit results and logit results and a little bit higher for men (around 10% points greater in the logit models).

(See Graph 5.5 in separate file)

(See Graph 5.6 in separate file)

5.5. Summary and conclusions

This chapter contains the first part of the empirical examination of the association between class and health at the individual level. It is based on the statistical analysis of the Spanish *Encuestas Nacionales de Salud* for the first half of the 1990s. I have examined the two dimensions of health that I argued in Chapter 3 operationalise my definition of health status. I used multivariate regressions to analyse the objective dimension of health both in the short and long-term, and ordered probit models to analyse the subjective dimension of health. All indicators of health have been analysed with two main objectives in mind. First, to test whether there is a significant association between an individual's social class and her state of health. Second, if such a relation exists, to test the adequacy of the theoretical mechanisms that I proposed in Chapter 2. In the rest of the section, I will summarise the main findings of the chapter and relate these to the theoretical framework of the research.

The analysis of the three indicators of health has provided robust evidence showing that social class does indeed have a significant impact on individuals' health. The values of the class coefficients of the initial model for both the objective and the subjective dimensions clearly show that there is a gross class effect on health. We have seen that this effect varies by gender and by health dimension. We have observed that women in general present a stronger net class effect than men do –the only exception is the nine class categories for the subjective health of men-. We have seen that for women the gross class effect is greatest in the subjective dimension and smallest in the short-term dimension for health. For men, the weight of the net class effect is similar: class has the greatest effect on subjective health, and the lowest on short-term health. It has also been seen that for all individuals the association between the subjective and the objective dimensions of health is as expected: long-term objective health has a stronger association with subjective health than short-term objective health has. Thus, individuals' definition of their own health status does reflect their objective health.

The statistical modelling of the analysis was designed in a bid to produce empirical evidence with which to analyse the second question posed in this chapter, which is also the main research question of the thesis as a whole. That is, if social class determines part of the health gap among individuals, what are the possible factors that account for this divergence? The methodological strategy used to answer this question has been to examine the standard deviation of the sheaf coefficients of the class and education dummies. This indicator captures the effect of a categorical variable as a whole; accordingly, if the coefficient drops when a variable is introduced in the model, then that variable can be understood to mediate the link between the categorical variable under analysis and health. The examination of the standard deviation of the sheaf coefficients has shown that the explanatory variables of the investigation -i.e. educational level, lifestyles and, in the case of subjective health, objective measures of health- do account for a significant part of the gross class effect. For women, the proposed explanatory framework was most effective in accounting for the class effect of first the long-term dimension, second the subjective dimension and thirdly the short-term dimension of health. The order of explanation of the class effect achieved by the explanatory framework is then first the long-term dimension; second the subjective dimension; and thirdly the short-term dimension. A possible explanation for this divergence in explanatory capacity is that the long-term dimension is not subject to random fluctuations while the short-term dimension is. Since the long-term dimension has a stronger correlation to the subjective dimension than the short-term dimension does then, it follows that subjective health should be the second best explained indicator of the models. For men, the order of explanation from highest to lowest is the subjective dimension, followed by the long-term objective indicator and then by short-term objective health.

The examination of, on the one hand, the specific effect of each group of explanatory variables and, on the other hand, the combination of variables that explains the highest percentage of the class effect, has provided the empirical evidence necessary to test the theoretical mechanisms of the research. We have seen that for the objective indicators of health, that is, the short and long-term objective indicators, after controlling for age and civil status, education is the variable that is best able to explain the class impact. It has been shown that for the subjective dimension the combination of variables that accounts for most of the class effect is slightly different for men and women. For women and for the seven class categories for men, the most adequate one is the combination of education, lifestyles and objective health (i.e. model (5)). For the nine categories of class for men, education (i.e. model (3)) is the one that explains the largest part of the class effect. However, the gap in the percentage of explanation between model (3) and model (5) is small for both men and women.

The empirical evidence summarised so far provides support for the second proposed explanatory mechanism. However, it is necessary to distinguish between health indicators, as education has very little effect with respect to short-term health. The effect of education on long-term health is larger although it remains small. The mediating role of education is clearest in the analysis of self-perceived health. Hence, the evidence shows that an individual's class has an impact on her health partly through education, especially for subjective health. As argued in Chapter 2, this link works through the knowledge or education about health issues as well as through individuals' ability to make effective use of the health care system. An individual's education influences her ability to make use of information on health issues, to understand advice from a doctor or safety regulations at work, to make adequate use of entitlements such as health care and sickness insurance, or to engage in healthy behaviour.

As argued in detail in Chapter 2, the third mechanism of explanation states that the relationship between class and health is partly due to the mediating role of lifestyle between both class and education and health. Hence, an individual's education and class would have some influence on her lifestyle, which in turn would have an effect on her health. However, we have seen only very weak evidence in support of this argument. Lifestyle variables (smoking and drinking habits, practise of physical exercise and the BMI) do not seem to reduce the class effect for any of the three indicators of health. On the contrary, the standard deviation of the sheaf coefficients for the class dummies slightly increases. Thus, the class effect on health does not seem to be mediated by individuals' lifestyles. As for education, the analysis provides partial support for the third mechanism, as individuals' lifestyles reduce the effect of education on health in all cases except in men's subjective health. However, we have seen that the decline is rather small. Hence, differences between individuals in their educational achievements have a small impact on health through different lifestyles.

The analysis of the value of the standard deviation of the sheaf coefficients in the last model shows the class effect that is left unexplained by the models. The class effect that the sequence of models is not able to explain is however relatively small, especially for long-term objective health. We have also seen that this unexplained effect is greater in every case for the occupied categories than for the nine categories of class. The greater standard deviation of class with nine categories seen in the first model for the different health indicators gradually diminishes and undergoes the largest decline in the second model, that is, when we adjust for age and civil status. We have suggested that a possible explanation for this is that most unemployed individuals are found in the youngest age group and that a very high proportion of fulltime homemakers are married women.

It is also interesting to try to consider the possible explanations for the class effect that remains unexplained in the last model of the explanatory sequence. One possible explanation for the class effect of the occupied is the impact of individuals' specific occupations on health. As argued in the theoretical framework, part of the literature on occupational health risks argues that there are certain occupations that are intrinsically more unhealthy than others (e.g. Bosma *et al.*,1997; Marmot *et al,*. 1997 and 1998; Schrijvers *et al.,* 1998; Chandola and Jenkinson, 1999; Stansfeld *et al.,* 1999; Borg and Kristensen, 2000; Griffin *et al.,* 2002; Stansfeld *et al.,* 2002; Vahtera *et al.,* 2002; Kuper and Marmot, 2003; Steenland *et al.,* 2003; Siegrist, 2000; Kivimäki *et al.* , 2002; Levi *et al.* , 2000). This literature basically argues that those occupations that imply intense job strain (defined as high work demands and low job control) or suffer from an effort-reward imbalance (defined as the mismatch between high effort at work and low rewards received in return) or both, have a higher probability of resulting in bad health than occupations characterised by a low job strain and low-effort reward imbalance. An examination of the class coefficients of the final model shows that for men, class V remains statistically significant for both the long-term and the subjective dimension. This category, lower-grade technicians and supervisors of manual workers, contains some occupations that could be characterised in some respects as having high job-strain and effort-reward imbalance model. Thus, the results from the final model could offer some support for the first mechanism of explanation –i.e. class affects health through the impact of employment conditions on health.

In short, the statistical analysis presented in this chapter leads us to conclude two main points. First, the class of an individual has an influence on her objective and subjective health condition. Second, health inequalities between social classes are partly the result of a complex interaction of variables measured at the individual level. We have seen that the mediating effect of education although small is clear for most of the cases and that, in contrast, lifestyle variables do not act as significant mediators between class and health. In the following chapter I test whether the analysis of the British case will confirm these results.

Figure 5.1: The relationship between the theoretical explanation and the statistical model

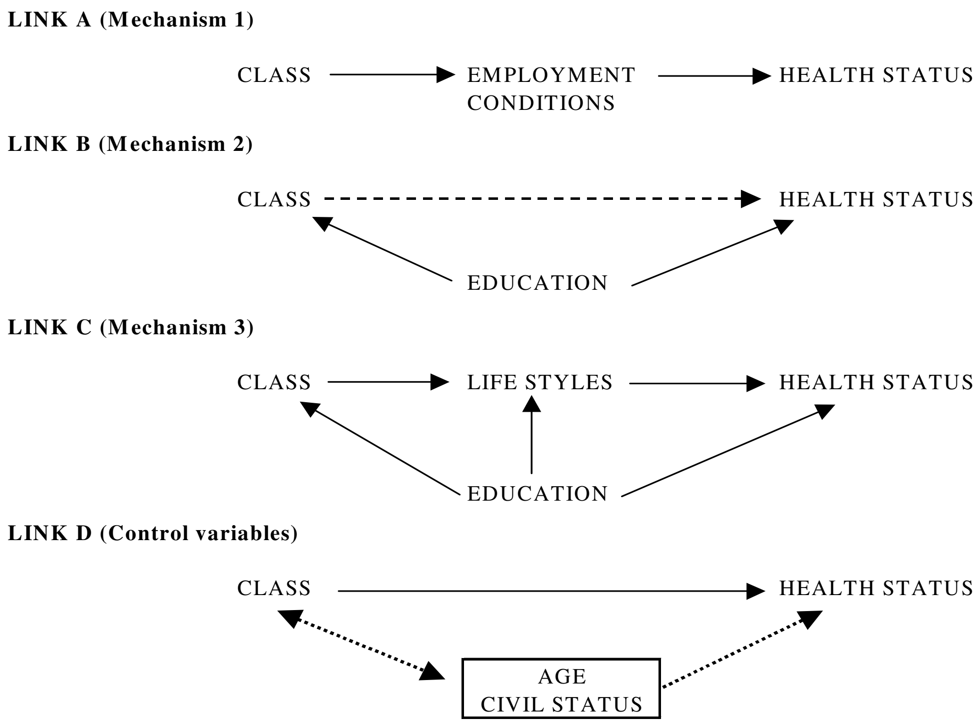


Figure 5.2: Association between education and short-term objective health

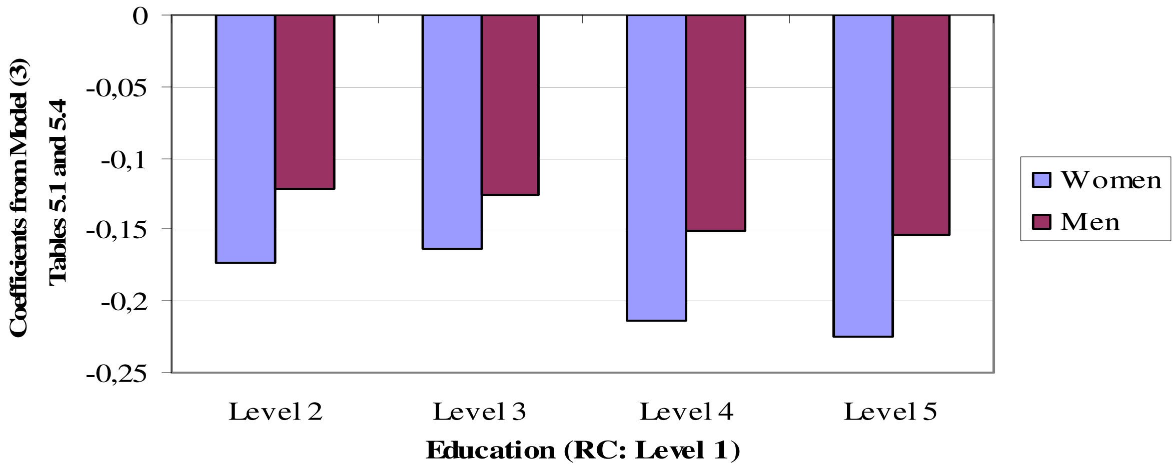
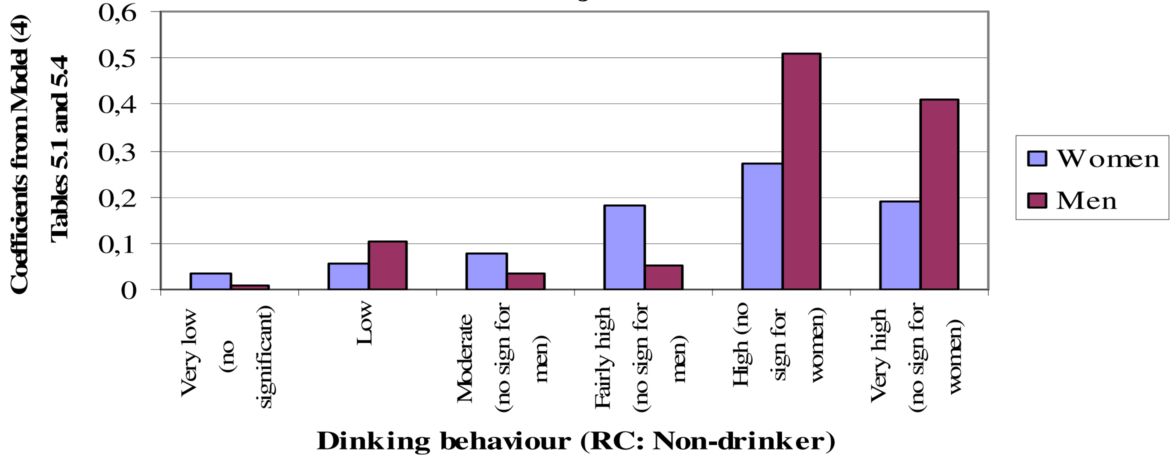
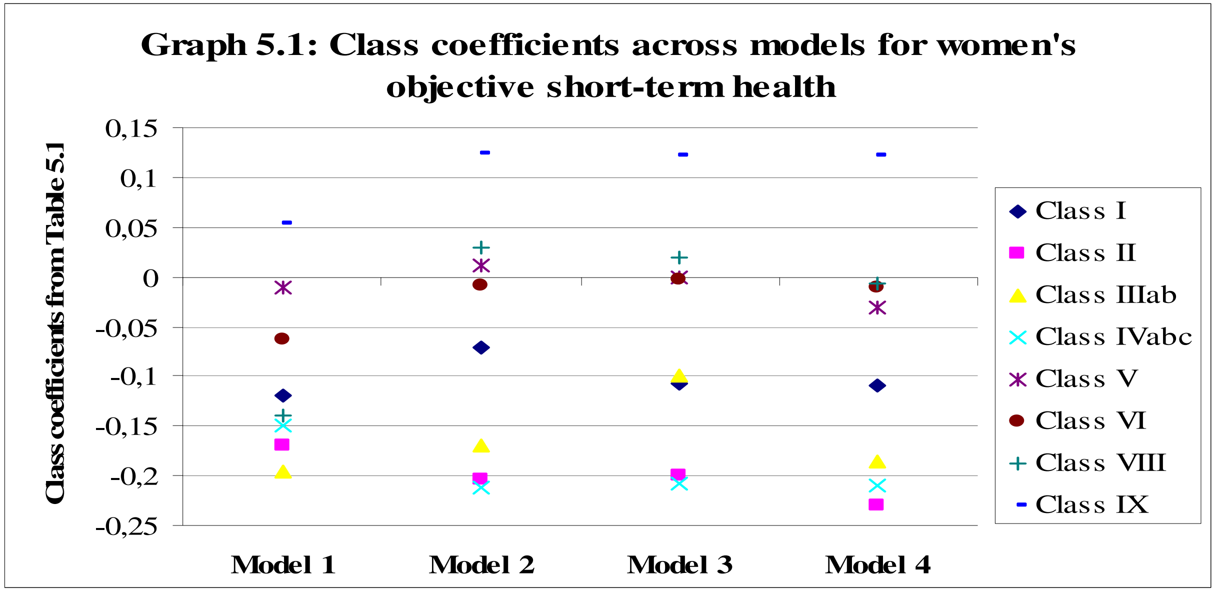
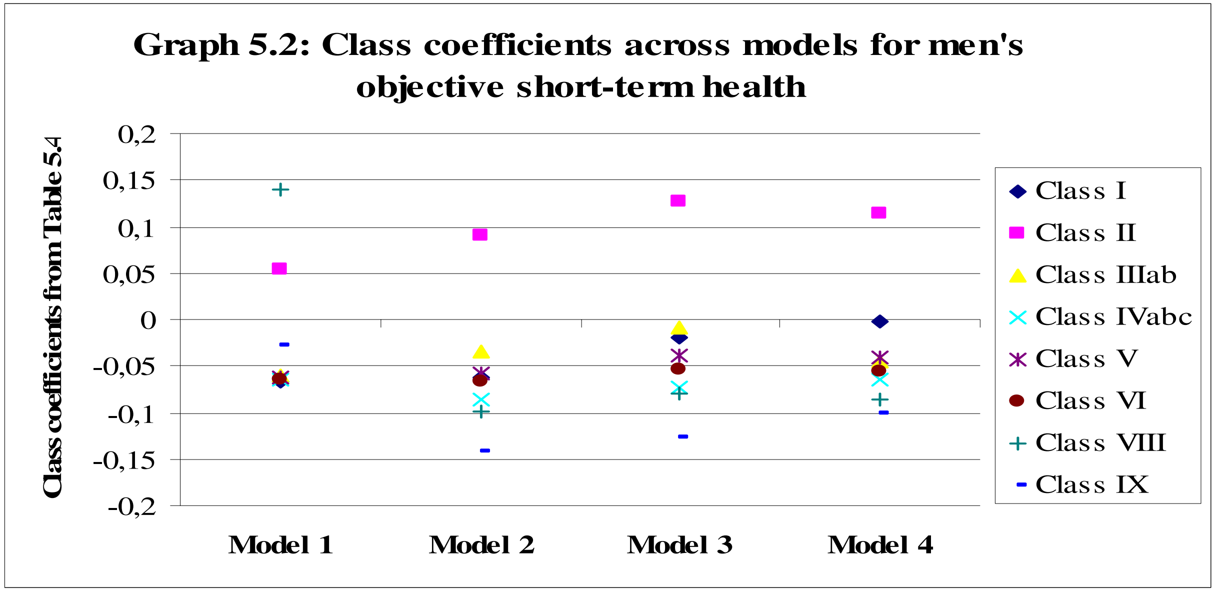


Figure 5.3: Association between drinking behaviour and short-term objective health




Graph 5.1: Class coefficients across models for women's objective short-term health
Class coefficients from Table 5.1
0,15
0,1
0,05
0
-0,05
-0,1
-0,15
-0,2
-0,25
Model 1
Model 2
Model 3
Model 4
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX



Graph 5.2: Class coefficients across models for men's objective short-term health
Class coefficients from Table 5.4
0,2
0,15
0,1
0,05
0
-0,05
-0,1
-0,15
-0,2
Model 1
Model 2
Model 3
Model 4
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX

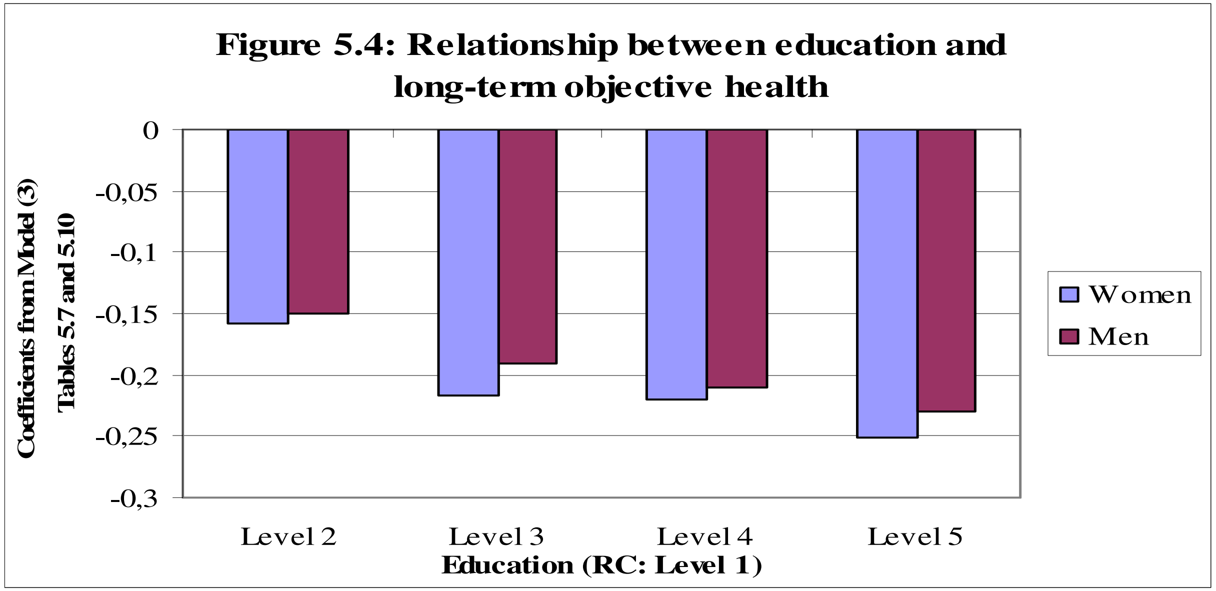
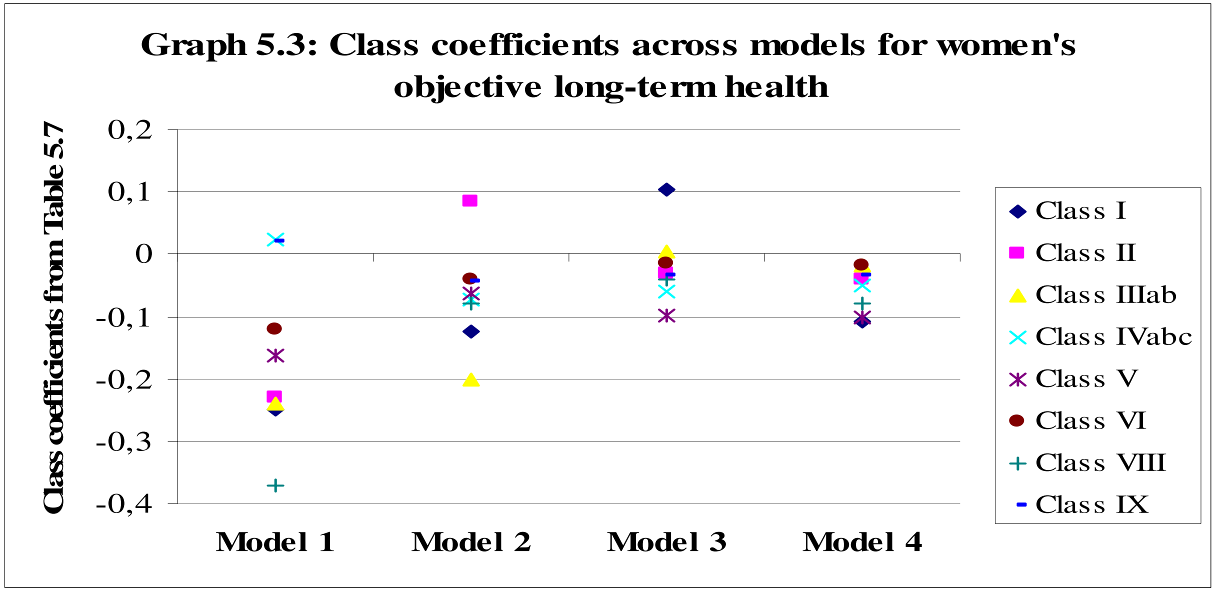
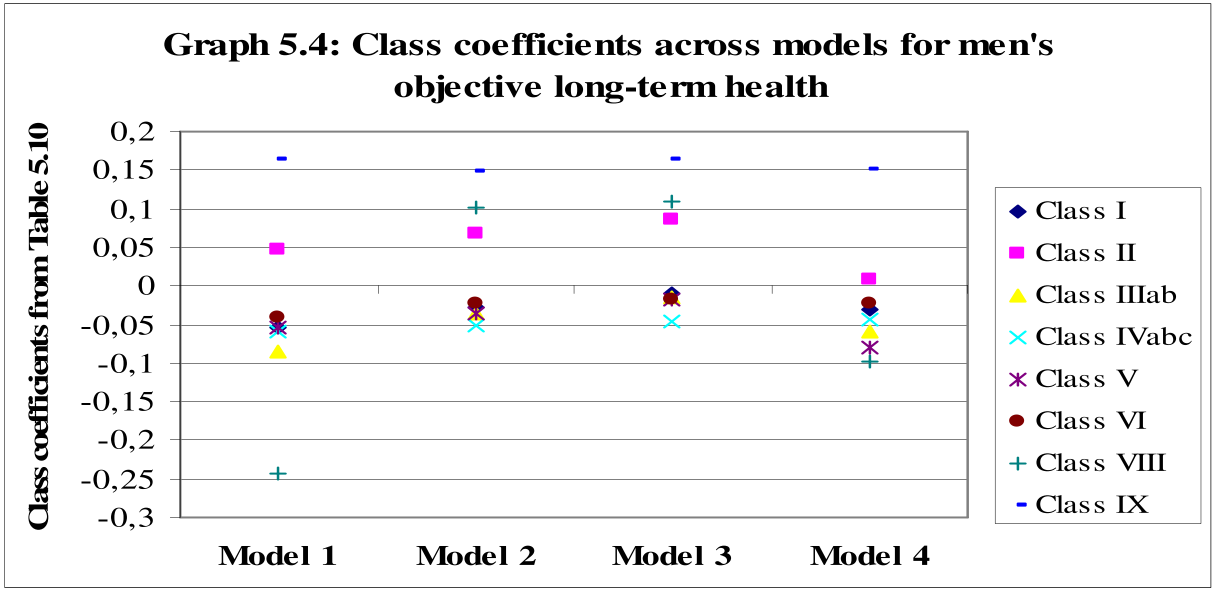


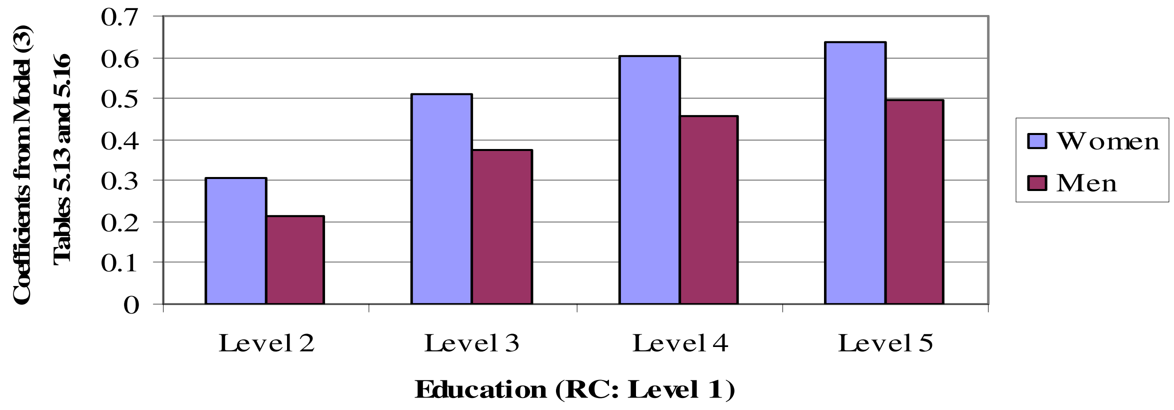
Figure 5.4: Relationship between education and long-term objective health
Coefficients from Model (3) Tables 5.7 and 5.10
0
-0,05
-0,1
-0,15
-0,2
-0,25
-0,3
Level 2
Level 3
Level 4
Level 5
Education (RC: Level 1)
Women
Men


Graph 5.3: Class coefficients across models for women's objective long-term health
Class coefficients from Table 5.7
0,2
0,1
0
-0,1
-0,2
-0,3
-0,4
Model 1
Model 2
Model 3
Model 4
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX



Graph 5.4: Class coefficients across models for men's objective long-term health
Class coefficients from Table 5.10
0,2
0,15
0,1
0,05
0
-0,05
-0,1
-0,15
-0,2
-0,25
-0,3
Model 1
Model 2
Model 3
Model 4
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX

Figure 5.5: Association between education and subjective health status



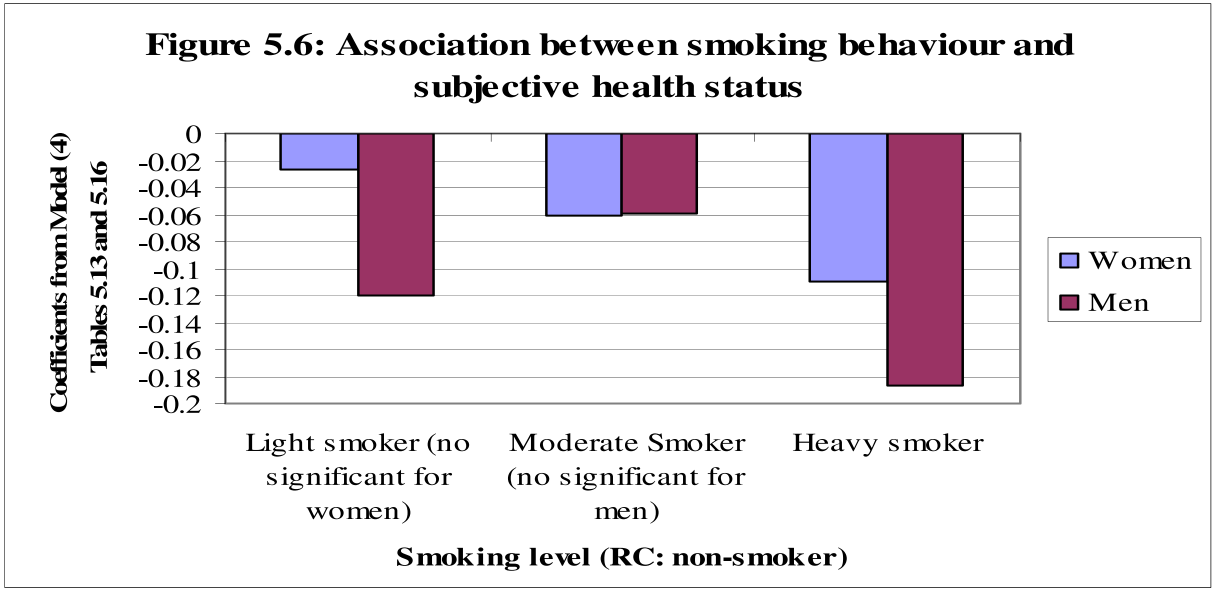


Figure 5.6: Association between smoking behaviour and subjective health status
Coefficients from Model (4) Tables 5.13 and 5.16
0
-0.02
-0.04
-0.06
-0.08
-0.1
-0.12
-0.14
-0.16
-0.18
-0.2
Women
Men
Light smoker (no significant for women)
Moderate Smoker (no significant for men)
Heavy smoker
Smoking level (RC: non-smoker)

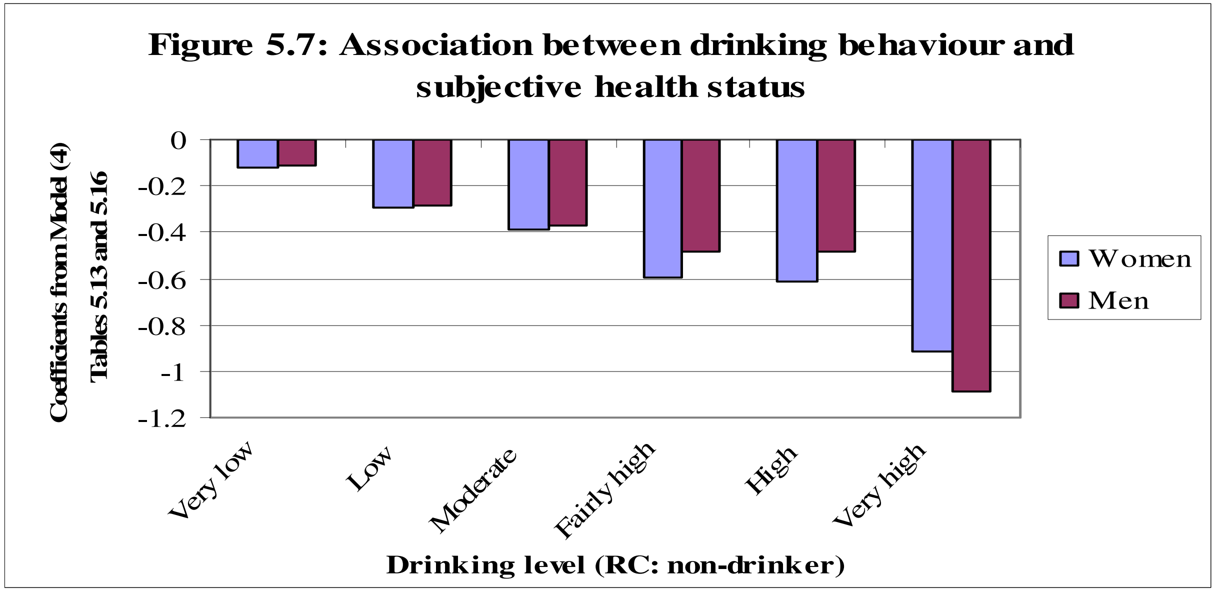


Figure 5.7: Association between drinking behaviour and subjective health status
Coefficients from Model (4) Tables 5.13 and 5.16
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
Very low
Low
Moderate
Fairly high
High
Very high
Drinking level (RC: non-drinker)
Women
Men

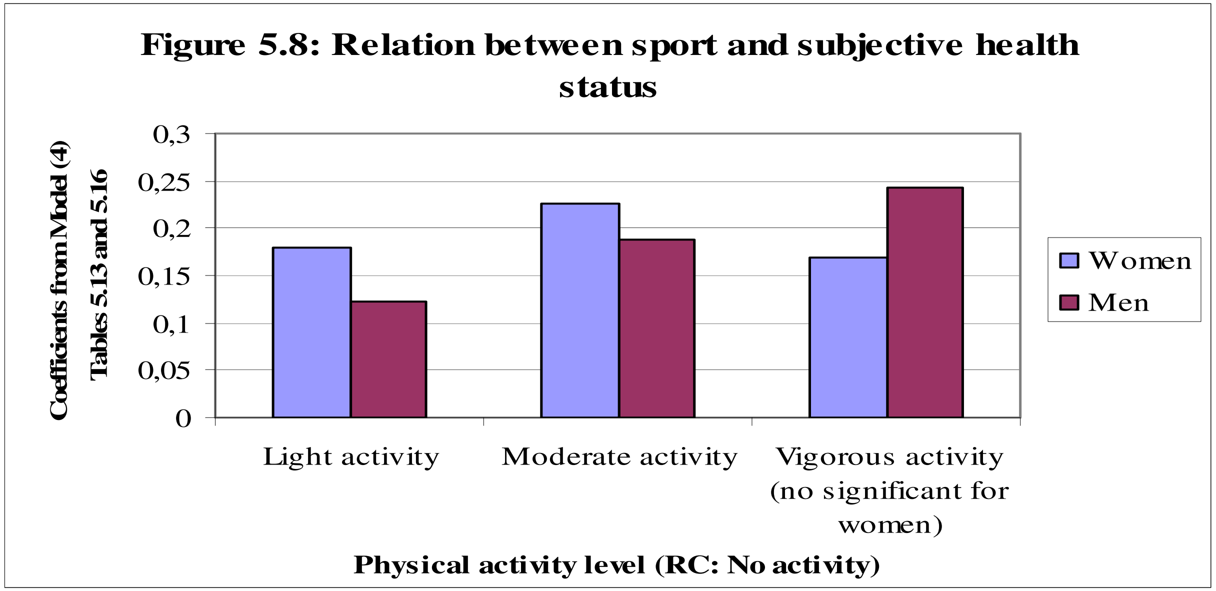


Figure 5.8: Relation between sport and subjective health status
Coefficients from Model (4) Tables 5.13 and 5.16
0,3
0,25
0,2
0,15
0,1
0,05
0
Light activity
Moderate activity
Vigorous activity (no significant for women)
Physical activity level (RC: No activity)
Women
Men

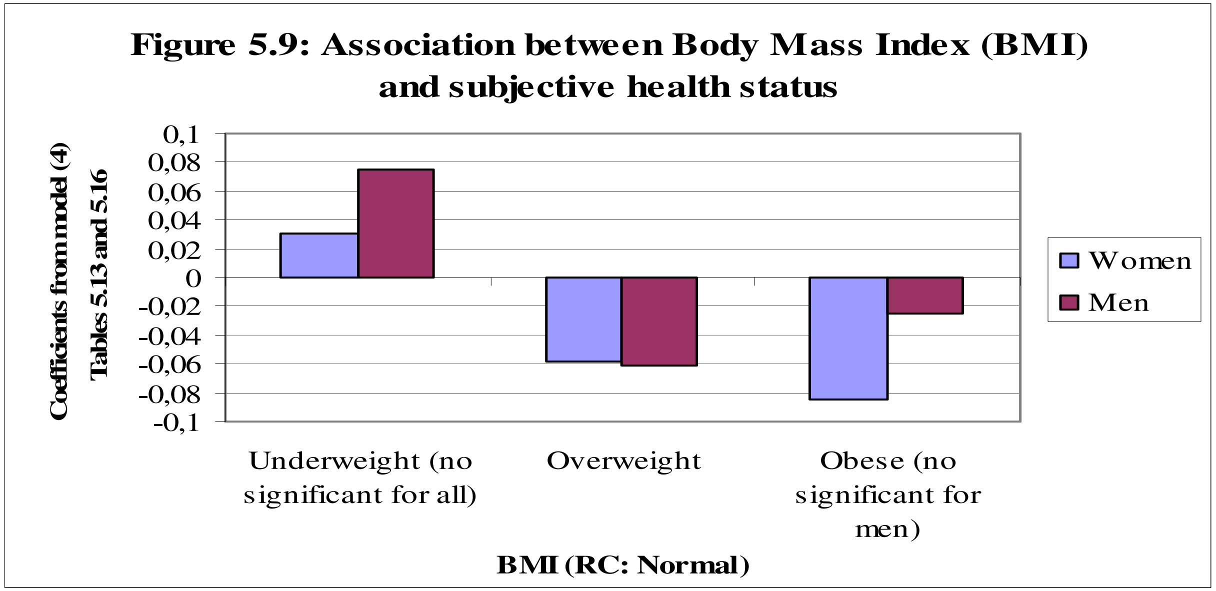
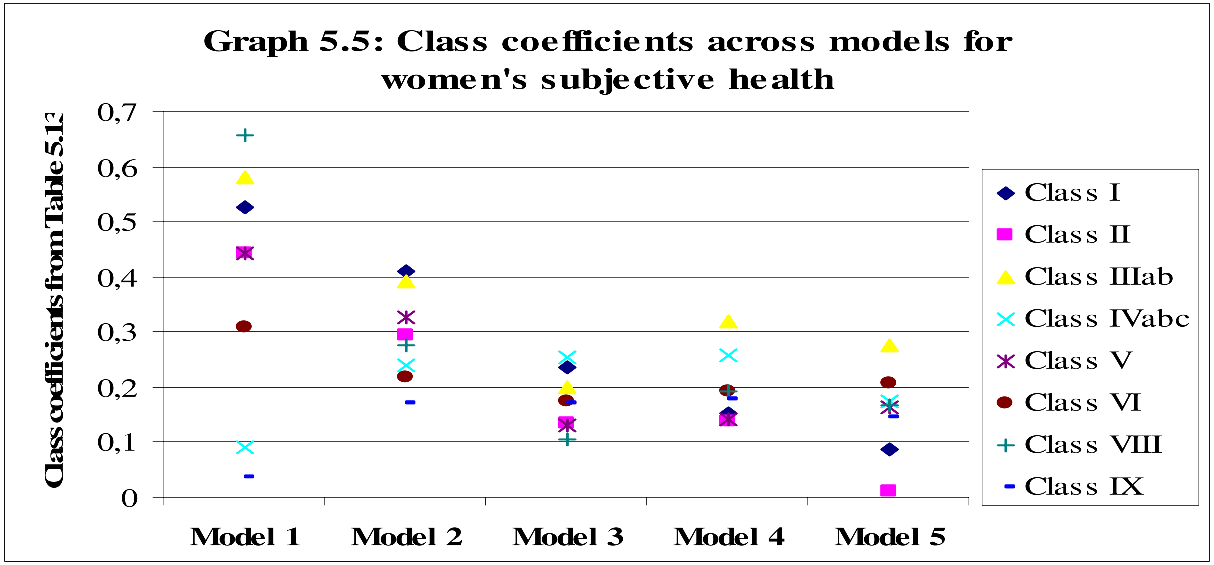
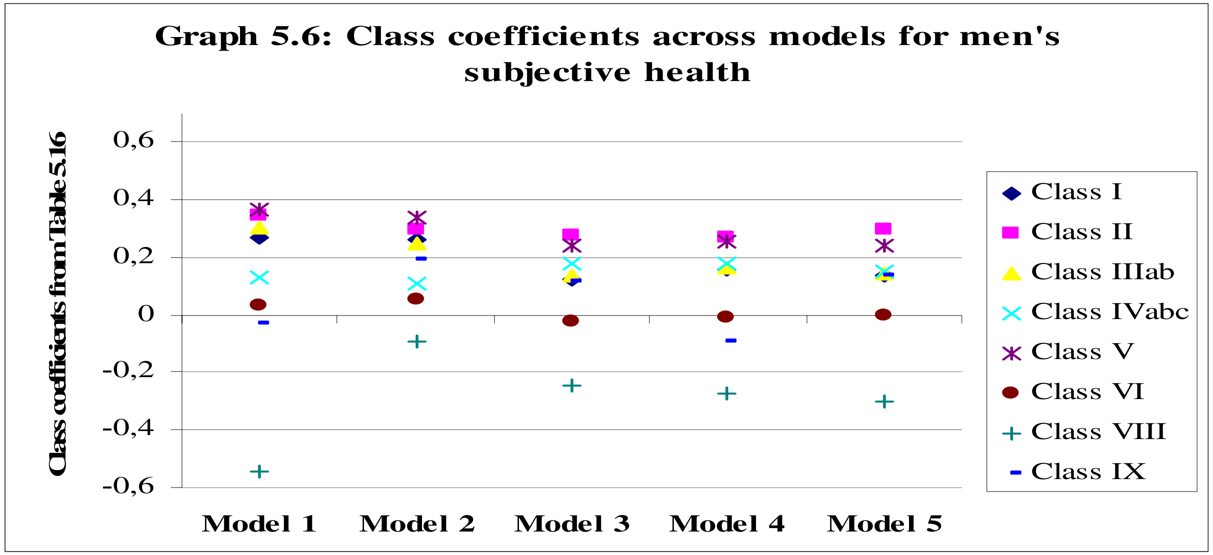


Figure 5.9: Association between Body Mass Index (BMI)
and subjective health status
Coefficients from model (4)
Tables 5.13 and 5.16
0,1
0,08
0,06
0,04
0,02
0
-0,02
-0,04
-0,06
-0,08
-0,1
Underweight (no significant for all)
Overweight
Obese (no significant for men)
BMI (RC: Normal)
Women
Men



Graph 5.5: Class coefficients across models for women's subjective health
Class coefficients from Table 5.12
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
Model 1
Model 2
Model 3
Model 4
Model 5
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX


Graph 5.6: Class coefficients across models for men's subjective health
Class coefficients from Table 5.16
0,6
0,4
0,2
0
-0,2
-0,4
-0,6
Model 1
Model 2
Model 3
Model 4
Model 5
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX

CHAPTER 6: ANALYSING THE LINKS BETWEEN SOCIAL CLASS AND HEALTH IN ENGLAND

6.1. Introduction

This chapter continues with the examination of the association between social class and health status at the individual level. In this chapter I will analyse the British case in a smiliar way to that done for the Spanish case in the previous chapter. The study is based on the *Health for England Surveys* dating from the early 1990s. As I explained in the methodological chapter, I selected surveys carried out simultenously in the two countries in order to facilitate the comparative analysis. Therefore, the Health Surveys analysed for both Spain and England contain similar questions that permit the operationalization of the theoretical framework of the research.

The chapter focuses on the analysis of the empirical findings for the British case restricting the analysis to England. The empirical strategy (i.e. preparation of the data and pooling the data[1]) and the statistical modelling of the analysis are similar to

[1] To test for the appropriateness of pooling the data I have conducted a Likelihood ratio test similar to that performed with the Spanish data (see Section 5.1 for an explanation of this test). The following table summarises the values of the test statistics and the χ^2 values for all three indicators of health. The tests have been carried out for women and men separately. The tests have been performed for all the explanatory models applied in the thesis, i.e. models (1) to (5). I report

those of the previous chapter. Hence, the section on methodology from Chapter 5 applies here as well. The structure of the chapter is as follows. The next section presents an analysis of the short-term objective health of the English population. Long-term objective health is studied in the third section of the chapter. Given the continuous nature of the dependent variable, the analysis of the objective dimension of health is carried out through regression models. The fourth section is devoted to the examination of subjective health. This is based on the examination of ordered probit models. The chapter will conclude with a discussion of the main empirical findings. Appendix E contains some additional empirical analysis. Specifically, the results of the logit models computed for the subjective dimension of health and some simulations that further analyse the effect of social class on the probability of being healthy.

6.2. An analysis of objective short-term health

The objective dimension of health for the English case has been studied in the same way as in the Spanish case. That is, the objective short-term dimension is a factor formed by three variables that capture the state of an individual's health during the

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here the results of the test for the final model for the three indicators of the dependent variable.

<table>
<tr><th rowspan="3">Sample</th><th colspan="6">Health indicator</th></tr>
<tr><td colspan="2">Short-term objective health</td><td colspan="2">Long-term objective health</td><td colspan="2">Subjective health status</td></tr>
<tr><td>Test statistic (i.e. χ^2)</td><td>Critical value from the χ^2 distribution (i.e. $\chi^2_{(df_c - df_u)}$)</td><td>χ^2</td><td>$\chi^2_{(df_c - df_u)}$</td><td>χ^2</td><td>$\chi^2_{(df_c - d}$</td></tr>
<tr><td>Women</td><td>41.3</td><td rowspan="2">47.4</td><td>43</td><td rowspan="2">47.4</td><td>47</td><td rowspan="2">49.8</td></tr>
<tr><td>Men</td><td>39</td><td>44.3</td><td>38</td></tr>
</table>

two weeks prior to the interview[2]. The analysis is also performed by means of a sequence of models, which commences with social class as the only explanatory variable in the initial model and finishes in the last model with all explanatory variables included. Since the short-term dimension of health is a continuous variable, the statistical tool that has been selected is multivariate regression. Women and men, as throughout this thesis, have been studied separately. I will first discuss the models fitted for women and then those for men.

6.2.1. Women's objective short-term health

The regressions computed to analyse women's short-term health are shown in Tables 6.1, 6.2 and 6.3. The coefficients of the first column of Table 6.1 show a significant association between class and health. The social gradient that characterises the association between class and short-term health is less clear than the one we will see when analysing both long-term objective health and subjective health. The total effect of class on women's objective health in the short-run is weaker than the one we will find for the long-term dimension, as well as for the subjective dimension. The effect of class on health is stronger when we consider the nine categories operationalization of class as opposed to the seven categories. Similarly to the Spanish case and for all dimensions of health, this is mainly due to the large coefficient for the category of unemployed. Nonetheless, it should be noted that

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[2] These variables are: (1) number of days with restrictions on the principal activity due to health problems in the last two weeks; (2) number of days in bed due to health problems in the last two weeks; and (3) total number of pains or symptoms affecting activities carried out during spare time during the last two weeks. Given the composition of the factor a negative sign of the class (or any other explanatory variable) coefficients would imply a positive association between social class and the dependent variable. Likewise, a positive sign would imply a negative association between the explanatory variable and the short-term dimension of objective health.

the divergence decreases when we control for age and civil status, and declines still further when we include education.

Table 6.1: Linear regression for the short-term dimension of health. Coefficients for models fitted to women, (standard errors in parentheses). Number of observations: 9169. Reference categories (RC) in parenthesis.

Model	(1)	(2)	(3)	(4)
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.063** (0.03)	-0.01 (0.03)	0.004 (0.04)	0.002 (0.04)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**-0.049** (0.02)	-0.026 (0.02)	-0.009 (0.03)	-0.003 (0.02)
Class IIIab: Higher-grade routine nonmanual employees	**-0.083** (0.02)	**-0.063** (0.02)	**-0.052** (0.02)	**-0.04** (0.02)
Class IVabc: Small proprietors and employers and self-employed workers	**-0.067** (0.03)	**-0.08** (0.03)	-0.07 (0.04)	-0.037 (0.03)
Class V: Lower-grade technicians and supervisors of manual workers	-0.02 (0.06)	-0.1 (0.08)	-0.1 (0.08)	-0.09 (0.06)
Class VI: Skilled manual workers	0.052 (0.04)	0.09 (0.06)	0.095 (0.06)	0.09 (0.04)
Class VIII: Unemployed	**-0.336** (0.16)	-0.27 (0.38)	-0.248 (0.16)	-0.219 (0.3)
Class IX: Full-time homemakers	-0.074 (0.05)	-0.13 (0.07)	-0.12 (0.05)	-0.13 (0.07)
Age (RC: 25-34 age group)				
35-44 age group		**0.051** (0.03)	0.043 (0.03)	0.032 (0.3)
45-54 age group		**0.075** (0.03)	**0.06** (0.03)	0.04 (0.03)
55-65 age group		**0.155** (0.03)	**0.134** (0.04)	**0.109** (0.03)
Civil status (RC: Single)				
Married or cohabiting		0.003 (0.03)	0.003 (0.02)	-0.003 (0.03)
Separated or divorced		0.046 (0.04)	0.04 (0.03)	0.04 (0.04)
Widowed		0.022 (0.06)	0.015 (0.03)	0.01 (0.06)
Education (RC: Level 1a: Inadequately completed General Elementary Education)				
Level 1bc: General Elementary Education or Basic Vocational			**-0.104** (0.03)	**-0.1** (0.03)
Level 2ab: Intermediate Vocational or Intermediate General Education			**-0.06** (0.02)	**-0.052** (0.02)

Level 3b: Lower-level Tertiary Certificate	-0.016	-0.011
	(0.03)	(0.03)
Level 3c: Higher education –Upper Tertiary Certificate-	-0.065	-0.049
	(0.03)	(0.04)
Smoke (RC: Non-smoker)		
Light smoker		0.04
		(0.02)
Moderate smoker		0.011
		(0.02)
Heavy smoker		0.003
		(0.03)
Drink (RC: Non-drinker)		
Very low		-0.041
		(0.05)
Low		-0.038
		(0.02)
Moderate		0.004
		(0.02)
Fairly high		0.005
		(0.05)
High		-0.19
		(0.21)
Very high		-0.021
		(0.33)
Physical exercise (RC: No activity)		
Light activity		**0.06**
		(0.02)
Moderate activity		0.013
		(0.02)
Vigorous activity		0.053
		(0.4)
Relation between weight and height (BMI) (RC: Normal)		
Underweight		0.02
		(0.03)
Overweight		**0.056**
		(0.01)
Obese		**0.137**
		(0.02)

Table 6.2: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 6.1				
Model	**1**	**2**	**3**	**4**
Class (nine categories)	.045	.041	.038	.034
Class (seven categories)	.039	.033	.025	.024
Education	-	-	0.037	0.031

Table 6.3: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3 and 4 in Table 6.1			
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**
Class (nine categories)	8.9	15.5	24.44
Class (seven categories)	15.4	35.9	38.47
Education	-	-	16.2

Women's age and civil status control part of the class effect on health. The class coefficients drop and the value of the standard deviation of the sheaf coefficients diminishes accordingly. The percentage reduction of the class effect varies between 10 and 15 percentage points. Thus, a woman's age and civil status have a control effect on the significance that class has on objective short-term health. Age and civil status have a stronger control effect for class with seven categories than for class with nine categories; more specifically, the control effect is around two times greater.

The effect of age itself on health is similar to that found for Spanish women: it is weaker than that we will see below for women's long-term objective health and subjective health. We see that all age categories are significant and that the sign is the expected one: the older a woman is, the poorer her short-term health. In terms of civil status, there appear to be no significant difference in the health of women in the different categories.

The introduction of education as an explanatory variable into the model produces a decline in the class effect. The decline of the class coefficients and the smaller standard deviation of the sheaf coefficients provide evidence of this. The reduction increases when we consider only the occupied categories of class, as opposed to class with nine categories (35.9% as opposed to 15.5%). As we would expect, therefore, non-occupied categories appear to be less sensitive to the impact of education as a mediator between class and health. As regards the association between education itself and health, this is statistically significant for the first two educational levels. These two educational levels have better health scores than the reference category.

In the final model I control for women's lifestyles. These variables conform to the pattern of explanation of the impact that social class has on health as the value of the class coefficients continues to go down and the magnitude of the standard deviation of the sheaf coefficients reaches its minimum point. Thus, the reduction of the class effect is greatest when the analysis incorporates women's behaviour (approximately 25% for class with nine categories and around 40% for class with seven categories). However, it should be noted that not all personal habits have a similar impact on health itself. On the one hand, drinking and smoking behaviour do not significantly affect objective short-term health. On the other hand, physical exercise and the relation between a woman's height and weight significantly affect health in the expected sense. Lifestyle variables also have an effect on the association between education and short-term health. The standard deviation of the sheaf coefficients for the education dummies declines when such variables are included. Hence, around 15 percentage points of the impact that education has on health is explained by women's behaviour.

In short, women from different social classes have different levels of short-term health. These health differences appear to be smaller than those that we will see for both long-term objective health and the subjective dimension. However, as explained below, the explanatory mechanisms prove to be the same. The impact of a woman's class on her health, after controlling for age and civil status, is mediated to a certain extent by her educational achievements and lifestyle. These variables account for more of the differences between the seven occupied class categories than among the nine-category operationalization of class that includes occupied and non-occupied women[3]. We therefore see that mechanism (2) is partly supported by the analysis of the relation between women's class and short-term objective health, as education reduces the initial class effect. There is also some support for mechanism (3) as both class and education have an impact on health, a relation which is partly mediated by lifestyle variables. The mediating role of education in mechanism (2) appears to be slightly greater than that of personal behaviour in mechanism (3). In any event, it should be noted that in the final model we still need to explain a large part of the class effect (75% for class with seven categories and 60% for class with nine categories) and an even larger part of the education effect (85%). There is therefore support for both our mechanisms, but it is only weak.

[3] I have also calculated the variance of the class coefficients to analyse how differences among social classes in the mean effect on health vary as explanatory variables are included. These results show that these differences almost disappear once we control for all the explanatory variables for both class with nine categories (i.e. variance value from the initial to the final model: 0.049, 0.043, 0.037 and 0.03) and class with seven categories (i.e. variance value from model (1) to model (4): 0.008, 0.006, 0.006 and 0.001).

6.2.2. Men's objective short-term health

Social class has also a significant effect on English men's short-term health. Tables 6.4, 6.5 and 6.6 show the results of the regression analysis. Similarly to the case of women, men's social class has a weaker association with short-term health than with both long-term objective health and subjective health. The association between both variables also displays a weaker social gradient shape. Class category eight, the unemployed, should be noted for the strength of its association with health. As in previous models, the coefficient largely decreases after controlling for men's age and civil status. This class category has the worst state of health in the initial model as compared to that of the non-skilled manual and agricultural workers.

Model (2) introduces age and civil status into the model as control variables. The impact of these variables on health varies. Whereas, the oldest age group has a negative effect on the dependent variable, civil status does not have any significant effect. As for their influence on the association between class and short-term objective health, both class coefficients and the standard deviation of the sheaf coefficients decrease. These trends are reflected in the percentage reduction of the class effect as a whole, which is around 10% for class with nine categories and approximately 12.5% for class with seven categories.

Men's education has a significant and positive effect on health. The scale of this impact increases in the sense that the more educated a man is, the better his short-term health. The only category that does not show a significant difference with the reference category is the first one (i.e. the 35-44 age group). Figure 6.1 shows that the educational effect is lower for women than for men except for the second level of educational achievement (i.e. intermediate vocational or intermediate general education). Education has two main consequences for the relationship between men's social class and health. First, there is a general decline in the value of the class coefficients (see column 2, Table 6.4). Second, the standard deviation of the sheaf coefficients also drops (see column 2, Table 6.5). Thus, men's education accounts for part of the class divergence in their short-term health. Table 6.6 shows the decline of the class effect measured in percentage points (24.5% for class operationalised in nine categories and 31.2% for class with seven categories). As in the case of women, education explains more of the class divergence when class is measured with the seven categories of the occupied population.

The final model controls for men's lifestyles. Their effect as a whole on the relationship between class and health is clear: they account for a small part of the health inequalities among classes. Thus, the value of both the standard deviation of the sheaf coefficients and the class coefficients decline slightly. The percentage reduction of the impact of class as a whole is two percentage points larger than in the previous model. Hence, lifestyle variables play a very small minor mediating role between class and health.

In relation to the association of each of the types of behaviour with health, they all have a low and, in most cases, statistically non-significant effect on objective short-term health.

Regarding lifestyles' effect on education, they have a small impact on the association between education and health: about 6% of the education effect on objective short-term health is due to men's habits.

In short, social class influences men's short-term health. This effect is significant although weaker than the one we will see for the other health indicators. Controlling for age and civil status and including education and living habits as explanatory variables accounts for about 40% of the total class effect when all class categories are considered. As was the case for women, the explanatory framework is able to account for a larger part of the class effect when this variable includes only those categories of the traditional class schema. It should be noted that class achieved its greatest explanatory power when all the independent variables are combined.

(See Figure 6.1 in separate file)

Table 6.4: Linear regression for the short-term dimension of health. Coefficients for models fitted to men, (standard errors in parentheses). Number of observations: 8494. Reference categories (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.094**	**-0.09**	**-0.07**	**-0.068**
	(0.03)	(0.03)	(0.03)	(0.03)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**-0.06**	**-0.05**	-0.037	-0.036
	(0.03)	(0.03)	(0.03)	(0.04)
Class IIIab: Higher-grade routine nonmanual employees	**-0.107**	**-0.095**	**-0.07**	**-0.069**
	(0.03)	(0.04)	(0.03)	(0.04)
Class IVabc: Small proprietors and employers and self-employed workers	-0.04	-0.06	-0.04	-0.03
	(0.03)	(0.03)	(0.03)	(0.03)
Class V: Lower-grade technicians and supervisors of manual workers	0.061	0.007	0.02	0.021
	(0.02)	(0.02)	(0.03)	(0.04)
Class VI: Skilled manual workers	-0.004	-0.003	0.002	0.003
	(0.03)	(0.03)	(0.03)	(0.03)
Class VIII: Unemployed	**0.31**	0.01	0.01	0.011
	(0.15)	(0.15)	(0.3)	(0.15)
Class IX: Full-time homemakers	-0.49	-0.455	-0.45	-0.47
	(0.67)	(0.67)	(0.93)	(0.67)
Age (RC: 25-34 age group)				
35-44 age group		-0.026	-0.03	-0.039
		(0.03)	(0.03)	(0.04)
45-54 age group		0.045	0.029	0.026
		(0.04)	(0.04)	(0.04)
55-65 age group		**0.091**	**0.067**	**0.058**
		(0.03)	(0.04)	(0.03)
Civil status (RC: Single)				
Married or cohabiting		-0.002	-0.002	-0.004
		(0.03)	(0.02)	(0.02)
Separated or divorced		-0.005	-0.03	-0.002
		(0.05)	(0.04)	(0.04)
Widowed		-0.005	-0.005	-0.003
		(0.01)	(0.01)	(0.05)
Education (RC: Level 1a: Inadequately completed General Elementary Education)				
Level 1bc: General Elementary Education or Basic Vocational			-0.053	-0.054
			(0.03)	(0.03)
Level 2ab: Intermediate Vocational or Intermediate General Education			**-0.06**	**-0.057**
			(0.02)	(0.02)
Level 3b: Lower-level Tertiary Certificate			**-0.061**	**-0.063**
			(0.03)	(0.03)
Level 3c: Higher education –Upper Tertiary Certificate-			**-0.075**	**-0.07**
			(0.03)	(0.03)

Smoke (RC: Non-smoker)	
Light smoker	0.001
	(0.03)
Moderate smoker	-0.007
	(0.02)
Heavy smoker	0.025
	(0.03)
Drink (RC: Non-drinker)	
Very low	-0.09
	(0.06)
Low	-0.003
	(0.02)
Moderate	-0.03
	(0.03)
Fairly high	-0.059
	(0.05)
High	-0.016
	(0.16)
Very high	0.225
	(0.27)
Physical exercise (RC: No activity)	
Light activity	-0.023
	(0.02)
Moderate activity	-0.028
	(0.02)
Vigorous activity	0.233
	(0.2)
Relation between weight and height (BMI) (RC: Normal)	
Underweight	0.053
	(0.04)
Overweight	0.007
	(0.02)
Obese	**0.05**
	(0.02)

Table 6.5: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 6.4

Model	**1**	**2**	**3**	**4**
Class (nine categories)	.057	.051	.043	.042
Class (seven categories)	.048	.042	.033	.032
Education	-	-	0.033	0.031

Table 6.6: Percentage reduction of the class and education effect when moving from model 1 to models 2, 3 and 4 in Table 6.4

Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**
Class (nine categories)	10.5	24.56	26.3
Class (seven categories)	12.5	31.25	33.3
Education	-	-	6

6.2.3. Summary and conclusions

The evidence presented in this section has clearly shown that there is a significant link between an individual's class and her objective short-term health. The net effect of class on this indicator of health is similar for men and women. All explanatory variables mediate class and health for both genders, although the mediation effect is relatively small. The explanatory role of each set of variables is also similar. Thus, after controlling for socio-demographic variables, education produces a decrease in the standard deviation of the sheaf coefficients (and therefore an increase in the percentage explanation of the class effect) for all individuals. Lifestyle variables, together with education have the same effect for men and women: the class impact on health is further explained, although the improvement is very small (i.e. approximately two percentage points for all individuals except 9% for men in the nine-category class schema).

There are no significant differences between men and women in terms of the variables with the greatest explanatory capacity. For both genders, this is greatest for the combination of education and lifestyle variables, education being the variable with the single strongest mediating effect.

Finally, it can also be seen that the sequence of explanatory models accounts for more of the class effect of the occupied classes than for the nine-class schema. This explanatory gap amounts to approximately 14 percentage points for women and six points for men.

Graphs 6.1 and 6.2 below plot part of the results discussed in this section. They show how the class coefficients diminish as the independent variables are introduced in models (2) to (5). The graphs also illustrate that for both men and women controlling for age and civil status results in a decline of the class coefficients that takes their values closer to zero. The inclusion of education begins to explain the class effect on short-term health, especially for men. Model (4) introduces a control for lifestyle, which results in a larger decline in the coefficients. These graphs allow us to see that the percentage of explanation of the class effect in the final model is around 30% of the original value.

The pattern of explanation of short-term objective health provides, therefore, some support for mechanism (2) and (3), and especially for the former. Education acts as a mediator between a man's class and his health score. Lifestyles also intervene in the association between, on the one hand, class and health, and on the other hand, education and health. The effect of both mechanisms is in any event small, as much of both the class and, especially, the education effect remain unexplained.

(See Graph 6.1 in separate file)

(See Graph 6.2 in separate file)

6.3. An analysis of long-term objective health

The definition of the long-term dimension of health was discussed in Chapter 2. It should be remembered that this indicator measures the number of chronic illnesses an individual suffers from at the time of the survey[4]. It is therefore a measure of the constraints that long-term diseases may represent for the satisfactory performance of daily activities. This section analyses the influence that an individual's social class has on her long-term health. As before, I will first present and discuss the results for women and then those for men.

6.3.1. Women's objective long-term health

An analysis of Tables 6.7, 6.8 and 6.9 reveals that there is a strong and significant association between English women's social class and their long-term health. Similarly to what we saw in the case of Spanish women, this association is stronger than the one between class and objective short-term health and weaker than the one linking class and subjective health. We will encounter the same pattern when we come to the analysis of English men.

The association between class and health for women seems to favour the more privileged social classes. Unemployed women in England, like all individuals in Spain, show a significant and large coefficient. However, similarly to previous models, the value of the coefficient falls to almost zero once we control for age and civil status. This pattern is similar to that described for the short-term indicator and to the one we will find for the subjective dimension of health. Most individuals within this category are young, a fact which could explain why the coefficient becomes non-significant in model (2).

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[4] Since the variable measures the number of chronic diseases an individual has, a negative coefficient of any explanatory variable would imply that the variable has a positive association with a good health in the long-run. A positive coefficient would therefore indicate the contrary.

Model (2) allows us to evaluate the relevance of age and civil status as control variables (see column 2 in Tables 6.7 and 6.6 and column 1 in Table 6.9). The standard deviation of the sheaf coefficients of social class diminishes for class measured in nine categories as well as for the occupied class categories, with a reduction of 40.25% in the case of the former and 58.13% in the case of the latter. A woman's age and civil status play, therefore, a more important role as control variable when only the occupied categories are considered. The control effect is in any event large. Class coefficients decline in line with the value of the standard deviation of the sheaf coefficients. This decline is the largest across models for most of the occupied categories. As noted above, the unemployed category loses its statistical significance once age and civil status are controlled for.

Age and some categories of civil status have a significant negative association with health. Separated and divorced women suffer from worse health than the reference category (i.e. single women). As for age, the negative association rises considerably for each consecutive age group, implying that its effect on health is cumulative. Thus, the older an individual is, the worse her health condition will be and the impact of age becomes more pronounced as she gets older.

The inclusion of education as an explanatory variable in the third model has a significant and major impact on the association between class and health. Class coefficients fall, above all for the first four class categories. The impact of class as a whole decreases for both the nine-category class classification and the measure of occupied class (see column 3, Table 6.8 and column 2, Table 6.9). The statistical significance of the class categories that were significant in the previous model is maintained. Classes I to IV continue to enjoy better long-term health than the reference class category does.

Education itself has a positive and significant association with long-term health. The strength of this link is larger than that recorded for short-term health and weaker than that found for subjective health. Women with the fourth level of educational attainment, that is, lower-level tertiary qualifications, are those with the best score in long-term health when compared with women who failed to complete general elementary education. Women in the highest educational category also have better health than the reference category. It should be noted that the difference with the previous level of education is very small. Thus, increasing levels of education are associated with better long-term health.

The final model controls, as in previous analyses, for lifestyle variables. The last column in Table 6.7 shows that the effect of these variables on long-term health is similar to that found for short-term and subjective health: drinking and smoking behaviour do not significantly affect health –with the exception of smoking for subjective health - whereas physical exercise and the relation between height and weight have a significant association with health, which is of the expected sign (i.e. the more physically active a person is, the better her health, at the same time as women who are underweight, overweight or obese have worse health than those with a normal BMI).

As for the explanatory role of lifestyle variables in the association between class and health, it proves to be significant irrespective of the operationalization of social class used. Thus, the value of the standard deviation of the sheaf coefficients is 0.024 for the seven-category class schema and 0.039 for the nine-category variable. Personal behaviour continues to explain the class effect, although the percentage reduction of this effect is very small (i.e. about three percentage points).

The last model shows that the final reduction of the class effect as a whole is 72.1% for the occupied class categories and 49.35% for all class categories. Approximately two thirds of the class effect, therefore, is explained by the model's independent variables. Education and lifestyle variables have a cumulative and increasing ability to explain the class effect. The combination of education and lifestyle, after controlling for age and civil status, achieves the highest percentage reduction in the impact of class as a whole on women's long-term health.

The impact of education on long-term health is also partly explained by women's behaviour. More specifically, the standard deviation of the sheaf coefficients for the education dummies is reduced by 16.6% as a consequence of controlling for lifestyle variables. In other words, the distinct behaviour of women with different levels of education does explain part of the health gap among women. All education coefficients decrease accordingly.

Table 6.7: Linear regression for the long-term dimension of health. Coefficients for models fitted to women, (standard errors in parentheses). Number of observations: 8268. Reference category (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.25**	**-0.127**	**-0.093**	**-0.091**
	(0.03)	(0.04)	(0.04)	(0.04)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**-0.23**	**-0.073**	**-0.049**	**-0.038**
	(0.02)	(0.02)	(0.02)	(0.02)
Class IIIab: Higher-grade routine nonmanual employees	**-0.24**	**-0.042**	**-0.037**	**-0.02**
	(0.02)	(0.02)	(0.02)	(0.01)
Class IVabc: Small proprietors and employers and self-employed workers	0.023	**-0.13**	**-0.055**	-0.054
	(0.03)	(0.03)	(0.03)	(0.03)
Class V: Lower-grade technicians and supervisors of manual workers	**-0.164**	-0.035	-0.097	-0.102
	(0.06)	(0.04)	(0.05)	(0.05)
Class VI: Skilled manual workers	**-0.122**	-0.035	-0.014	-0.017
	(0.04)	(0.04)	(0.04)	(0.04)
Class VIII: Unemployed	**-0.372**	-0.08	-0.049	0.08
	(0.15)	(0.15)	(0.14)	(0.14)
Class IX: Full-time homemakers	-0.019	-0.03	-0.038	-0.035
	(0.05)	(0.05)	(0.05)	(0.04)
Age (RC: 25-34 age group)				
35-44 age group		**0.1**	**0.04**	**0.042**
		(0.03)	(0.02)	(0.03)
45-54 age group		**0.272**	**0.24**	**0.237**
		(0.03)	(0.03)	(0.03)
55-65 age group		**0.629**	**0.57**	**0.568**
		(0.03)	(0.03)	(0.03)
Civil status (RC: Single)				
Married or cohabiting		-0.05	0.009	0.006
		(0.02)	(0.02)	(0.02)
Separated or divorced		**0.116**	0.108	**0.111**
		(0.03)	(0.03)	(0.03)
Widowed		0.06	0.051	0.058
		(0.03)	(0.03)	(0.03)

Education (RC: Level 1a: Inadequately completed General Elementary Education)		
Level 1bc: General Elementary Education or Basic Vocational	**-0.158**	**-0.148**
	(0.02)	(0.02)
Level 2ab: Intermediate Vocational or Intermediate General Education	**-0.217**	**-0.206**
	(0.02)	(0.02)
Level 3b: Lower-level Tertiary Certificate	**-0.218**	**-0.213**
	(0.02)	(0.03)
Level 3c: Higher education –Upper Tertiary Certificate-	**-0.181**	**-0.179**
	(0.03)	(0.03)
Smoke (RC: Non-smoker)		
Light smoker		-0.011
		(0.02)
Moderate smoker		0.006
		(0.02)
Heavy smoker		0.016
		(0.02)
Drink (RC: Non-drinker)		
Very low		0.008
		(0.04)
Low		0.035
		(0.03)
Moderate		0.033
		(0.02)
Fairly high		**-0.194**
		(0.06)
High		-0.13
		(0.15)
Very high		**-0.587**
		(0.2)
Physical exercise (RC: No activity)		
Light activity		**0.05**
		(0.01)
Moderate activity		**0.07**
		(0.02)
Vigorous activity		0.047
		(0.1)
Relation between weight and height (BMI) (RC: Normal)		
Underweight		**0.061**
		(0.02)
Overweight		**0.064**
		(0.01)
Obese		**0.23**
		(0.02)

Table 6.8: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 6.7				
Model	**1**	**2**	**3**	**4**
Class (nine categories)	.077	.046	.041	.039
Class (seven categories)	.086	.036	.026	.024
Education	-	-	0.042	0.035

Table 6.9: Percentage reduction of the class and education effects when moving from model 1 to model 4 in Table 6.7			
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**
Class (nine categories)	40.25	46.75	49.35
Class (seven categories)	58.13	69.76	72.1
Education	-	-	16.6

6.3.2. Men's objective health in the long-term

The long-term health of English men is significantly associated with their social class. Tables 6.10 to 6.12 present a detailed analysis of this relationship. Similarly to the case of English women, as well as to that of Spanish women and men, the association between class and long-term health is stronger than that between class and short-term health but weaker than the link between class and subjective health. The strength of the relation varies for the different class categories. The occupied categories – except skilled manual workers- enjoy better long-term health than unskilled manual and agricultural workers. Similarly to the results for the other health indicators, the unemployed present a large and significant coefficient that declines and loses statistical significance once we control for age and civil status, that is, in model (2). In the initial model, the standard deviation of the sheaf coefficients is 0.077 for the nine-category classification of class and 0.051 for class with seven categories (see Table 6.10). The class effect is, therefore, approximately a third greater for the class variable that includes both the occupied and non-occupied categories.

Model (2) controls for age and civil status. As expected, age has a negative and cumulative effect on long-term health. The older a man is, the worse his health will be. Civil status, on the other hand, does not significantly affect a man's long-term health. The decline in the value of the standard deviation of the sheaf coefficients reveals that these variables are significant control factors between class and health. The class effect loses approximately a quarter (i.e. 24.67%) of its initial explanatory power for the nine-class schema, and 27.45% for the occupied class categories. Class coefficients, especially those of the non-occupied categories, are smaller than the ones in the initial model.

Education results in a further decrease in the class coefficients, matching the result found for Spanish men's long-term health. Education has had the same effect on all our indicators: a decline of the class impact on health. Men's educational achievements seem to partly mediate the influence of class on long-term health. For most of the occupied class categories, the inclusion of education leads to the largest drop in the coefficients. The coefficients for the non-occupied categories also decrease, but by less. This divergence is reflected in the change in the value of the standard deviation of the sheaf coefficients and, hence, in the percentage reduction of the class effect when moving from model (1) to model (3), a drop which is more pronounced in the case of the nine-category class classification than for class with seven categories. Once again, therefore, education does help to explain the influence that a man's class has on his health.

As for the impact of education itself on health, Figure 6.2 shows the relation between education and long-term objective health for both men and women. We can see that education is positively associated with health and that, while the pattern of the association across models is similar for men and women, the effect is much stronger for women.

Men's lifestyles have a mixed effect on health. Smoking habits do not appear to have significant health implications. Drinking behaviour has some significant effect on health, as the categories of low and moderate drinkers suffer from worse health than the reference category (i.e. non-drinkers). Physical exercise and the BMI have a significant impact on long-term health: the more exercise a man does and the closer his BMI is to the normal category, the healthier he will be. Class coefficients for the occupied categories decrease, whereas those for the non-occupied categories increase slightly, while remaining non-significant. The decline of the coefficients is reflected in the lower standard deviation of the sheaf coefficients, especially for class with seven categories. For class with nine categories, the standard deviation of the sheaf coefficient decreases slightly by approximately 0.001). The percentage of explanation of the class effect falls, therefore, by just some two percentage points compared to that seen when moving from the first to the third model. The difference in the percentage of explanation of the class effect in the last model is around ten percentage points, accounting for about half of the effect when class is measured through nine categories and about 40 percentage points when class is operationalised with the occupied categories alone. Thus, the gap in the percentage reduction of the class effect between the nine-category variable and the occupied categories of class slightly decreases from model (3) to model (4).

(See Figure 6.2 in separate file)

Table 6.10: Linear regression for the long-term dimension of health. Coefficients for models fitted to men, (standard errors in parentheses).
Number of observations: 8776. Reference categories (RC) in parenthesis.

Model	(1)	(2)	(3)	(4)
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)				
Class I: Higher grade professionals, administrators and managers	**-0.072**	**-0.104**	**-0.085**	**-0.068**
	(0.02)	(0.03)	(0.03)	(0.03)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**-0.062**	**-0.06**	-0.024	-0.02
	(0.02)	(0.03)	(0.03)	(0.02)
Class IIIab: Higher-grade routine nonmanual employees	**-0.14**	**-0.09**	-0.054	-0.048
	(0.03)	(0.03)	(0.03)	(0.03)
Class IVabc: Small proprietors and employers and self-employed workers	**-0.072**	**-0.01**	**-0.09**	**-0.087**
	(0.02)	(0.03)	(0.02)	(0.02)
Class V: Lower-grade technicians and supervisors of manual workers	**-0.179**	-0.013	-0.003	-0.003
	(0.03)	(0.03)	(0.03)	(0.04)
Class VI: Skilled manual workers	-0.023	**-0.04**	**-0.053**	**-0.052**
	(0.02)	(0.03)	(0.02)	(0.02)
Class VIII: Unemployed	**-0.505**	-0.43	-0.4	-0.44
	(0.13)	(0.13)	(0.13)	(0.28)
Class IX: Full-time homemakers	-0.127	0.162	0.13	0.15
	(0.61)	(0.6)	(0.58)	(0.58)
Age (RC: 25-34 age group)				
35-44 age group		**0.083**	**0.072**	**0.06**
		(0.03)	(0.03)	(0.02)
45-54 age group		**0.275**	**0.256**	**0.241**
		(0.03)	(0.03)	(0.02)
55-65 age group		**0.534**	**0.505**	**0.465**
		(0.03)	(0.03)	(0.03)
Civil status (RC: Single)				
Married or cohabiting		-0.03	-0.031	-0.02
		(0.02)	(0.02)	(0.02)
Separated or divorced		0.005	0.005	0.013
		(0.03)	(0.03)	(0.03)
Widowed		-0.084	-0.092	-0.079
		(0.04)	(0.04)	(0.04)
Education (RC: Level 1a: Inadequately completed General Elementary Education)				
Level 1bc: General Elementary Education or Basic Vocational			-0.042	-0.04
			(0.02)	(0.02)
Level 2ab: Intermediate Vocational or Intermediate General Education			**-0.089**	**-0.08**
			(0.02)	(0.02)
Level 3b: Lower-level Tertiary Certificate			**-0.094**	**-0.092**
			(0.03)	(0.02)
Level 3c: Higher education –Upper Tertiary Certificate-			**-0.092**	**-0.093**
			(0.03)	(0.03)
Smoke (RC: Non-smoker)				

Light smoker	-0.009 (0.02)
Moderate smoker	0.02 (0.02)
Heavy smoker	-0.036 (0.02)
Drink (RC: Non-drinker)	
Very low	0.026 (0.04)
Low	**0.044** (0.02)
Moderate	**0.071** (0.02)
Fairly high	0.019 (0.04)
High	0.114 (0.15)
Very high	0.368 (0.23)
Physical exercise (RC: No activity)	
Light activity	**-0.137** (0.01)
Moderate activity	**-0.171** (0.02)
Vigorous activity	-0.252 (0.16)
Relation between weight and height (BMI) (RC: Normal)	
Underweight	**0.08** (0.03)
Overweight	0.015 (0.01)
Obese	**0.211** (0.02)

Table 6.11: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 6.10

Model	1	2	3	4
Class (nine categories)	.077	.058	.041	.04
Class (seven categories)	.051	.037	.034	.032
Education	-	-	0.041	0.038

Table 6.12: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3 and 4 in Table 6.10			
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**
Class (nine categories)	24.67	46.75	48.05
Class (seven categories)	27.45	33.3	37.27
Education	-	-	7.31

The impact of education on health is also slightly mediated by lifestyle variables. The inclusion of men's lifestyle reduces the educational effect by seven percentage points. The effect is therefore significant and small. The individual education coefficients also show a small decline from model (3) to model (4).

To recapitulate, men's long-term health is influenced by social class. The results discussed here show that some factors such as education and lifestyle variables account for part of the class effect. More specifically, after controlling for age and civil status and including education and lifestyle, approximately half of the class effect is explained. The combination of education and lifestyle produces the greatest explanation of the class effect. The mediating role of education between class and health is much greater than the one played by lifestyle, as if only the latter is included the class effect falls by only some three percentage points. Spanish men show similar trends with respect to the explanatory weight of each variable with the exception of personal habits, which produce a slight increase in the class effect.

6.3.3. Summary and conclusion

We have seen that the second indicator of health, that is, long-term objective health, is also related to individuals' social class. The evidence included in this section shows that women and men both experience a significant link between their class and long-term health. This link is weaker than the one between class and subjective health but stronger than the one between class and objective short-term health. The regressions discussed here reveal that education and lifestyles mediate this relation, although their mediating impact is limited. Age and civil status have a significant control effect.

We have seen that the net class effect on health is fairly similar for both men and women. We have also seen that the independent variables have a significant role in explaining part of this effect. Furthermore, there are no significant differences between men and women in terms of the relative importance of each variable in explaining the class effect. For both women and men, adjusting for age and civil status controls much of the effect. The subsequent inclusion of education implies a larger percentage reduction in the class effect for all class categories. The subsequent incorporation of lifestyle variables implies an even greater percentage reduction in the class effect. However, it should be noticed that the drop in the class effect between the second and the final model is small. Thus, education and life styles are significant explanatory variables but, especially in the case of the latter, their effect is limited.

We have also seen that for all individuals, after adjusting for age and civil status, the class effect is reduced most significantly through the combined effect of education and lifestyles. In the case of the nine-category class variable, the final model accounts for about two thirds of the original class effect for women and about half of the effect for men. In relation to the difference in the percentage reduction of the class effect between the seven- and nine-category class classifications, moving from the first to the last model implies a slight convergence. However, the explanatory capacity of the model is still greatest for women and the seven-category schema. In the case of men, class with nine categories is explained in the final model about ten percentage points better than class with seven categories.

An examination of the variation in the class and education coefficients between the initial and the final model enables us to test the explanatory mechanisms presented in Chapter 2. We have seen that there is some support for mechanism (2), as education has a significant mediating effect on class and long-term health. Mechanism (3) also finds some support, as lifestyles act as intermediaries between class and health as well as between education and health. As in previous models, the mediating effect of education is greater than that of lifestyle.

Graphs 6.3 and 6.4 illustrate most of the findings discussed in this section. The graphs show the class coefficients for each of the four explanatory models. Hence, the variation of the value of the class coefficients captures the effect of each set of independent variables. For both women and men we see that the size of the coefficients is significantly reduced by the inclusion of socio-demographic characteristics, and that the coefficients drop to almost zero when education and lifestyle variables are introduced into the explanatory framework.

A closer look at each of the class coefficients reveals that irrespective of gender, class categories gradually approach the value zero. The exception to this pattern is constituted by unemployed men, who continue to be the category with the highest coefficient across all models, even if from model (2) onwards this coefficient loses its statistical significance. The coefficient for full-time homemakers is also not significantly explained. The final model shows that the variance in the female class coefficients is better accounted for than the variance in the male class coefficients. We should also notice that several coefficients of class remain significant in model (4) and that, especially for men, much of the sheaf coefficient variance remains unexplained.

(See Graph 6.3 in separate file)

(See Graph 6.4 in separate file)

6.4. An analysis of the subjective dimension of health

The results of the ordered probit models are presented in Tables 6.1 and 6.4[5]. The models have been calculated identically to those computed for the Spanish data. Therefore, coefficients of model (1) present the net effect of class on health; the second model presents the influence of socio-demographic characteristics on the association between class and health; model (3) includes the effect of introducing class, education and socio-demographic characteristics; the fourth model controls for lifestyle variables and, finally, model (5) introduces individuals' objective health. I will first discuss the models fitted for women and then those for men.

6.4.1. Women's subjective health

Table 6.13 presents the analysis for women. The coefficients in column 1 show that there is a clear social gradient in the association between class and subjective health. That is, the probability of being healthy of any social class compared to that of the reference category (i.e. unskilled or nonskilled manual and agricultural workers) clearly declines as we move from the higher-

[5] Appendix E presents the results of the logit models that I have run for the subjective dimension of health. Similarly to the analysis for the Spanish case, I have recoded subjective health dimension into two values: not good health and good health. The first value is equal to the sum of the first three categories of the ordered variable (i.e. very poor, poor and fair) and the second value to the sum of the last two categories (good and very good). The distribution of the answers is similar to that of the Spanish data (i.e. 22.49% report poor health and 77.51% good health). In general, the logit models for both men and women produce similar results to those of the ordered probit models. Class has a significant and pronounced impact on subjective health. There are differences in the state of health among social classes favouring the most-privileged classes. In relation to the magnitude of the class effect, it is almost two times greater than that shown by the ordered probit models. This may reflect the loss of information resulting from re-codification. The explanation of the class effect by the theoretical framework is also around 40% for women and 26% for men.

grade professionals to full-time homemakers. The exception to this pattern is the coefficient for unemployed women, which is positive although non-significant. It should be noted the coefficient for this category is close to zero when all explanatory variables are included into the analysis.

The inclusion of age and civil status produces a generalised decline in the class effect. The weakening of the class effect can be seen in the shrinking of the class coefficients, as well as in the smaller value of the sheaf coefficients for the social class dummies. It should be noted that while the control for age and civil status is significant, it is nonetheless small. Thus, the class effect is reduced by approximately 5% for the nine categories of class and by about 6% for the seven categories. The control effect of the socio-demographic characteristics is, therefore, much smaller in this case than in all previous models both for England and for Spain.

Regarding the specific effect of age and civil status on each class coefficient, we see the coefficient for the last category, that is, full-time homemakers, rises and retains its statistical significance. Hence, as in previous models, adjusting for age and civil status produces a larger difference between this category and the reference class category in terms of the probability of being healthy, which is much lower for full-time homemakers. Among the occupied categories, the higher-grade professionals are those which show the greatest decline in the class effect, although it remains being the class category with highest magnitude.

In relation to the impact of these variables themselves on health, the age coefficients show that, as we would expect, the older a woman is, the less likely she is to enjoy good health compared to the youngest age group. A woman's civil status has a significant effect on how her subjective health, as married and cohabiting women are a little more likely to report good health than single women are. Widowed women are also much more likely to report good health than both single women and married or cohabiting women.

The introduction of education into the explanation leads to a large and marked decline in the class effect on subjective health. Class coefficients are significantly reduced for the first four categories. Non-occupied categories, on the other hand, show a smaller decline, suggesting that the class effect on health is mediated to a greater extent by education for members of social classes active in the labour market than for those who are not. The significant mediating role that education plays in the association between class and health, after adjusting for age and civil status, is clearest in the decline of the total class effect. Moving from the first to the third model, the percentage reduction of the class effect amounts to some 33% for the nine- category schema and 40% for the occupied class categories. The class effect as a whole drops considerably when education is taken into account; more specifically, it falls by about 29 percentage points in the case of the nine-category classification and 35% when class is defined in the traditional seven category variable.

The impact of education itself on health can be seen to be major and significant. Individuals who have completed the lower-level tertiary certificate level enjoy the largest positive health gap with respect to those with the lowest education. All other educational categories also enjoy a positive gap compared to reference category although in their cases the gap is smaller. The last educational category has a slightly smaller coefficient than the preceding category, implying that education begins to suffer from diminishing returns once the lower-level tertiary level has been reached. The association between education and health is therefore positive and increases gradually until the fourth level, thereafter it is still positive and significant but to a lower extent. As for the significance of education as a whole, the standard deviation of the sheaf coefficient shows a strong effect in accordance with the effect on health of each category of education.

As we can see in the results from model (4), a woman's living habits entail an additional general reduction in the impact of class on health. The class coefficients remain statistically significant and their magnitude declines slightly when we compare them to model (3) and almost halves for the first three categories when compared to model (1). When, after adjusting for age and civil status and including education, we add lifestyle variables to the explanation, the effect of class as a whole falls by 36.2% for class with nine categories and by 45.5% for the seven categories (see column 4, Table 6.14 and column 3, Table 6.15). Thus, around 40% of the impact of class on health is explained by a woman's education and living habits after having controlled for age and civil status. Hence, similarly to what we found from earlier models, lifestyle plays a small mediating role between class and health.

Education and health are also mediated by lifestyle. We can see in the third column of Table 6.15 that the inclusion of these variables produces a 7.4% reduction in the educational effect on health. Women's lifestyles help to account for a small part of the health gap insofar as they mediate the association between education and health.

In relation to the effect of living habits on health, a number of interesting variations should be noted. On the one hand, drinking behaviour is not related to health. On the other hand, however, smoking behaviour, the intensity of physical exercise and the association between a woman's height and weight all have a significant effect on her self-perceived health. The sign and direction of these effects are as expected. Thus, a lifestyle that includes non-smoking, physical exercise and an adequate BMI, does have a positive impact on a woman's subjective health.

Model (5) controls for women's objective health. The sign and magnitude of both short- and long-term health are as we would expect. Thus, the way a woman defines her health is significantly related to her objective state of health. Similarly to the results for the Spanish case, the objective indicator measuring long-term health is more closely associated with subjective health than is the indicator of short-term objective health. This further validates the means used to operationalise health[6]. As regards the impact of objective health measures on the class coefficients, the last column in Table 6.13 shows that the effect of class on health further declines, and especially among the unemployed.

It is interesting to examine the net effect of class -measured by the standard deviation of the sheaf coefficients of the class dummies- in more detail, and to consider how it is affected by the inclusion of the explanatory variables. This is the purpose of Tables 6.14 and 6.15. We can see that the introduction of women's age and civil status decreases the class effect by about five percentage points. The further inclusion of education brings the class effect down by some forty percentage points. When women's personal behaviour is taken into consideration, the class effect continues to fall by from around three to five points for both operationalizations of class. Finally, when the objective health measures are taken into account the class effect drops still further, shrinking by around five points for class with nine categories and by some two points for the first seven class categories. For the occupied class categories, after controlling for socio-demographic characteristics, around half of the class effect (41.4% for the nine categories of class) is explained by the combination of education, lifestyle variables and objective health. Education is the factor responsible for most of the explained class effect. The other explanatory variables have minor effects on the percentage of the

[6] As I argued in Chapter 5, the two indicators of objective health are not measured on the same scale in these models. This is why direct comparison of the values of the coefficients is not possible. However, similarly to the tests run in the Spanish case, I have carried out a number of analyses in order to compare the association between both long- and short-term health with subjective health. First, I have re-estimated the models, introducing both variables measured on a comparable scale. The coefficients show that the association between long-term health and subjective health is even larger and stronger than that between short-term health and subjective health. Second, I have also computed the predicted probabilities for each value of the dependent variable, keeping all the explanatory variables at their mean. The results show that, as in the Spanish case, the association between long-term health and subjective health is stronger for each value of subjective health than that between the short-term dimension and subjective health.

Table 6.13: Ordered probit for perceived health status. Coefficients for models fitted to women, (standard errors in parentheses). Number of observations: 9131. Reference categories (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Log-likelihood	-15800.8	-10280.9	-10206.9	-10114.3	-9160.9
Log-likelihood change		5519.9	74	92.6	953.4
***P*-value for the approx. likelihood ratio test of the parallel regression assumption**	0.33	0.21	0.19	0.12	0.1
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)					
Class I: Higher grade professionals, administrators and managers	**0.667**	**0.621**	**0.4**	**0.39**	**0.36**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**0.411**	**0.4**	**0.22**	**0.21**	**0.193**
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Class IIIab: Higher-grade routine nonmanual employees	**0.314**	**0.295**	**0.197**	**0.187**	**0.172**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Class IVabc: Small proprietors and employers and self-employed workers	**0.334**	**0.333**	**0.27**	**0.257**	**0.2**
	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)
Class V: Lower-grade technicians and supervisors of manual workers	0.054	**0.19**	**0.177**	**0.16**	**0.135**
	(0.07)	(0.07)	(0.07)	(0.08)	(0.07)
Class VI: Skilled manual workers	-0.053	-0.081	-0.07	-0.07	-0.1
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Class VIII: Unemployed	0.231	0.017	0.176	0.179	0.09
	(0.18)	(0.4)	(0.18)	(0.18)	(0.18)
Class IX: Full-time homemakers	**-0.197**	**-0.34**	**-0.312**	**-0.291**	**-0.27**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Age (RC: 25-34 age group)					
35-44 age group		**-0.103**	**-0.054**	-0.04	0.026
		(0.04)	(0.03)	(0.04)	(0.04)
45-54 age group		**-0.29**	**-0.186**	**-0.155**	-0.01
		(0.04)	(0.04)	(0.03)	(0.05)
55-65 age group		**-0.496**	**-0.36**	**-0.309**	-0.025
		(0.04)	(0.04)	(0.04)	(0.07)
Civil status (RC: Single)					
Married or cohabiting		**0.09**	**0.107**	**0.112**	0.035
		(0.03)	(0.03)	(0.03)	(0.03)
Separated or divorced		-0.023	-0.001	-0.036	0.027
		(0.04)	(0.04)	(0.04)	(0.04)
Widowed		**0.144**	**0.181**	**0.18**	**0.16**
		(0.07)	(0.07)	(0.04)	(0.04)
Education (RC: Level 1a: Inadequately completed General Elementary Education)					
Level 1bc: General Elementary Education or Basic Vocational			**0.251**	**0.23**	**0.21**
			(0.03)	(0.03)	(0.03)

Level 2ab: Intermediate Vocational or Intermediate General Education	**0.346**	**0.329**	**0.32**
	(0.02)	(0.02)	(0.02)
Level 3b: Lower-level Tertiary Certificate	**0.412**	**0.387**	**0.33**
	(0.03)	(0.03)	(0.03)
Level 3c: Higher education –Upper Tertiary Certificate-	**0.405**	**0.368**	**0.36**
	(0.04)	(0.04)	(0.04)
Smoke (RC: Non-smoker)			
Light smoker		**-0.07**	-0.03
		(0.03)	(0.03)
Moderate smoker		**-0.064**	**-0.072**
		(0.03)	(0.03)
Heavy smoker		-0.04	-0.03
		(0.03)	(0.03)
Drink (RC: Non-drinker)			
Very low		0.044	0.07
		(0.06)	(0.06)
Low		-0.043	-0.003
		(0.02)	(0.02)
Moderate		0.009	0.02
		(0.03)	(0.03)
Fairly high		-0.076	-0.005
		(0.05)	(0.05)
High		0.118	-0.051
		(0.19)	(0.2)
Very high		0.19	0.04
		(0.29)	(0.3)
Physical exercise (RC: No activity)			
Light activity		**0.057**	**0.025**
		(0.02)	(0.02)
Moderate activity		**0.132**	**0.11**
		(0.03)	(0.03)
Vigorous activity		0.341	0.3
		(0.6)	(0.42)
Relation between weight and height (BMI) (RC: Normal)			
Underweight		**-0.106**	**-0.09**
		(0.03)	(0.03)
Overweight		**-0.16**	**-0.11**
		(0.02)	(0.02)
Obese		**-0.41**	**-0.28**
		(0.02)	(0.02)
Short term dimension of objective health			**-0.128**
			(0.01)
Indicator of long term objective health			**-0.63**
			(0.01)

Note: The p-value for the approximate likelihood ratio test of the parallel regression assumption indicates whether the assumption has been violated. If it is less than 0.05 the parallel regression assumption is violated and can be rejected at the 0.05 level.

class reduction. The impact of education on health is also explained partly by the combination of lifestyles and objective health. Specifically, the impact of education on subjective health is reduced in the final model by almost a fifth of its original value. However, as the slight decrease in the coefficients for education shows, the explanation of the educational effect is much lower than the explanation of the class effect.

Table 6.14: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 6.13

Model	1	2	3	4	5
Class (nine categories)	.21	.2	.139	.134	.123
Class (seven categories)	.202	.19	.12	.11	.107
Education	-	-	0.175	0.162	0.15

Table 6.15: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table 6.13

Model change	From 1 to 2	From 1 to 3	From 1 to 4 for class From 3 to 4 for education	From 1 to 5 for class From 3 to 5 for education
Class (nine categories)	4.76	33.8	36.19	41.42
Class (seven categories)	5.9	40.59	45.54	47
Education	-	-	7.42	14.3

In sum, an analysis of the value of the class coefficients from model (1) to model (5) and the examination of the variation of the standard deviation of the sheaf coefficients along the same sequence, makes it possible to draw two main conclusions. First, in the first half of the 1990s, English women from different social classes enjoyed different levels of subjective health, class health inequality favouring the more privileged social classes. Second, after adjusting for age and civil status, around 50% of the total effect of social class with seven categories on health is explained by educational achievement, lifestyles and objective health (40% for class with nine categories).

6.4.2. Men's subjective health

The analysis of men's subjective health has been carried out in the same way as the study of this indicator for women. Thus, I have run five different ordered probit models that include the explanatory variables of the research. The first model includes only social class in order to analyse the net class effect on health. The second model includes social class and men's socio-demographic characteristics. The third model includes the control variables of model (2) and education. The fourth model comprises the variables of model (3) and variables that measure men's lifestyle variables. Finally the last model includes all previous variables, as well as controlling for men's objective health. The ultimate aim of this statistical design is similar to that of the previous analyses. That is, model (1) makes it possible to examine the impact of social class on health. Models (2) to (5) allow me to test for an explanation of the class effect. The results of the modelling process are set out in Tables 6.16, 6.17 and 6.18.

Table 6.16: Ordered probit for perceived health status. Coefficients for models fitted to men, (standard errors in parentheses). Number of observations: 8457. Reference categories (RC) in parenthesis.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Log-likelihood	-14151.1	-9435.8	-9389.6	-9293.2	-8435
Log-likelihood change		4715.3	46.2	96.4	858.2
***P*-value for the approx. likelihood ratio test of the parallel regression assumption**	0.63	0.004*	0.001*	0.001*	0.001*
Social class (RC: Class VIIab: Nonskilled manual workers and agricultural workers)					
Class I: Higher grade professionals, administrators and managers	**0.6**	**0.583**	**0.45**	**0.455**	**0.4**
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	**0.415**	**0.394**	**0.31**	**0.31**	**0.303**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Class IIIab: Higher-grade routine nonmanual employees	**0.336**	**0.289**	**0.26**	**0.27**	**0.25**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Class IVabc: Small proprietors and employers and self-employed workers	**0.226**	**0.21**	**0.2**	**0.21**	**0.17**
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Class V: Lower-grade technicians and supervisors of manual workers	-0.05	0.08	0.02	0.026	0.04
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Class VI: Skilled manual workers	**0.06**	**0.15**	**0.123**	**0.118**	**0.09**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Class VIII: Unemployed	**0.34**	0.67	0.68	0.774	0.5
	(0.17)	(0.17)	(0.17)	(0.4)	(0.17)
Class IX: Full-time homemakers	-0.5	-1.3	-1.2	-1	-1.2
	(0.73)	(0.74)	(1)	(1.04)	(-1.3)
Age (RC: 25-34 age group)					
35-44 age group		**-0.19**	**-0.16**	**-0.14**	**-0.12**
		(0.04)	(0.04)	(0.04)	(0.04)
45-54 age group		**-0.38**	**-0.32**	**-0.3**	**-0.17**
		(0.04)	(0.04)	(0.04)	(0.04)
55-65 age group		**-0.60**	**-0.51**	**-0.47**	**-0.2**
		(0.04)	(0.04)	(0.05)	(0.05)
Civil status (RC: Single)					
Married or cohabiting		**0.156**	**0.127**	**0.109**	**0.122**
		(0.03)	(0.03)	(0.03)	(0.03)
Separated or divorced		0.097	0.06	0.01	0.035
		(0.53)	(0.53)	(0.05)	(0.05)
Widowed		-0.075	-0.04	-0.03	-0.07
		(0.06)	(0.06)	(0.06)	(0.2)
Education (RC: Level 1a: Inadequately completed General Elementary Education)					
Level 1bc: General Elementary Education or Basic Vocational			**0.124**	**0.12**	**0.12**
			(0.03)	(0.03)	(0.03)
Level 2ab: Intermediate Vocational or Intermediate General Education			**0.255**	**0.24**	**0.22**
			(0.03)	(0.02)	(0.03)
Level 3b: Lower-level Tertiary Certificate			**0.33**	**0.3**	**0.299**
			(0.03)	(0.037)	(0.03)
Level 3c: Higher education –Upper Tertiary Certificate-			**0.39**	**0.399**	**0.385**
			(0.04)	(0.04)	(0.04)
Smoke (RC: Non-smoker)					

Light smoker	-0.011 (0.03)	-0.023 (0.03)
Moderate smoker	-0.06 (0.04)	-0.04 (0.03)
Heavy smoker	-0.04 (0.04)	-0.065 (0.03)
Drink (RC: Non-drinker)		
Very low	-0.03 (0.06)	-0.035 (0.08)
Low	-0.03 (0.02)	-0.05 (0.03)
Moderate	**-0.077** (0.03)	-0.04 (0.03)
Fairly high	-0.096 (0.06)	-0.102 (0.06)
High	0.13 (0.19)	0.065 (0.2)
Very high	-0.34 (0.3)	-0.1 (0.4)
Physical exercise (RC: No activity)		
Light activity	**0.17** (0.02)	**0.1** (0.02)
Moderate activity	**0.255** (0.03)	**0.18** (0.03)
Vigorous activity	-0.36 (0.24)	**-0.574** (0.25)
Relation between weight and height (BMI) (RC: Normal)		
Underweight	**-0.252** (0.05)	**-0.214** (0.07)
Overweight	-0.018 (0.02)	-0.005 (0.02)
Obese	**-0.34** (0.03)	**-0.234** (0.03)
Short term dimension of objective health		**-0.126** (0.01)
Indicator of long term objective health		**-0.652** (0.01)

Note: The p-value for the approximate likelihood ratio test of the parallel regression assumption indicates whether the assumption has been violated. If it is less than 0.05 the parallel regression assumption is violated and can be rejected at the 0.05 level.
*: From model (2) onwards the parallel regression assumption is violated. The analysis shows that the violation is due to the variable "age" as the other variables present a p-value higher than 0.05. I have run multinomial models for each case to see if different results would be obtained. The results were very similar and, since "age" is a control variable, I decided to continue to use the ordered probit models as they can be interpreted much more clearly.

Table 6.17: Standard deviation of the sheaf coefficients for the social class and education dummies from Table 6.16					
Model	**1**	**2**	**3**	**4**	**5**
Class (nine categories)	0.22	0.21	0.161	0.17	0.14
Class (seven categories)	0.22	0.2	0.158	0.162	0.13
Education	-	-	0.146	0.14	0.13

Table 6.18: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table 6.16				
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**	**From 1 to 5 for class From 3 to 5 for education**
Class (nine categories)	4.5	26.8	22.7	36.6
Class (seven categories)	9	28.2	26.36	40.9
Education	-	-	4.1	10.9

The coefficients of model (1) show the significant and strong association between a man's class and his subjective health status. Similarly to English women, English men show a social gradient in terms of the association between these two variables. The size of the health gap between any social class and the reference category (i.e. unskilled manual and agricultural workers) declines as we move from class I to class IX. The exception to this pattern are the unemployed (as we found in the case of women) who report a statistically significant better state of health than the reference class. As in previous models, the significance of the unemployed coefficient disappears once we control for age and civil status. The standard deviation of the sheaf coefficients for the class dummies shows the magnitude of the effect of class as a whole on health. We can see that it is similar to that for women.

When we control for socio-demographic characteristics (model (2)) most class coefficients become smaller while those that were statistically significant remain so (except for the unemployed). The pattern of the social gradient also remains the same. The most privileged classes are still the categories with the greatest probabilities, as compared to the reference category, of reporting good health.

The association between age and health is as we would expect. Thus, the older a man is the lower the probability he has of being healthy in comparison to that of a man from the youngest age group. The magnitude of the association is presented in Figure 6.3, which shows the age coefficients from the second column of Tables 6.13 and 6.16. It can clearly be seen that age has a greater impact on the subjective health of English men than women.

In terms of men's civil status, the results show that married men enjoy better subjective health than single men. The other categories do not show a significantly different probability of being healthy.

It is interesting to see how part of the class effect is explained by the introduction of men's educational achievements. The value of most class coefficients falls, dropping more in the case of the occupied than the non-occupied classes. The pattern of the social gradient is maintained, while the total effect of class decreases by about 28%. Thus, controlling for age and civil status and including education as an explanatory variable reduces both the differences between classes in terms of their impact on health and the impact of class as a whole. Similarly to the Spanish case and to the results for women, the greatest impact of education is on the occupied class categories.

(See Figure 6.3 in separate file)

The effect of education on health is significant and strong. It presents a positive and increasing shape in which the probability of reporting good health increases in all the consecutive levels of education. Figure 6.4 depicts the association between education and health for both women and men. The linear shape of the association can clearly be appreciated. Thus, the more educated individuals are, the better their self-perceived health is. Education does not show diminishing returns. As in the Spanish case, education has a greater impact on women's subjective health than on that of men.

The next set of explanatory variables is formed by men's lifestyle variables (see column 4 in Tables 6.16 and 6.17 and column 3 in Table 6.18). Of the various potentially unhealthy types of behaviour controlled for, moderate drinking proves to be slightly positive whereas smoking does not show any significant impact on men's subjective health. As for physical exercise, light and moderate activity leads to better health as compared to the effect of taking no exercise at all. A man's weight, and specifically, the relation between this and his height, is significant in determining his health. The two extremes of the BMI show a negative association with health as compared to that of a normal BMI.

The effect of the introduction of all these variables on the association between class and health is as follows: we observe a small increase in the class effect on the dependent variable. All but three of the class coefficients increase slightly; the exceptions are classes VI and IX, which decrease slightly, and class II that does not change. When we consider the class effect as a whole, we can see that this also increases slightly, as the standard deviation of the sheaf coefficients rises from 0.161 to 0.17 for the nine-category class schema and from 0.158 to 0.162 for the seven-category schema. The percentage reduction of the class effect from the initial model amounts to 22.7% for the nine-category classification and to 26.36% for the seven-category classification. Hence, the explanation of the effect diminishes by about four percentage points. As for education, the inclusion of lifestyle variables

(See Figure 6.4 in separate file)

explains a small part (4.1%) of the education effect on men's subjective health.

The final model in the sequence, model (5), controls for the objective state of health. As a general result, we can see that, similarly to the case of English women and to all individuals in Spain, long-term objective health is more closely associated with subjective well being than it is to short-term objective health. The more chronic and short-term health problems a man has, the worse his subjective health will be. Class coefficients show a generalised decline, suggesting that, after controlling for age and civil status, a man's objective health, lifestyle and education explain approximately 36% of the variance found in the relationship between class with nine categories and health (40.9% for class with seven categories).

It is very interesting to note that model (5) is the one that accounts for the largest percentage of explanation. That is, education, lifestyle and objective health outcomes are the combination of variables with the greatest explanatory capacity for both operationalizations of class. In relation to education, the fall in the sheaf coefficients (from 0.14 to 0.13) shows that objective health measures account for a small part of the effect that education has on subjective health.

6.4.3. Summary and conclusions

In short, the analysis presented in this section on women and men's subjective health has shown that social class has a statistically significant relation with health, and one that operates in favour of the more privileged social classes. Detailed analysis of the class coefficients for each model reveals that, irrespective of gender, education, lifestyle and objective health account for part of the class effect. Their explanatory capacity is larger for women's subjective health than for that of men (41.42% for the nine-category and 47% for the seven-category class classification as opposed to 36.6% and 40.9% respectively). In the case of both sexes, after controlling for age and civil status, education is a variable with considerable explanatory power, although this is stronger for women. Education and socio-demographic variables are by themselves able to account for approximately a third of the class impact (10 percentage points more in the case of women in the seven-category schema). Mechanism (2) is, therefore, supported, especially for women. The inclusion of certain types of behaviour as an explanatory variable, however, has different effects for women and for men. For women, they imply a further explanation of the class effect (approximately four percentage points). For men, in contrast, these variables lead to a small (about three percentage points) decline in the model's capacity to explain the class effect. We have also seen that the impact of education on self-perceived health is only slightly mediated by lifestyles, since it falls by just seven percentage points for women and four percentage points for men. This constitutes only weak support for mechanism (3), therefore, as lifestyle variables only mediate a small part of the effect of class on women's health and a very small part of the impact of education on men and women's health.

Finally, the introduction of objective measures of health results in a further decline of the class effect for all individuals, but especially for men. Both women and men show a small gap in the percentages of explanation of the class effect between the two operationalizations of class. The gap is one of about six percentage points in favour of the seven-category operationalization.

The graphs below (Graph 6.5 and 6.6) show most of these findings. The graphs give the value of the class coefficients for women and men across the explanatory models. It can be seen that the first model presents the strongest class effects and that as we move to the right of the x-axis (i.e. from the initial to the final model) the class coefficients decrease. Thus, as more of the independent variables are included in the model, the class effect on subjective health becomes weaker. There are slight gender differences in the pattern of explanation of the class effect. For women, on the one hand, this diminishes gradually as socio-demographic characteristics, education, lifestyle variables and objective health measures are introduced into the model. Women's class coefficients approach zero progressively as we move from model (1) to model (5). For men, on the other hand, although class coefficients are also closest to zero in the final model, the inclusion of lifestyle variables leads to a slight increase in the magnitude of the coefficients. The final model controls for men's objective health status, taking the coefficient closer to zero. Class coefficients have their lowest values in this model.

6.5. Summary and conclusions

In this chapter I have continued with the analysis of the relationship between social class and health at the individual level. The chapter has presented the statistical analysis of the *Health Surveys for England* from the early 1990s. The analysis has matched that of the Spanish case. Hence, the chapter examines the two dimensions of health (i.e. the objective and the subjective dimensions) that I argued in the chapter on methodology allow for the effective operationalization of the dependent variable. As in Chapter 5, the two main questions addressed in this chapter are: is individuals' health related to social class and, if so, what factors account for the class effect on health? In other words, are the theoretical mechanisms presented in the second chapter able to explain why social classes enjoy different levels of health? Here I will summarise the main findings of the analysis of the English case, and highlight the way they relate to the explanatory mechanisms posited in this thesis.

In terms of the first aim of the chapter as well as of the empirical analysis of the thesis at the individual level, the empirical evidence presented here confirms that class does have a statistically significant impact on health. The ordered probit models run for subjective health and the multivariate regression models computed for objective health show that this association is significant. The magnitude and statistical significance of the class coefficients from the initial model (the one in which class is the

(See Graph 6.5 in separate file)

(See Graph 6.6 in separate file)

only independent variable) show that the more privileged social classes enjoy better health than their less privileged compatriots. The significance of the association varies by health indicator. We have seen that the strength of the relationship between class and health is very similar for women and for men. We have also seen that the strength of this relationship varies for the different dimensions of health. It is strongest for the subjective dimension of health, then for the indicator of long-term objective health, and finally for short-term objective health. We have seen that this is the case for both women and men. As in the Spanish case, irrespective of gender, the long-term indicator of health is more closely related to the subjective dimension of health than the short-term indicator is.

We can see, therefore, that the analysis presented in the chapter provides empirical evidence in favour of giving a positive answer to the first research question. In other words, in England, social class does indeed affect individuals' health. Furthermore, the sign of the association is clear: the more privileged social classes enjoy better health than the less privileged classes. Once the association has been confirmed, the next question addressed in the chapter concerns the possible explanatory mechanisms for this relationship. As in the previous chapter on the Spanish case, the analysis has been organised so as to make it possible to test the theoretical explanation posited in this thesis. The sequence of the models has been structured in such a way as to make it possible to test the significance of each group of independent variables in accounting for the class effect. Thus, we have seen that the rationale behind the formalization of models (2) to (5) is to examine whether mechanisms (2) and (3) hold. Very briefly, it should be remembered that mechanism (2) argues that an individual's class affects her health status through the mediating impact of education between class and health. The third mechanism posits that the association between class and health can partly be attributed to the mediating effect of lifestyle variables, and that these variables also play a mediating role between education and health.

The methodology employed to test for these mechanisms, similar to the one used in the previous chapter, has consisted in observing how the class coefficients change as the independent variables are added to the model. The control and explanatory factors have been incorporated in the following way. Socio-demographic characteristics, that is, age and civil status, have been included as control variables in the second model. In the third model, education has been introduced as an explanatory factor. The fourth model includes lifestyle as an explanatory variable. Finally, for subjective health status, the fifth model includes individuals' objective health. The examination of, on the one hand, the class and education coefficients and, on the other hand, the sheaf coefficient of the standard deviation of the class and education dummies, has made it possible to test the mechanisms of explanation. I will briefly summarise now the evidence presented in this chapter, and above all the evidence related to the theoretical explanation posited in this thesis.

In relation to the theoretical framework's capacity to explain the class effect for the different dimensions of health we have seen that for both women and men this is greatest in the case of long-term health, then subjective health, and finally short-term health. The only exception is men in the seven-category operationalization of class, for whom the order of explanation is first the subjective dimension, then the long-term objective dimension, and finally the short-term objective dimension. However, the gap between the first and the second dimensions is very small (just 2 percentage points). The previous revealed the same order of explanation applied in the Spanish case. Thus, the explanatory model posited in this thesis can account best for the impact that an individual's social class has on how her long-term health, then the effect of class on how her own perception of her health, and finally for the class impact on her objective short-term condition. A possible explanation for this order of classification was offered in the previous chapter. There it was argued that the short-term indicator of health might be subject to random fluctuations to which long-term health is not. Given that long-term health has a stronger correlation with the subjective dimension compared to that of the short-term dimension, it can be seen why the subjective dimension of health is the second indicator in order of explanation.

To test the validity of the mechanisms it is also necessary to know which variables are best able to account for the class effect for each of the dimensions or indicators of health. It has been shown that in the case of the long-term indicator, education has the greatest capacity to explain the class effect for men, whereas for women, it is the group of all the independent variables. For the indicator of short-term objective health and for the subjective health indicator for both women and men, the class effect is explained best by the final model, that is, the one that includes age, civil status, education and, lifestyle variables for the objective dimension, and these variables plus objective health for the subjective dimension. In every case, except for the long-term dimension for men, the percentages of explanation of the nine-category class schema and the seven-category schema show a small gap in favour of the latter, although the difference is small.

All this would appear to offer some empirical support for the second mechanism of explanation. Similarly to the results for Spain, education acts as a significant mediator between the social class of an individual and her health condition. The class of an individual does, therefore, influence her health through the effect of education. Knowledge about health issues, adequate use of the health care system, and the capacity to understand a doctor's advice may provide the link between class and health outcomes. However, we should note that this mediating effect varies for class operationalised in nine categories or in seven categories and for each indicator of the dependent variable. Thus, education has a smaller mediating effect between class with nine categories and short-term objective health than between class with seven categories and health. We would expect this finding, since the occupied class categories generally show higher levels of educational achievement. For all individuals and for the two operationalizations of class the mediating effect of education is largest for the subjective dimension, followed by the indicator of short-term objective health, and finally for the indicator of long-term objective health.

The evidence summarised so far also provides some support for the third mediating link between class and health, although this support is very weak. We have seen that lifestyle variables account for part of the class effect for women in all cases and for men in the case of the objective health both in the long and short run. It seems, therefore, that lifestyle does partly mediate the impact of class on health. However, the percentages of explanation are always very low: around five percentage points. Furthermore, this mechanism maintains not only that lifestyle acts as a mediator between class and health, but also that it mediates between education and health. In this respect, all the models show that a very small part of the impact of education on health is accounted for by individuals' lifestyles. The percentage reduction of the education effect varies by gender and by the dimension of health in question. It is approximately twice as high for women than for men in all the cases. For women, lifestyle has the highest mediating effect between education and health first for the long-term objective health indicator; second for the indicator of short-term objective health; and thirdly for the subjective dimension. For men, the order of the indicators is first the subjective dimension; second the long-term indicator; and thirdly the short-term indicator. It should be remarked that in all cases, the mediating effect is indeed very small. Thus, the evidence shows that personal behaviour and characteristics (smoking and drinking behaviour, physical exercise, and BMI) do to some extent mediate between an individual's class and her health condition. It could be said that, the nature of the link is direct through the connection between class and lifestyle, but also indirect as a result of the link between education and lifestyle, since education is a major determinant of class.

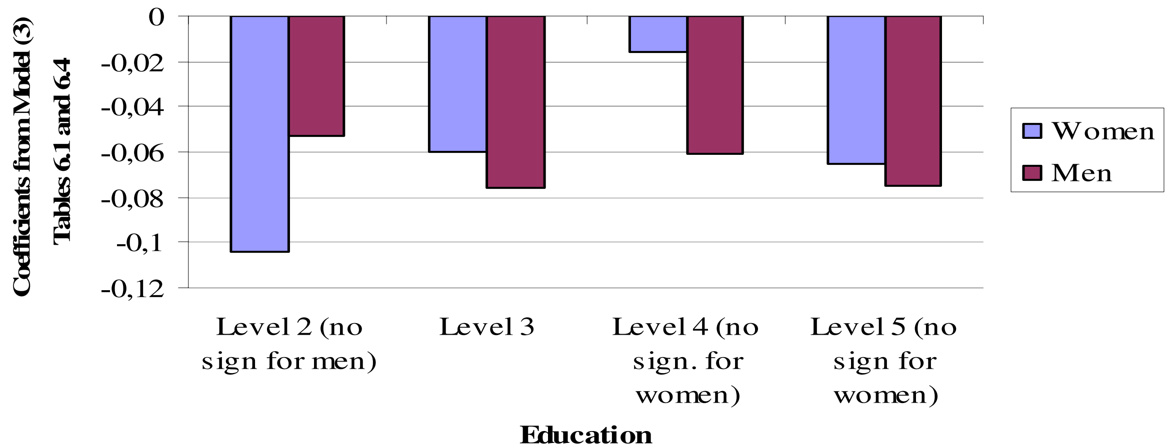
Finally, let us consider the class effect that is not accounted for by the independent variables of the research. This question can be posed as follows: what are the factors that might explain the class effect that persists even after controlling for socio-demographic characteristics, education, lifestyles and objective health? In other words, what other factors could be mediating the effect of class on individuals' health? The exact measure of the unexplained class effect is given by the size of the class coefficients in the final models. We have seen that although the class coefficients that remain statistically significant and other than zero are different for each health indicator, there are some similarities. The coefficients of class V and VI diverge from zero in some cases, especially for long-term objective health and for subjective health.

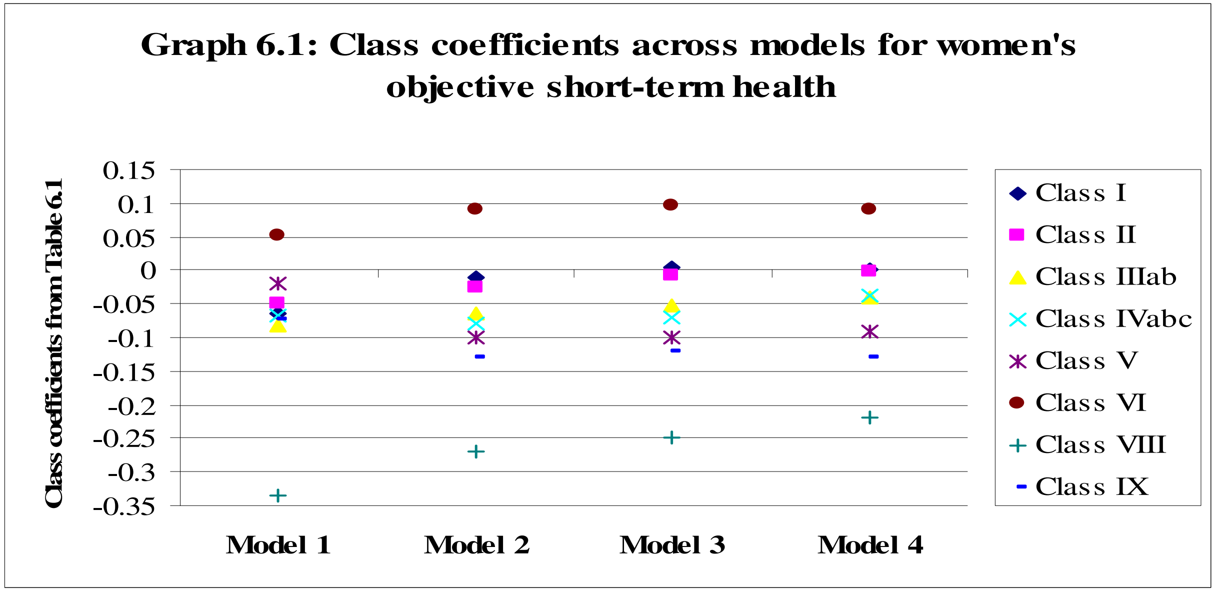
As argued in the previous chapter, one explanation for this residual effect can be found in the literature on occupational health risks. The argument is that there are certain occupations that make up these class categories that imply high job strain and effort-reward imbalance. Individuals in these occupations are more likely to suffer from poor health than those in occupations with low job strain and no effort-reward imbalance. This reasoning would support the first explanatory mechanism posited here, which argues that social class has an impact on health through the specific effect of working conditions. Thus, the employment conditions of certain occupations would account for part of the health divergence among social classes. Hence, the evidence presented in the literature on occupational health as well as the results of this chapter, partly support the first mechanism of explanation. However, we should treat this conclusion with considerable caution, as it has not been tested empirically. Thus, it should only be taken as a suggestion to try understanding the class effect that remains unexplained by the final model.

All in all, the empirical evidence presented in the two chapters devoted to the analysis of the association between social class and health at the individual level does enable us to conclude that an individuals' social class has a significant effect on how her subjective and objective health is both in the short- and long-run. The sign of the direction is the following: individuals in the more privileged class categories enjoy better health than those in the less privileged class categories. The strength of the association varies by sex and for different dimensions of health. The second main finding is that the link between class and health is partly explained by the combined effect of different variables such as individuals' education and lifestyles. The specific weight of each of these factors on the explanation is different for men and women and also for the subjective and the objective dimensions of health.

The final chapter will consider the link between the theoretical arguments and the empirical evidence of the thesis in more detail. It will do so by comparing the results from Great Britain and Spain to test whether the mechanisms between class and health are, as hypothesized, similar in both societies. It will also attempt to pull together the evidence presented at both the aggregate and the individual level. The chapter will further examine the remaining class effect in the final models in a bid to suggest additional and complementary explanations for the residual class effect. Chapter 7 will also try to provide some answers to some of the questions that have been raised during the empirical analysis that have yet not been answered. The chapter will end with a discussion of questions suggested for future research such as why social class differences in subjective health persist even when objective measures are included into the explanation.

Figure 6.1: Association between education and short-term objective health




Graph 6.1: Class coefficients across models for women's objective short-term health
Class coefficients from Table 6.1
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
Model 1
Model 2
Model 3
Model 4
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX

Graph 6.2: Class coefficients across models for men's objective short-term health

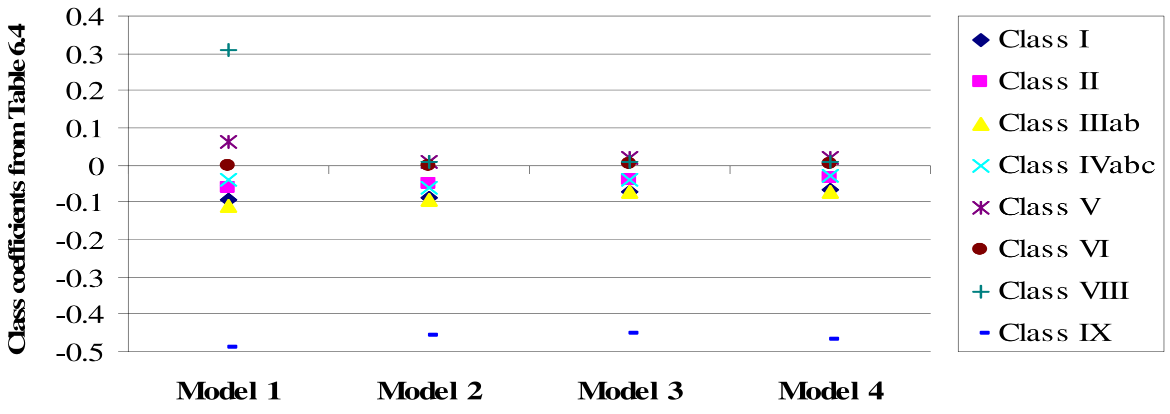
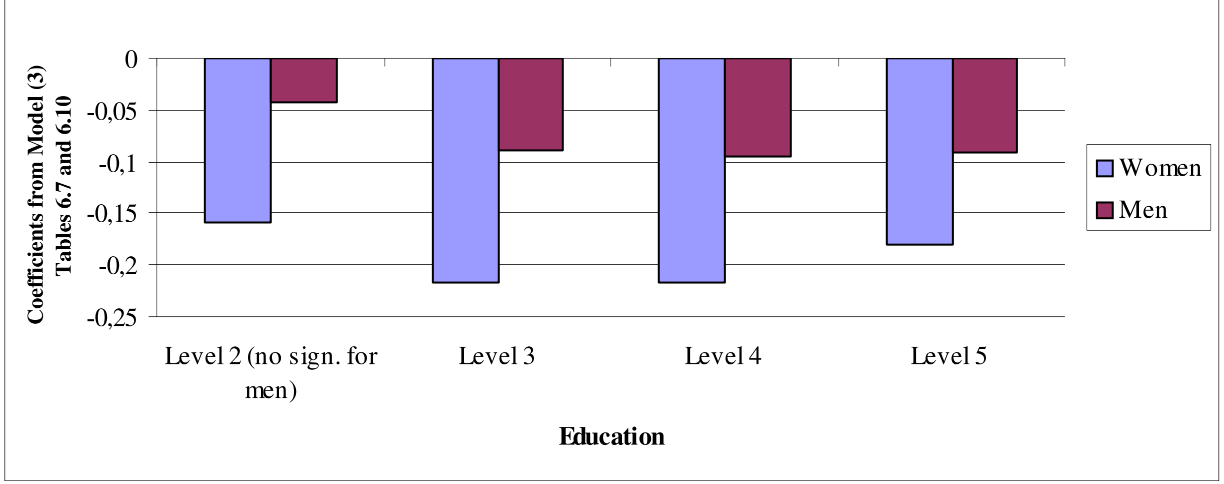
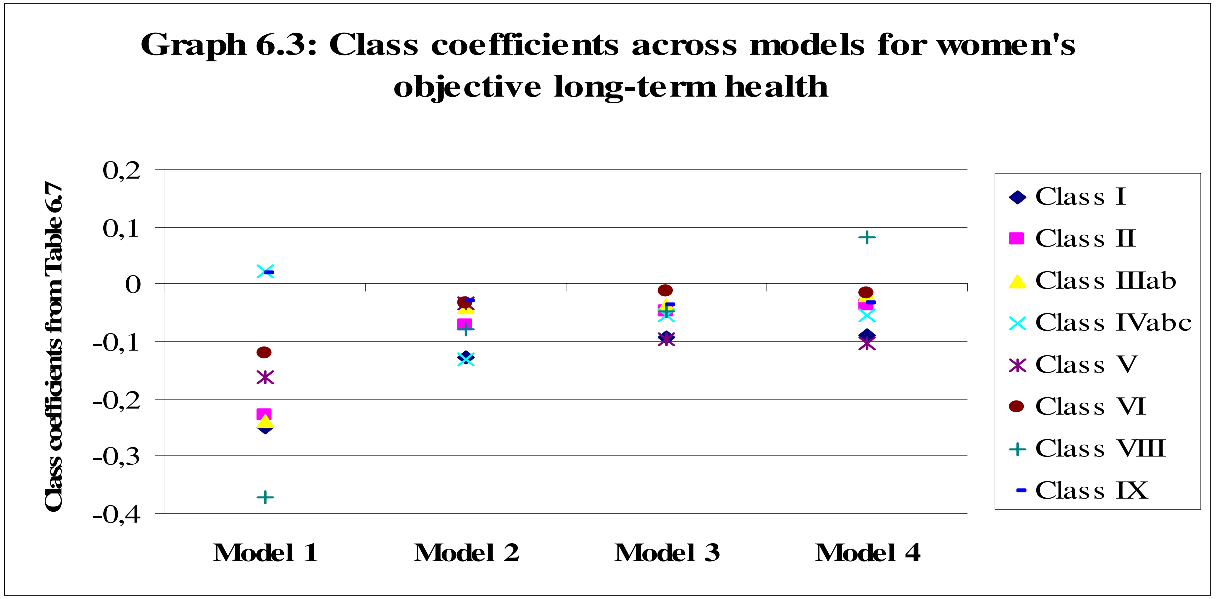
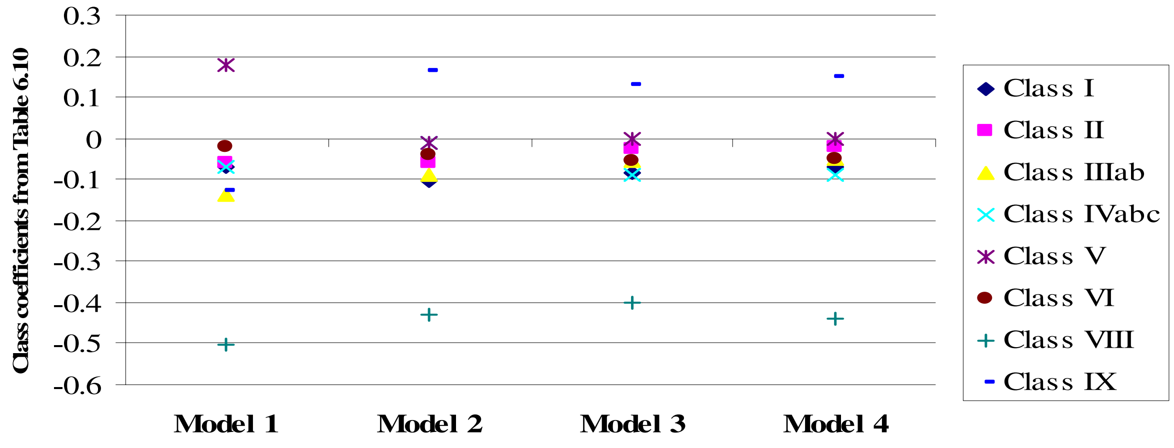


Figure 6.2: Association between education and long-term objective health




Graph 6.3: Class coefficients across models for women's objective long-term health
Class coefficients from Table 6.7
0,2
0,1
0
-0,1
-0,2
-0,3
-0,4
Model 1
Model 2
Model 3
Model 4
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX

Graph 6.4: Class coefficients across models for men's long-term health



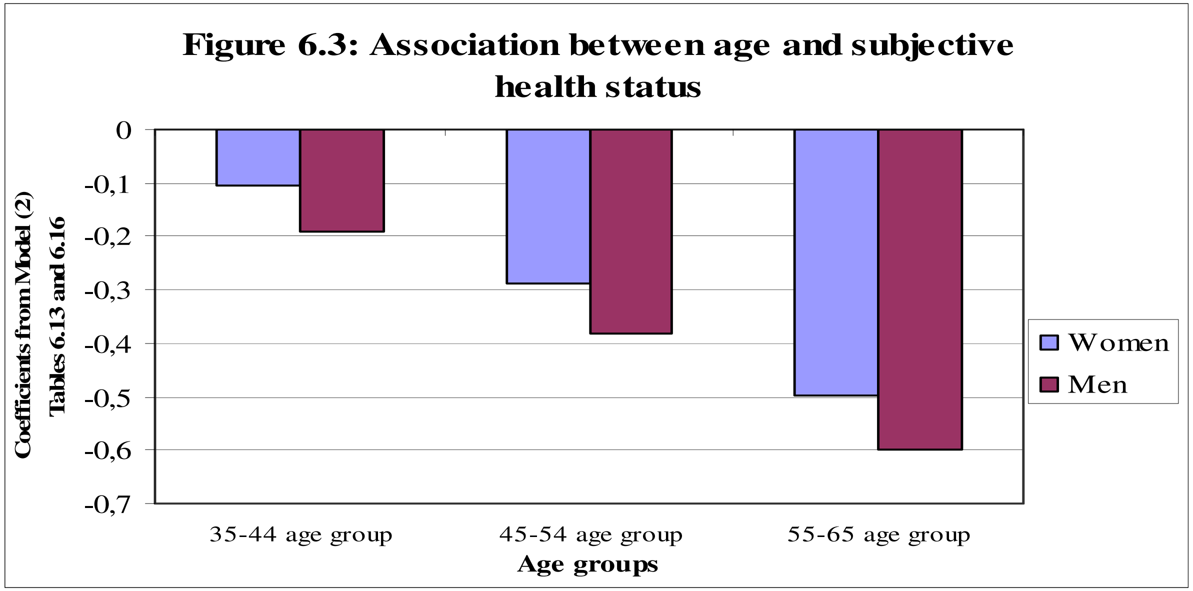
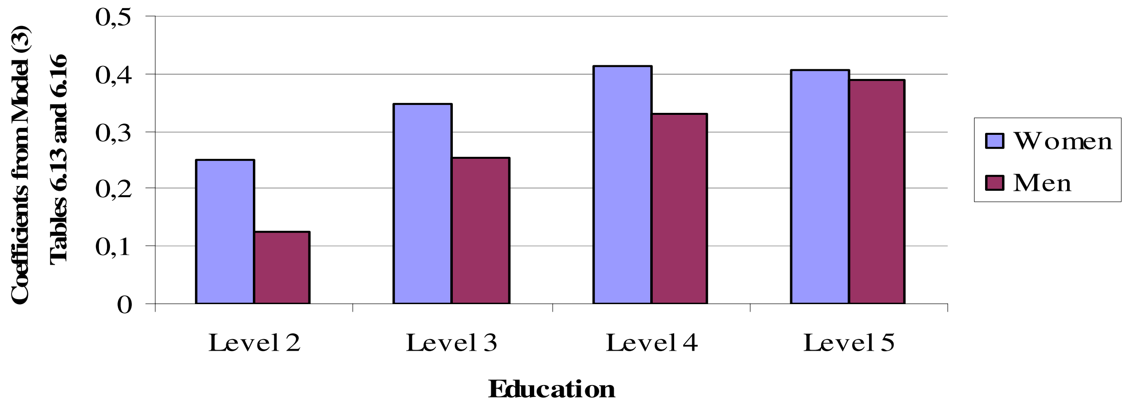
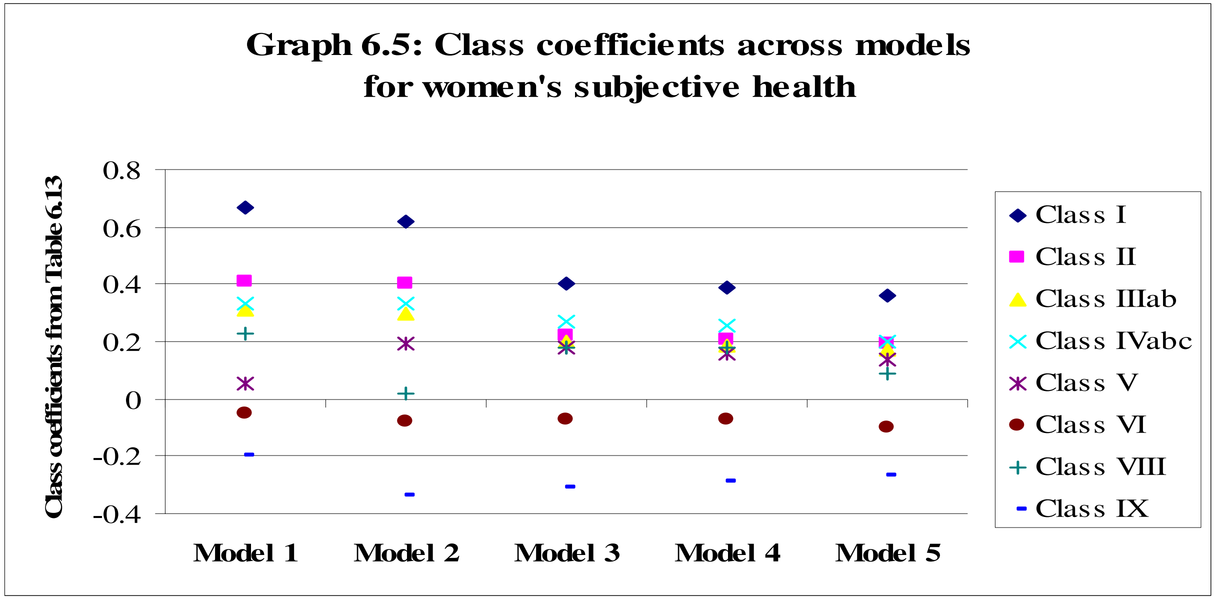
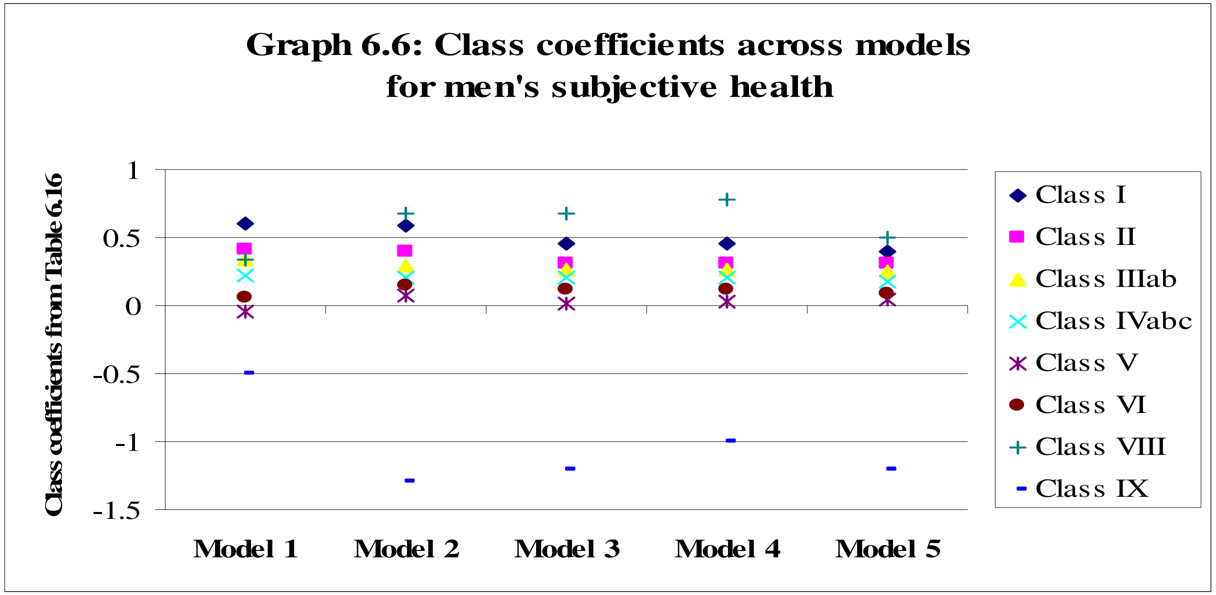


Figure 6.3: Association between age and subjective health status
Coefficients from Model (2) Tables 6.13 and 6.16
0
-0,1
-0,2
-0,3
-0,4
-0,5
-0,6
-0,7
35-44 age group
45-54 age group
55-65 age group
Age groups
Women
Men

Figure 6.4: Relationship between education and subjective health status




Graph 6.5: Class coefficients across models for women's subjective health
Class coefficients from Table 6.13
0.8
0.6
0.4
0.2
0
-0.2
-0.4
Model 1
Model 2
Model 3
Model 4
Model 5
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX



Graph 6.6: Class coefficients across models for men's subjective health
Class coefficients from Table 6.16
1
0.5
0
-0.5
-1
-1.5
Model 1
Model 2
Model 3
Model 4
Model 5
Class I
Class II
Class IIIab
Class IVabc
Class V
Class VI
Class VIII
Class IX

CHAPTER 7: CONCLUSION

This thesis has sought to explore the mechanisms that lie behind health inequalities among individuals, and more specifically to examine the processes that link the structure of inequality of developed societies and health outcomes. The initial conundrum that inspired this thesis was the realisation that in developed societies, despite decades of economic growth and social development resulting in an overall increase in the level of well being, the health gap among individuals has continued to expand. Does social position play a significant role in this trend? Is there any systematic, consistent and significant association between the class structure and health outcomes? Moreover, is this association similar across developed societies? The evidence presented in the second part of the thesis makes it possible to answer these questions. I shall summarise the main findings through a comparative analysis of the results for England and Spain. This summary will also relate the findings to the theoretical mechanisms that the thesis has tested, that is, mechanisms (2) and (3). The summary will include some tables with the most relevant evidence to test the explanatory mechanism. However, I will start by summarising the main objectives that the thesis has accomplished in each chapter. I will end this concluding chapter by addressing some suggestions for future research.

7.1. Linking social class and health: Summarising the argument and the analysis

In order to answer the research questions posed in Chapter 1, in Chapter 2 I outlined a theoretical framework that could be tested empirically. I argued that social structure influences health through the distribution of certain resources such as material resources or health-related behaviour that ultimately result in divergent lifestyles. Educational achievements also influence the use of these resources and therefore, living habits. An essential component of a social class is occupation: individuals' employment conditions also affect their health. Moreover, the shape of a social structure has an influence on health at an aggregate level since social policies are partly the result of the interests of social classes. Four mechanisms were specified so that the framework could be tested. Mechanisms (2) and (3), those that relate class and health through education and lifestyles, have formed the centre of the empirical analysis. Chapter 3 presented the data, defined and operationalised the research variables and discussed the statistical tools necessary to conduct the empirical analysis. The fourth chapter has provided an answer to the first research question. The evidence presented for both the Spanish and the English case has shown that health is a resource that is unequally distributed among social classes and that in most cases the distribution takes a form of a social gradient with the following characteristics: the most privileged classes are healthier than the other individuals in the class structure. The evidence also shows that the distance between classes are greater in England than in Spain, even though the differences are small. The remaining empirical analysis in the dissertation sought to move from description to explanation, that is, to provide some evidence that would make it possible to analyse the second research question. Hence, as well as demonstrating that there is a health gap among social classes, Chapters 5 and 6 have also tested the two mechanisms that capture some of the class effect on health at the individual level. I shall now consider the main findings from those two chapters.

7.2. The association at the individual level: Summarising the evidence

7.2.1. Comparing the results from England and Spain on the objective short-term dimension

The comparison of the English and the Spanish results proves useful in order to further understand the influence that an individual's social class has on her short-term health. This comparative analysis, as well as the one done for the two other dimensions of health, is done with the further aim of examining whether the mechanisms of explanation from the theoretical framework work in a similar way in both countries. In other words, as countries have been taken as contexts in which to test the theoretical framework, it will provide evidence that will allow us testing to what extent the link between the social structure and health is similar in developed societies. Eight main points emerge from this comparative analysis. First, the effect of class on individuals' short-term health is weaker than the impact class has both on how individuals perceive their health and on their long-term objective health (the only exception is the case of Spanish men, for whom class has a slightly smaller effect on their long- as opposed to short-term health). Class coefficients were found to be of a lower magnitude when we analysed the association between social class and the two other health indicators. Second, the pattern of explanation of the class effect displays some similarities, but also some differences in the two cases. Hence, whereas in Spain it is education the variable that, after controlling for socio-demographic characteristics, emerges as the variable that achieves the highest explanation of the class effect, in England it is the association of lifestyle variables and education. This is an important finding as it means that classes behave in such a way in

England that has some significant impact on the health gap whereas this is not the case in Spain. Third, in relation to the percentage of the class effect that the final model is able to account for, this is slightly higher in England than in Spain. Thus, the percentage reduction in England is around 30%. For Spanish women it is around 20% and for Spanish men it is lower (18% for the nine categories and 9.1% for the seven categories). The fourth point arising from the comparative analysis is that countries differ in terms of the operationalization of class that the model explains best. More specifically, in Spain, irrespective of gender, the explanatory framework works better for the nine classes whereas in England it achieves better results for the occupied class categories. The fifth point emerging from the comparison concerns the effect of education itself on health, which is greater for women in England than in Spain, but stronger for men in Spain than in England.

The sixth point that I would like to address derives from a closer examination of the statistical significance of the class categories. Although most class coefficients are statistically significant in the initial model, the size of some of them is small indicating that although class influences the objective well-being in the short-run, its impact is smaller than the one it has on the two other indicators of health. As we also saw from the change of the values of the standard deviation of the sheaf coefficients, after controlling for age and civil status, a large part of the class effect is explained by individuals' education. This point should be highlighted as it is lends support to the second explanatory mechanism posited in the thesis: the relation between class and health is partly explained by differences in educational achievements among classes as the changes in the class coefficients from model (2) to model (3) show.

The seventh main point to be noted stems from a closer analysis of how class coefficients change across the sequence of models. In general, all class coefficients behave in a similar way across models. There are however some points that should be emphasised. Firstly, the professional classes lose their statistical significance in all cases once we control for socio-demographic characteristics and education, the exception being English men from class I who continue to have a significant coefficient in models (3) and (4). Secondly, in England the third class –the higher routine non-manual employees- stands out as the category that shows the best health status in all models, whereas in Spain this is true of class IVabc (i.e. the petty bourgeoisie). Thirdly, classes V and VI in all cases do not present a significantly different association with short-term health to the one presented by the reference class except class VI for Spanish men, which has a slightly better health score than the reference category.

The final remark derived from the comparative analysis concerns the adequacy of mechanism (3). This mechanism posited that lifestyles mediate part of the effect of class on health and part of the effect that education has on health. In relation to the first link, class coefficients remain almost unchanged when we introduce living habits in model (4). We have seen that the mediating role of lifestyles is only positive for England. The mediating effect is in any case very small. As for the second link, all coefficients of education decline when we incorporate individuals' lifestyles into the model, although the decline is small. The percentage reduction of the education effect for women is larger in England than in Spain (16.2% as opposed to 11.76%) whereas for men it is two times greater in the Spanish case (12.12% as opposed to 6 %).

The data, therefore, provides only weak support for the third mechanism, as we have seen that only a small part of the association between education and health can be attributed to the mediating effect of lifestyles, and that these only mediate a very small part of the relation between class and health in England.

7.2.2. Comparing the long-term health results between England and Spain

The examination of the results on long-term health in both countries clearly indicates that individuals' class has a significant effect on their long-term objective health. The impact is greater than the effect on individuals' health in the short-term, but weaker than the impact on their subjective health. A more detailed comparative analysis highlights seven major points that should be considered.

First, in relation to the impact of class as a whole, class has a stronger effect on women in both countries. Hence, in the initial model more class categories are significant and their size is greater for women than for men. So too is the standard deviation of the sheaf coefficients for the class dummies except for the nine class categories in England, which present a similar value for all individuals.

Second, in relation to the models' explanatory capacity, this is greater for women than for men for both operationalizations of class. The percentage reduction of the class effect in the final model is therefore greater for women in both England and Spain.

Third, in terms of the variables that best account for the variations in the long-term health of the different classes, we have seen that, as was the case of short-term health, after controlling for age and civil status**,** England achieves the highest class reduction when living habits and education are taken into account, whereas education has the greatest explanatory power in Spain, although the explanation of the class effect for economically active women in Spain increases by one point when lifestyles are considered. In other words, while dissimilar lifestyles among women and men from different social classes in England contribute to their divergent health status in the long run, in Spain they do not seem to have any effect on either men or women's health.

Fourthly, it is also interesting to note that, similarly to what we saw with respect to short-term health, the models explain better the nine-category operationalization of class in Spain, whereas in

England the seven-category schema is much better explained for women, and the nine-category for men. The gap between the nine- and the seven-category schema is approximately equal to 15% in Spain and to 10% for English men, whereas for English women the difference in explanatory power of the models as applied to the seven- and the nine-category schema is much larger at almost 25% points.

Fifthly, regarding the change in the value of the class coefficients as we move from the first to the last model, we can see that the coefficients gradually approach the value zero. That is, differences with the reference category are explained by the variables included in the models. In the Spanish case this is particularly evident, as most coefficients lose statistical significance and have values very close to zero. This is also the case in England: coefficients diminish and drop to almost zero, although some of them, especially for men, do not lose their statistical significance (i.e. they continue to have a distinctive health score to the reference category).

The sixth point arising from the comparative analysis concerns the adequacy of mechanism (2) in explaining part of the link between class and health. Education has the hypothesised effect on class; hence, class coefficients partly disappear when education is included for all individuals in both countries. The educational effect is especially important for English men for both categories of class. For Spanish men and women, the inclusion of education means a fall of approximately seven percentage points in the class effect for the nine-category class schema, and of 15 percentage points for the seven-category schema. Moving from the second to the third model shows that the second mechanism of the analytical framework is supported, although the scant explanation of the class effect should be noted.

Finally, in relation to the third explanatory mechanism, we should note the impact that lifestyles have on both class and education coefficients. In the case of class, the coefficients decline a little in England and rise slightly in Spain (except for the nine classes for women that go down slightly). Class and long-term health, therefore, only seem to be very weakly mediated by lifestyles, and only in the case of England. As for the association between education and health, in both countries, personal behaviour helps to explain a small part of this effect. In terms of gender differences, similarly to the short-term indicator, personal behaviour accounts for a larger part of the educational effect for women in England and for men in Spain. Thus, living habits play only a slight mediating role between education and health. We can conclude, therefore, that the capacity that lifestyles have to explain the link between, on the one hand, class and long-term health, and on the other hand, education and long-term health, is very small. The data, therefore, constitute only very weak evidence in favour of the third explanatory mechanism.

7.2.3. Comparing the results for subjective health between England and Spain

In this sub-section I will conclude the comparative analysis by examining the results on the subjective dimension of health. I will first consider women and then men.

The comparison of the English results with those for Spain shows that the association between class and subjective health for women is fairly similar in both countries: the more privileged social classes enjoy a better health than less advantaged categories. All class coefficients present a much smaller coefficient in the last model as compared to that of the initial model. In both countries, the values of the initial coefficients show that the association between class and health is strongest for subjective health.

As for the patterns of explanation of the class effect, the occupied class categories are largely accounted for in both countries: the class effect falls by some 50% points. Thus, the combination of all the independent variables accounts for about half of the original class effect, with education being the variable that explains the largest part of the variation. The pattern of explanation of the nine categories of class presents, however, some divergence. While age and civil status control a large part of the effect in Spain (i.e. 42.48%) they only control for a small part in England (i.e. 4.76%). The introduction of education in model (3) implies a significant explanation of the class effect in both countries, thereby providing some support for mechanism (2) in both countries. The introduction of living habits in the fourth model leads to a further decrease in England and a small increase in Spain, demonstrating that, similarly to what we discovered with respect to the other dimensions of health, part of mechanism (3) is only very weakly supported in England but not in Spain. Finally, objective health measures result in an added explanation of class which reaches its limit in both countries. The percentage of the total class effect accounted for is about 25% points higher in Spain than in England.

In short, the pattern of explanation of both the nine categories and the occupied categories is similar in both countries, except for the divergent effect of lifestyles. The model that achieves the highest explanation for the two class operationalizations in both countries is also similar: it is model (5), that is, the model which, while controlling for age and civil status, includes education, lifestyles and objective health measures. The percentage of the class effect explained is similar for the seven class schema, but when applied to the nine-category classification it is much greater in Spain than in England.

In relation to the explanation of the education effect, in both countries lifestyle variables imply a small reduction, thereby providing some support for mechanism (3), although this is limited given that the percentage of explanation is small. The combination of personal behaviour and objective health measures reduces the original effect by about one fifth.

As for the results for men, the following points should be noted. First, the association between class and subjective health is rather similar in both countries, the more privileged social classes enjoying better health than their counterparts further right on the social class axis. Second, after controlling for all independent variables, the magnitude of the coefficients is significantly reduced although the statistical significance is maintained in most cases. The value of the coefficients in the final model is broadly similar in both countries, although especially in the case of the professional classes, they are slightly higher in England. There is one category that differs between countries in terms of the evolution of the coefficients: lower-grade technicians and supervisors of manual employees. Class V presents a significant and better health status than the reference category throughout the explanatory framework in England but that it is not the case in Spain.

Regarding the explanation of the total class effect, England and Spain present a similar pattern that also mirrors the results found for women. After controlling for age and civil status, a third of the effect on subjective health of the occupied class categories in both countries is explained by men's education. Men's lifestyles imply a small increase in the class effect in both countries, while objective health implies a decrease in the effect in both countries. The only difference with women (and indeed with the rest of the health indicators), therefore, is the effect that lifestyles have for men in England, as in this case they imply a slight increase in class differences. The effect on health of class with nine categories achieves its greatest percentage of explanation in Spain, i.e. 55.3%, when education is taken into account after controlling for socio-demographic variables. For the class operationalization that only includes the occupied categories, model (5) results in the largest (38.4%) reduction of the class effect. In the English case, the effect of education, lifestyles and objective health reduce the class effect to its lowest value, independently of the class operationalization used.

Similarly to women, education therefore accounts for a significant part of the class effect, as would be expected in the light of mechanism (2). Neither in Spain nor England, in contrast, do lifestyles link class and perceived health. On the contrary, they have the opposite effect, that is, they lower the explained percentage of the class effect, although the percentage change is very small. Mechanism (3) also posits that lifestyles connect class and health through the link between education and health through life styles. The evidence shows that this is not the case for Spanish men. The small decrease in the standard deviation of the sheaf coefficient for the education dummies in England only provides very weak support for this argument. Hence, there is only the most superficial evidence in favour of this mechanism.

7.3. Linking class and health: Testing the mechanisms of explanation

The empirical analysis presented in the second part of the thesis has enabled me to carry out a detailed examination of the two explanatory mechanisms that the thesis set out to study that is, mechanisms (2) and (3). The study of the association between class and health in the mid-1990s in England and Spain has provided clear evidence for evaluating the two mechanisms. Tables 7.1, 7.2 and 7.3 summarise the principal evidence presented in Chapters 5 and 6. They show the initial and final class and education effect on health as well as how these effects have been varying as independent variables have been included in the model. Five clear and consistent points can be concluded from the evidence presented in the thesis.

First, age and civil status have a significant and considerable effect as controlling variables. Tables 7.1 and 7.2 show that models need to be adjusted for these two variables before entering into the explanation, as in both countries, they account for much of the class effect on all indicators of health. The controlling effect is, as we would expect, greatest for long-term health and larger for the nine classes than for the seven classes.

Second, mechanism (2) proves significant, but is has only a moderate impact. We have seen that in all cases, the introduction of education in the models led to a decline in the class coefficients, as well as in the effect of class as a whole. In other words, differences in educational achievements account for part of the class differences in objective and subjective health. The exact mediating effect of education between class and health presents some variations between men and women, between countries and between health indicators; nonetheless, its effect is consistent and clear. Tables 7.1 and 7.2 show that the effect of education is important when analysing subjective health, and to a lesser extent when examining short-term health in England. We can also see that, as we would expect, education has a stronger mediating effect on the relation between class with seven categories and health than on the link between class with nine categories and health. Hence, this finding confirms the validity of arrow *a* from Figure 2.5.

Third, the evidence testing mechanism (3) is ambiguous and provides almost no support for this mechanism. The analysis points to two clear conclusions. First, lifestyles account for, and only in some cases, just a very small part of the relation between education and health. Table 7.3 shows that the mediating effect is clearest with respect to the indicator of short-term health. In all cases the effect is small and never greater than 18 percentage points. Second, lifestyles do not mediate between class and health. We can see in Tables 7.1 and 7.2 that they only reduce the effect of class in some cases in England and that the reduction is always very small (never more than 9%). In Spain, they have the opposite effect, namely, they result into a smaller percentage of explanation of the class effect. We can only safely conclude that different lifestyles play a negligible role in explaining the health divergence among classes in England since they only account for a very small part of the educational impact on health. Hence, arrow *b* and its association with *f* in Figure 2.5 are only weakly supported, whereas arrows *c* and its continuation on *f* are not supported.

Fourth, we have seen that the theoretical framework operates in a rather similar way in the two countries under analysis. In both countries, education accounts for part of the class effect. The only small difference is with respect to the influence of lifestyles in explaining the class impact on health. However, we have seen that this effect is so small that the difference cannot be considered relevant. Hence, the evidence suggests a similar pattern of explanation in England and in Spain.

Finally, even after controlling for age and civil status and including in the analysis mechanism (2) and (3), a large part of the class effect remains unexplained. Tables 7.1 and 7.2 show that the explanatory power of the models differs according to the health indicator in question: the impact of class on the indicator for short-term health is the least explained, whereas the models prove more effective in accounting for the impact of class on both the long-term and the subjective dimension of health. In every case, on average, approximately half of the class effect remains unexplained in the final model. Although accounting for the educational effect on health did not constitute one of the aims of the thesis, it is also interesting to observe in Table 7.3 that much of the educational effect remains unexplained; in fact, in most cases about 90% of the effect of education is unaccounted for, a much higher figure than that found for class. This point will be further addressed in the next section. The crucial point is to acknowledge that although education has been shown to be a variable that mediates the link between class and health, there is still a large part of the class effect (i.e. arrow *g* in figure 2.5) that cannot be accounted for, and should be the focus of future research. This statement leads us to the problem the thesis has not been able to resolve, that is, to the conundrums that should be considered in future research. This will be addressed in the last section of the chapter.

(See Table 7.1 in separate file)

(See Table 7.2 in separate file)

(See Table 7.3 in separate file)

7.4. Summing up: Puzzles and questions for future research

In short, this thesis constitutes an empirical study of the association that exists between the social position of an individual and her health. We have shown that such an association does indeed exist and that it favours certain classes. Specifically, as we move to the right of the class axis, the association between class and health becomes negative. We have seen that the distribution of some resources across social classes accounts for part of the divergence in health outcomes. Hence, education has been identified as a significant variable in the process of understanding health inequalities in the structure of inequality of a society. Lifestyles, on the other hand, have been shown not to be relevant in understanding health outcomes. This observation brings me to the questions that this thesis has not been able to answer. I highlight these questions as suggestions for possible lines of future research.

The first main question posed by the findings of this thesis is the explanation for the very weak impact of lifestyles. We have seen that differences in individuals' lifestyles and behaviour do not seem to help account for the health gap between classes. One possible partial answer to this puzzle concerns the way lifestyles have been measured in this thesis. It may be the case that in order to fully understand the impact of personal behaviour we need more detailed questions that could provide more accurate information about individuals' lifestyles. It should also be noted that lifestyles have not been fully accounted for in this thesis. For instance, the analysis has not considered other relevant living conditions such as housing conditions and house equipment, or the quality and characteristics of the environment in which individuals live. Part of the effect of lifestyles therefore might not be captured in the analysis. Another related point is that the thesis has not been able to address the different effect of lifestyles on health in England and Spain. Although the effect is very small, lifestyles do account for a small part of the class effect on health in England, but not in Spain. This is an interesting finding that deserves some attention in future research. As Appendix C shows, the association between personal habits and social class was significant in most cases. Moreover, the differences among countries did not seem relevant expect for drinking behaviour, which seems to be more intense in England. This could be a starting point for further research into this divergence. This finding should also be connected to the literature review presented in the second chapter. Research on the effects of lifestyles showed that these variables tended to have a limited impact on health. This finding is also linked to the difficulty involved in measuring the exact effect of lifestyles on health, which in turn results from the difficulties encountered in finding an adequate operationalization for them. This weakness should also be considered when further analysing the different effect that lifestyles have in England and in Spain.

The second main question that the thesis has not directly addressed is the accuracy of mechanisms (1) and (4), and especially the latter. In relation to mechanism (1), Chapter 2 included a discussion of the occupational health literature. We saw that there is a wide body of research on the effect that occupations themselves have on health outcomes. The critical evaluation of this research showed that it could convincingly be argued that characteristics of occupations have a specific and concrete effect on health. Given that class categories are aggregations of occupations, the methodological design of the thesis did not make it possible to test for this specific effect. However, we saw that in some cases the value of the class coefficients from the final model suggested that part of the residual class effect could be the result of the characteristics inherent to certain occupations. This is an interesting line of research that merits further attention.

Mechanism (4) argued that social class and health are linked not only at the individual level but also at a more aggregate level of analysis by a society's social policies, which, in turn, are partly the result of the nature of the class structure. This mechanism has not been tested, since simultaneously modelling two different levels of analysis would have required a different research design to the one developed here such as multilevel analysis. Chapter 2, in any case, discussed literature offering some support for this line of reasoning. It would also be interesting to examine whether there is a connection between this argument and the extensive literature on class voting (e.g. Dahl, 1961; Niemi and Weisberg *eds.*, 1967; Alford, 1973; Scase, 1997; Connor, 1979; Korpi, 1980; Sabel, 1982; Wald, 1983; Clegg, 1986; Richard, 1986; Savage, 1987, Pampel, 1989; Fishman, 1990; McEachern, 1980; Nieuwbeerta, 1995; Clawson *ed.*, 1998; Evans *ed.*, 1999; Manza, 1999; Bartolini, 2000; Roemer, 2001). In a sense, this would imply adding a variable that would connect the two variables of the argument (i.e. class structure and outcomes of policies). Thus, in developed democracies, the structure of social classes is normally reflected in the results of elections, which in turn determine the type of policies implemented. Put very simply, the working and the middle class would tend to vote for leftwing parties, as such parties would better represent their interests. Leftwing parties would, in turn, tend to implement social policies with a potentially positive impact on health outcomes. This is a very simplistic argument which requires substantial reworking in order to take account, among other things, of interacting effects such as the type of welfare state. Nevertheless, we would certainly benefit from research providing a more complete understanding of the association linking the structure of classes and health outcomes.

Five other possible future lines of enquiry can be suggested. The first involves the comparison of empirical results at the aggregate and individual levels of analysis. We saw in Chapter 4 that Spain presented a high score in almost all indicators of objective health and a low score in the subjective dimension. England, in contrast, did not display this divergence in the scores in the two dimensions of health. This finding becomes even more relevant in the light of the results obtained in Chapters 5 and 6, which showed that the subjective dimension of health is significantly correlated with individuals' objective health in the long term in both countries. This divergence in the findings between the aggregate and the individual level of analysis for the Spanish case is interesting. Measurement problems and the fact that the geographic unit varies for the British case between the analysis at the aggregate level (i.e. the United Kingdom) and the analysis at the individual level (i.e. England) might help account for the difference, but research shedding further light on this issue would be welcomed. The second point that deserves some further attention is the finding that the United Kingdom boasts, at both the aggregate and the individual level of analysis, better subjective health than Spain. It would be interesting to examine the reasons for this difference. The third line of research follows on from this. The empirical analysis has shown that in all cases social class has a larger effect on subjective health than on objective health. An important issue would be to investigate why social classes have a stronger effect on how individuals perceive their own health. Why does an individual's social position have a greater impact on her subjective well being than on her objective health condition? Why are the consequences of the social structure greater on perceptions of health? A fourth issue that would be interesting to examine and that is related to the third one is what does it mean to say that there are class differences in subjective health once we control for objective health? Why, even after controlling for education, lifestyles and objective health, do the most disadvantaged classes have a worse self-perception of their own health than the more privileged have of theirs? In other words, why should people from less advantaged classes believe themselves to be less healthy even when objectively their health is not different from people in more advantaged classes? It would be very interesting to examine this empirical finding further. The fifth question that could be considered for future research is the gap that exists in the explanatory capacity of the models for men and women. We have seen that although the difference is small, the sequence of models proves better at explaining health outcomes for women than for men. Validation analyses could, for example, test whether health indicators reflect women's health status better than that of men. These are all questions that I leave for future research.

APPENDIX A

A.1. The short-term dimension of health: reliability analysis

The section in Chapter 3 on the definition of the dependent variable explained how the short-term dimension has been constructed using factor analysis. There it was explained that the factor is the result of three variables. The content of the three variables leads to the interpretation that the factor is measuring the capacity that individuals have to carry out the activities they normally perform in their everyday lives, that is, their degree of short-term health. The following tables present the results of the reliability analysis applied to test the adequacy of the factor. The analysis has been carried out using the pooled data for 1993 and 1995, for men and women separately, and for each of the four age groups. It can be seen that alpha Cronbach values are either above or just under 0.7, which is the critical value[1]. The results validate the decision, therefore, to operationalise short-term health through a factor.

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[1] For some useful references on reliability analysis and interpretation of alpha cronbach see Carmines and Zeller (1979); Cortina (1993); and Cronbach (1951).

Table A.1.1: Reliability analysis for the Spanish data			
Age	**Sex**	**N**	**Alpha**
25-35 years old	Women	2473	0.7
	Men	2480	0.71
36-45 years old	Women	2048	0.7
	Men	2027	0.65
46-55 years old	Women	1938	0.71
	Men	1797	0.77
56-65 years old	Women	1995	0.76
	Men	1808	0.74

Table A.1.2: Reliability analysis for the British data			
Age	**Sex**	**N**	**Alpha**
25-35 years old	Women	3544	0.72
	Men	3082	0.7
36-45 years old	Women	3101	0.73
	Men	2877	0.7
46-55 years old	Women	2827	0.67
	Men	2629	0.72
56-65 years old	Women	2298	0.75
	Men	2131	0.74

A.2. Construction of the independent variables

A.2.1. Social class

Section 3.2 included an analysis of the variable social class. Firstly, class was defined in theoretical terms. Secondly, I discussed and justified its operationalization through Goldthorpe's class schema. I now turn to the data used to construct the schema for the British and the Spanish health surveys as well as the process followed when constructing it.

One way to construct Goldthorpe's class schema is by combining information on individuals' employment status and occupation[2]. However, the Spanish *Encuestas Nacionales de Salud* do not contain the specific occupation of each individual. As a result, information on occupation similar to that included in the British Standard Occupational Classification[3] is not available in the Spanish data.

Another way of constructing Goldthorpe's class schema is through the information available in the variable "socio-economic group". As is well known[4], this variable can be used to obtain a fair approximation to the Goldthorpe schema in its seven-category version. This information is available in both the Spanish and the British health surveys, although it is presented in a slightly different way in the Spanish case. That is the reason why the Goldthorpe schema in its seven-category version has been constructed in this thesis using this variable together with the variable measuring economic activity status.

The construction of the schema involved the following steps. First, I had to compute the Goldthorpe seven-category schema using the information from the economic activity status variable. I selected those individuals who were economically active, that is, those individuals determining the activity rate of the economy[5]. Second, I studied the socio-economic group of these individuals

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[2] For an excellent explanation of how to construct the Goldthorpe schema using the information from these two variables please see Goldthorpe and Heath (1992).

[3] For a complete description of all the occupations used in the British classificatory system please see: Office of Population Censuses and Surveys (1995).

[4] This is a strategy that has been used in numerous works as well as by Goldthorpe himself. See for instance: Heath and McDonald (1987); and Breen and Goldthorpe (2001).

[5] The economic activity status has the following categories: (1) full-time work; (2) part-time work; (3) work (number of hours not available); (4) unemployed; (5) permanently sick; (6) retired; (7) full-time homemaker; (8) full-time student with no job and; (9) other inactive. Categories 1, 2 and 3 have been used to compute the seven-class schema as they cover the active population. Category 4, that is, the unemployed, has been treated as category VIII in the class schema used in the thesis. Category 7, that is, full-time homemakers, has been treated as category IX in the class schema.

and recoded this variable to construct the class schema (please see Tables A.2.1 and A.2.2 below for the detailed re-codification of the socio-economic group variable into the class schema). Finally, I selected two groups from the non-occupied individuals: the unemployed and the full time homemakers. These two groups formed the two further categories that I have added to the Goldthorpe's seven-category class schema, that is, categories VIII and IX respectively.

Table A.2.1:Conversion table from socio-economic group to seven categories Goldthorpe class schema in the UK	
Socioeconomic group	**Class category from the Goldthorpe class schema**
1.- Large employers	Class I
2.- Large managers	Class I
3.- Small employers	Class IV
4.- Small managers	Class II
5.- Self-employed professionals	Class I
6.- Employed professionals	Class I
7.- Int non-manual anc	Class II
8.- Int non-manual foremn	Class II
9.- Junior non-manual	Class III
10.- Personal service	Class VII
11.- Manual foremenn/sv	Class V
12.- Skilled manual	Class VI
13.- Semi-skilled manual	Class VII
14.- Unskilled manual	Class VII
15.- Own acc non-prof	Class IV
16.- Farmers: emp & managers	Class IV
17.-Farmers: own acc	Class IV
18.- Agricultural workers	Class VII

Table A.2.2:Conversion table from socio-economic group to seven categories Goldthorpe class schema in Spain	
Socioeconomic group	**Class category from the Goldthorpe class schema**
1.- Self-employed agricultural worker (small proprietor)	Class IV
2.- Self-employed agricultural worker (big proprietor)	Class IV
3.- Self-employed employer with 5 or less employees	Class IV
4.- Self-employed employer with at least 6 employees	Class I
5.- Self-employed or employed professionals	Class I
6.- Employed worker monitoring 5 or less employees	Class II
7.- Employed worker monitoring at least 6 employees	Class I
8.- Intermediate cadres	Class V
9.- Workers qualified for administrative & office related tasks	Class III
10.- Workers no qualif.for admntive & office tasks & qual.workers	Class VI
11.- Non-qualified manual workers	Class VII

Table A.2.3: CASMIN Education variable
Level 1a: Inadequately completed General Elementary Education
Level 1bc: General Elementary Education or Basic Vocational
Level 2ab: Intermediate Vocational or Intermediate General Education
Level 3b: Lower-level Tertiary Certificate
Level 3c: Higher education –Upper Tertiary Certificate-

A.2.2. Education

As explained in Section 3.2, individuals' educational attainment has been measured using the CASMIN operationalization of education. The tables below (Tables A.2.4 and A.2.5) show how the education variables from the Spanish and the British health surveys have been converted into the education variable proposed by the CASMIN project. It should be noted that I have constructed the CASMIN educational variable with two slight differences. First, given the answers to the variable measuring education, in the Spanish case it is not possible to distinguish between 1b and 1c, on the one hand, and 2a and 2b, on the other. One solution is to collapse, on the one hand, 1b and 1c, and, on the other hand, 2a and 2b, into one category, while remaining aware of the impossibility of distinguishing between individuals who have completed their minimum obligatory education in the EGB programme and those who completed the Vocational Qualification programme.

The second slight difference between the education variable used in the research and the education variable developed by the CASMIN project is that the Spanish health surveys do not use specific codes for COU and *Selectividad* (the equivalent of "A" levels in Britain). As a result, category 3a, that is, "Higher Education: Maturity Examination" cannot be computed as a separate category. Table A.2.3 presents the CASMIN education variable used in the thesis. Tables A.2.4 and A.2.5 show the conversion between the educational variables in the British and Spanish surveys and the adapted education variable from the CASMIN project. The British conversion required an intermediate step, namely the conversion from the original education categories to the full specification of the CASMIN variable.

Table A.2.4: Table conversion from education as measured in the Spanish suveys to CASMIN education variable	
Education variable in the Spanish surveys	**Equivalent CASMIN education category**
1.- Without any study	1a
2.- Primaria o certificado de escolaridad; graduado escolar, bachillerato elemental o equivalente; formación profesional I o equivalente (i.e. education until 14-15 years old)	1bc
3.- Bachillerato superior, BUP o equivalente; formación profesional II o equivalente	2ab
4.- Estudios superiores de ciclo corto	3b
5.- Estudios superiores de ciclo largo	3c

Table A.2.5: Table conversion from education as measured in the British suveys to CASMIN education variable		
Education variable in the British surveys	**Equivalent CASMIN education category**	**Final CASMIN education category used in the thesis (final specification of education)**
1.- Degree/degree level qualification (including higher degree)	3c	3c
2.- Teaching qualification	3c	3c
3.- Nursing qualifications, SRN, SCM, SEN, RGN, RM, RHV, Midwife	3b	3b
4.- HNC/HND, BEC/TEC; Higher, BTEC; Higher/SCOTECH	3b	3b
5.- ONC/OND/BEC/TEC/BTE; C not higher	3a	3b
6.- City and Guilds Full Technological Certificate	1c	1bc
7.- City and Guilds Advanced/Final Level	1c	1bc
8.- City and Guilds Craft/Ordinary Level	2a	2ab
9.- A-levels/Higher School Certificate	3a	3b
10.-AS level	3a	3b
11.- SLC/SCE/SUPE at Higher Grade or Cert. of Sixth Year	3a	3b
12.- O-level passes taken in 1975 or earlier	2b	2ab
13.- O-level passes taken after 1975 GRADES A-C	2b	2ab
14.- O-level passes taken after 1975 GRADES D-E	2b	2ab
15.- GCSE GRADES A-C	2b	2ab
16.- GSCE GRADES D-G	1b	1bc
17.- CSE GRADE 1/SCE; BANDS A-C/Standard; Grade	2b	2ab
18.- CSE GRADES 2-5/SCE; Ordinary BANDS D-E	1b	1bc
19.- CSE Ungraded	1b	1bc
20.- SLC Lower	2a	2ab
21.- SUPE Lower or Ordinary	2a	2ab
22.- School Certificate or Matric	1c	1bc
23.- NVQ Level 5	3a	3b
24.- NVQ Level 4	3a	3b
25.- NVQ Level 3/Advanced Level GNVQ	3a	3b
26.- NVQ Level 2/Intermediate level GNVQ	2a	2ab
27.- NVQ Level 1/Foundation level GNVQ	1c	1bc
28.- Recognised Trade apprenticeship completed	1c	1bc
29.- Clerical or Commercial Qualification	1c	1bc

APPENDIX B

B.1. Health care inputs

Table B.1.1: Variance among EU countries in the density of practising physicians per 1,000 inhabitants			
Year	**Variance**	**Year**	**Variance**
1980	0.15	**1991**	0.78
1981	0.21	**1992**	0.74
1982	0.23	**1993**	0.98
1983	0.3	**1994**	0.94
1984	0.32	**1995**	0.9
1985	0.38	**1996**	0.86
1986	0.46	**1997**	0.9
1987	0.52	**1998**	0.84
1988	0.51	**1999**	0.85
1989	0.64	**2000**	0.91
1990	0.66		

Table B.1.2: Variance among EU countries in the total expenditure on health (% of GDP on health)			
Year	**Variance**	**Year**	**Variance**
1980	1.92	**1991**	0.88
1981	1.98	**1992**	1.01
1982	1.99	**1993**	0.85
1983	1.86	**1994**	0.99
1984	1.73	**1995**	1.12
1985	1.59	**1996**	1.26
1986	1.26	**1997**	1.36
1987	1.13	**1998**	1.33
1988	1.06	**1999**	1.4
1989	0.98	**2000**	1.14
1990	0.93		

Table B.1.3: Public expenditure on health in the EU (% of total expenditure on health)

Year	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Sweden	UK	EU Mean	Variance
1980	68.8	N/A	87.8	79	N/A	78.7	55.6	81.6	N/A	92.8	69.4	64.3	79.9	92.5	89.4	78.32	138.20
1981	76	N/A	87.7	79.7	N/A	78.7	N/A	81.7	N/A	92.9	69.9	64.3	78.7	91.9	88.9	80.95	80.75
1982	75.4	N/A	87.5	80	N/A	78.2	N/A	80.5	N/A	93	70.1	56.2	79.4	91.6	87.6	79.95	110.70
1983	76	N/A	86.6	79.1	N/A	77.3	N/A	78.4	N/A	89.2	70.8	52.4	84.9	91.5	87.4	79.42	120.86
1984	75.6	N/A	85.9	78.5	N/A	77.4	N/A	77.5	N/A	89.1	70.9	51.2	81.9	91.6	86.9	78.77	123.37
1985	76.1	N/A	85.6	78.6	N/A	77.4	N/A	75.7	N/A	89.2	71	54.6	81.1	90.4	85.8	78.68	100.85
1986	76.5	N/A	84.6	79.3	N/A	77.6	N/A	75.4	N/A	89.4	68.1	52.6	79.9	90.2	85.3	78.08	113.32
1987	75.9	N/A	84.4	79.6	N/A	77.5	59.9	73.1	N/A	93	68.8	51.5	79.7	89.9	84.3	76.47	142.52
1988	75.6	N/A	84.7	79.4	N/A	77.2	61.9	71.3	77.6	92.9	66.7	53.7	79.2	89.4	83.8	76.42	119.17
1989	73.7	N/A	84.2	80	N/A	76	63.5	71.5	76.9	92.9	67	53.1	78.2	89.6	83.2	76.14	116.52
1990	73.5	N/A	82.7	80.9	76.6	76.2	62.7	73.1	79.3	93.1	67.1	65.5	78.7	89.9	83.6	77.35	75.87
1991	73.4	N/A	83.5	81.1	75.9	N/A	61.1	74.1	79.2	93	69	62.8	77.5	88.2	83.3	77.08	85.52
1992	73.5	N/A	83.2	79.6	76.4	77.3	58.1	72.6	77.1	92.8	72.8	59.6	77.4	87.2	84.6	76.59	89.54
1993	74.2	N/A	82.7	76.1	76.4	76.4	57.9	74.2	76.7	92.9	73.6	63	76.6	85.7	85.1	76.54	77.95
1994	74.4	N/A	82.2	75.5	75.9	76.5	52.8	72.9	74.9	91.7	72.9	63.4	75.5	85.2	83.9	75.55	88.45
1995	71.8	69.6	82.5	75.5	76.1	76.7	54.5	73.8	72.2	92.4	71	61.7	70.9	85.2	83.9	74.52	87.27
1996	70.6	71.8	82.4	75.8	76.1	76.8	55.2	73.3	71.8	92.8	66.2	64.7	71.1	84.8	82.9	74.42	83.11
1997	70.9	70.5	82.3	76.1	76.2	75.3	55.1	76	72.2	92.5	67.8	64.8	71.1	84.3	79.9	74.33	77.08
1998	71.4	70.6	81.9	76.3	76	74.8	54.4	76.2	72	92.4	67.8	67.5	70.5	83.8	79.9	74.37	74.57
1999	70	71.1	82.2	75.4	76.1	74.8	54.3	76.3	72.3	92.9	66.5	70.7	70.2	N/A	80.1	73.78	74.63
2000	69.7	71.2	82.1	75.1	76	75.1	55.5	75.8	73.7	N/A	67.5	71.2	69.9	N/A	81	72.60	44.53

B.2. Definition of the main health care inputs

The variables used in Chapter 4 to measure the main health care inputs are taken from the health database compiled by the OECD (OECD, 2002. *OECD Health Data 2002. A comparative analysis of 30 countries.* OECD: Paris). The technical definition of these variables is included below.

I) Total health employment: Number of full-time (i.e. 35 hour per week or more) equivalent persons employed (including self-employed) in health services, including "contracted out" staff and excluding pharmaceutical and medical equipment manufacturing employees. Administrative staffs, private for-profit and non-profit medical benefit insurers are included. Health professionals working outside health services are excluded (e.g. physicians employed in industry. The following classes of the International Standard Industrial Classification (ISIC) are involved.

ISIC Class	Description
8511	Hospital activities
8512	Medical and dental practice activities
8519	Other human health activities
5231*	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles
5239*	Other retail sales not elsewhere classified
7512*	Regulation of the activities of agencies that provide health care education, cultural services and other social services excluding social security
7530*	Compulsory social security activities
6603*	Non-life insurance

II) Practising physicians: The number of physicians, general practitioners and specialists (including self-employed) who are actively practicing medicine in public and private institutions. The data excludes dentists, stomatologists, qualified physicians who are working abroad, working in administration, research and industry positions. Data should include foreign physicians licensed to practice and actively practicing medicine in the country. Data is calculated to represent full-time equivalents (FTE).

- Sources and methods:

1. Physicians:

Country	Head count or FTE	Includes non-practising physicians also (a)	Includes retired professionals	Includes professionals who are foreigners	Includes professionals who are working abroad	Estimation method
Austria	Head	No	No	Yes	no	31/12
Belgium	Head	Yes	No	Yes	no	annual
Denmark	Head	Yes	No	Yes	no	annual
Finland	Head	Yes	No	No	no	31/12
France	FTE	Yes	No	yes		01/01
Germany	FTE	Yes	No	Yes	no	31/12
Greece	Head	No	No	No	no	annual
Ireland	Head	Yes	Yes	Yes	no	31/12
Italy	Head	Yes	Yes	Yes	no	31/12
Luxembourg	FTE					
Netherlands	Head	Yes	Yes	Partly	no	31/12
Portugal	Head	Yes	Yes	Yes	yes	31/12
Spain	Head	Yes	No	Yes	no	Annual
Sweden	Head	Yes	No	Yes	no	01/01

UK	Head	No	No	Yes	no	

(a) Without medical practice means the person may work in research and development (R&D) activities, administrative functions, or be unemployed.

2. General practitioners:

Country	Head count or FTE	Includes non-practising physicians also (a)	Includes retired professionals	Includes professionals who are foreigners	Includes professionals who are working abroad	Estimation method
Austria	Head	No	No	Yes	No	31/12
Denmark	Head	Yes	No	Yes	No	Annual
Finland	Head	Yes	No	No	No	31/12
France	FTE	Yes	No	yes		01/01
Germany	FTE	Yes	No	Yes	No	31/12
Greece	head	No	No	No	No	Annual
Ireland	head	No	No	Yes	No	Annual
Italy	head	No	No	Yes	No	31/12
Luxembourg	FTE					
Netherlands	head		No	Yes	No	31/12
Portugal	head	Yes	Yes	Yes	Yes	31/12
Sweden	head	Yes	No	Yes	No	01/01
UK	head	No	No	Yes	No	
USA	head	No	No	Yes	No	Census

(a) Without medical practice means the person may work in research and development (R&D) activities, administrative functions, or be unemployed.

3. Specialists:

Country	Head count or FTE	Includes non-practising physicians also (a)	Includes retired professionals	Includes professionals who are foreigners	Includes professionals who are working abroad	Estimation method
Austria	Head	No	No	Yes	No	31/12
Belgium	Head	Yes	No	Yes	No	Annual
Denmark	Head	Yes	No	Yes	No	Annual
Finland	Head	Yes	No	No	No	31/12
France	head-FTE	Yes	No	yes		01/01
Germany	FTE	Yes	No	Yes	No	31/12
Greece	Head	No	No	No	No	Annual
Ireland	Head	No	No	Yes	No	01/01
Netherlands	Head	Yes	Yes	Yes	No	31/12
Portugal	Head	Yes	Yes	Yes	Yes	31/12
Sweden	Head	Yes	No	Yes	No	01/01
UK	Head	No	No	Yes	No	

(a) Without medical practice means the person may work in research and development (R&D) activities, administrative functions, or be unemployed.

III) Total expenditure on health: the sum of expenditure on activities that – through application of medical, paramedical, and nursing knowledge and technology – seek to: promote health and prevent disease; cure illness and reduce premature mortality; care for persons affected by chronic illness who require nursing care; care for persons with health-related impairments, disability, and handicaps who require nursing care; assist patients to die with dignity; provide and administer public health; provide and administer health programmes; health insurance and other funding arrangements. Within these limits, general public safety measures such as technical standards monitoring and road safety are not considered to form part of expenditure on health. Activities such as food and hygiene control and health research and development are considered health-related, but are not included in total health expenditure. Expenditures on those items are reported separately in the chapter on health-related functions. Health can be divided into the following functional components of health care (HC) and health care-related (HC.R) items according to the International Classification for Health Accounts (ICHA), which is presented in the OECD, 2000. *A System of Health Accounts*. OECD: Paris.

ICHA Code	**Description**
HC.1	Services of curative care
HC.2	Services of rehabilitative care
HC.3	Services of long-term nursing care
HC.4	Ancillary services to health care
HC.5	Medical goods dispensed to out-patients
HC.1-HC.5	*Total expenditure on personal health*
HC.6	Services of prevention and public health
HC.7	Health administration and health insurance
HC.6 + HC.7	*Total expenditure on collective health*
HC.1-HC.7	*Total current expenditure*
HC.R.1	Investment (gross capital formation) in health
HC.1-HC.7 + HC.R.1	*TOTAL EXPENDITURE ON HEALTH*

Further health care-related items *:

HC.R.2	Education and training of health personnel
HC.R.3	Research and development in health
HC.R.4	Food, hygiene and drinking water control
HC.R.5	Environmental health
HC.R.6	Administration and provision of social services in kind to assist living with disease and impairment
HC.R.7	Administration and provision of health-related cash-benefits

Public expenditure on health care: health expenditure incurred by public funds. Public funds are state, regional and local government bodies and social security schemes. Public capital formation on health includes publicly financed investment in health facilities plus capital transfers to the private sector for hospital construction and equipment.

Private expenditure on health care: Privately funded part of total health expenditure. Private sources of funds include out-of-pocket payments (both over-the-counter and cost-sharing), private insurance programmes, charities and occupational health care.

(*) HC.R.2-HC.R.7 are not included in the OECD/SHA definition of Total expenditure on health.

APPENDIX C

C.1. Distribution of the research variables in Spain and in England

In this appendix, I will complement the picture on the distribution of the research variables by presenting the allocation across social classes of the explanatory variables of the thesis. I will do this similarly to the way it was done in the third section of Chapter 4. Hence, I will present the distribution of social class, education, civil status, and lifestyle variables for men and women separately and for each country. Since the aim of this appendix is to present a clear picture of the values of the explanatory variables for each social class, the analysis presented will have an exploratory character and will be based mainly on cross tabulations between social class and the other explanatory variables. I will first present the distribution of social class itself; then the distribution of education; third, the distribution of civil status among the social classes; and finally, the distribution of the lifestyle variables. The information provided in the following paragraphs will therefore allow us to see if the explanatory variables have significantly different values for each class category. In other words, the analysis will show if there are significant differences among classes in, for instance, their levels of educational achievement or lifestyle.

Tables C.1 and C.2 are frequency tables for social class. They reveal that, in the mid-1990s, there were some differences in the degree of social stratification in Spain and England. The percentages of both men and women in each social class vary in the two countries. The differences are largest for women. Following the class classification used in this research, approximately 55% of the Spanish female population were economically inactive (i.e. in either category VIII or IX), whereas in the English case this percentage was only around 3%. Among the economically inactive women, the largest difference was related to the percentage of women who were full-time homemakers, which was approximately 52% in Spain and only 2.5% in England.

Table C.1
Social class distribution in Spain (%)

Social Class	Women (n=8001)	Men (n=8276)
Class I: Higher grade professionals, administrators and managers	5.50	10.80
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	0.30	1.90
Class IIIab: Higher-grade routine nonmanual employees	6.30	8.00
Class IVabc: Small proprietors and employers and self-employed workers	8.40	20.00
Class V: Lower-grade technicians and supervisors of manual workers	1.20	3.60
Class VI: Skilled manual workers	9.20	33.00
Class VIIab: Nonskilled manual workers and agricultural workers	14.80	20.80
Class VIII: Unemployed	1.90	1.60
Class IX: Full-time home-tasks makers	52.20	0.30

Within the occupied class categories, the largest difference was found with respect to the professional classes, which in Spain account for 6% of the female population and in England account for approximately 28%. Higher-grade, routine, non-manual employees also account for very different percentages of the occupied population, around 32% in England and only 6.3% in Spain. The proportion of women classified in classes IVabc and V are similar in both countries, although class IVabc is slightly larger in Spain. The number of skilled manual workers is three times higher in Spain than in England, whereas unskilled or nonskilled manual workers and agricultural workers are more common in England than in Spain.

We can see, therefore, that the distribution of women across the social classes was different in both countries. Hence, the majority of Spanish women were not part of the paid labour market whereas most English women were. However, within the occupied class categories there are also significant differences, above all at the two extremes of the social continuum. Women in both countries only seem to be equally represented in those occupations that are classified as classes IVabc and V, especially in the latter.

Table C.2
Social class distribution in England (%)

Social Class	Women (n=13398)	Men (n=11920)
Class I: Higher grade professionals, administrators and managers	6.60	21.00
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	22.00	16.30
Class IIIab: Higher-grade routine nonmanual employees	32.70	8.10
Class IVabc: Small proprietors and employers and self-employed workers	5.40	13.50
Class V: Lower-grade technicians and supervisors of manual workers	1.60	7.80
Class VI: Skilled manual workers	3.30	18.01
Class VIIab: Nonskilled manual workers and agricultural workers	25.70	14.70
Class VIII: Unemployed	0.30	0.30
Class IX: Full-time home-tasks makers	2.50	0.02

There are also differences between England and Spain for the distribution of men across social classes, although these differences are smaller. The percentage of men in classes I and II is much larger in England, in fact, three times as high as the percentage for Spain. The proportion of men included in classes IIIab and IVabc are similar in both countries, especially class IIIab. Class V accounts for some 7.8 % in England whereas in Spain it makes up 3.6% of the total. Skilled manual workers –i.e. class VI- form approximately 30% of the male population in Spain while in England they represent 18.2% of the total. Unskilled manual workers and agricultural workers present a closer percentage in both countries, this is 20.8% in Spain and 14.7% in England. Thus, in the occupied social classes, the largest differences between both countries are found in the professional classes and in the skilled manual jobs, while the other categories are more alike. Men, in contrast to women, do present a more analogous distribution for the non-occupied class categories. Full-time homemakers represent a similar proportion in both countries. The unemployed category however, as we would expect, is larger in the Spanish case (1.6% as opposed to 0.3%).

Hence, the comparison of the class distribution in both countries highlights the following points. First, the distribution of men in the class categories is more similar than that of women, although there are still some differences. Regarding the occupied class categories, irrespective of gender, a significantly larger part of the English population is classified in classes I and II. The occupations in the rest of the occupied class categories are distributed in a dissimilar way across countries for men and women. Women in England occupy more higher-grade routine non-manual jobs whereas in Spain they are largely found in skilled manual positions. Spanish men[1], on the other hand, are principally

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[1] A comparison of the class distribution in Spain with that of other studies is not easy since there are not many studies that have computed the Goldthorpe class schema. There is one study; however, that has examined a modified version of this schema for men (Garcia de Polavieja, 2001). The comparison of the male class distribution (see table below) shows that classes II and IIIab are under-represented in the data set employed in this research whereas classes I, V and VI

found in skilled and nonskilled manual jobs while a larger proportion of English men[2] fall into categories V, VI and VIIab.

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are over-represented. The reason for this divergence is probably related to differences in the computation of the class variable given the dissimilarities of the original data matrix. One implication of the under-representation of classes II and IIIab is that class inequalities among these categories and the subsequent categories could be greater that what the analysis from Chapter 5 has shown. However, the over-representation of classes V and VI could have the opposite effect. There are no rigorous studies that compute the class variable for women so a comparison with the one presented in this research is not possible.

Comparison of two social class distributions for men (%)		
Social Class	Distribution from the thesis	Distribution from Garcia de Polavieja (2001: Appendix A)
Class I	10.8	5.44
Class II	1.9	11.34
Class IIIab	8	17.03
Class IV	20	19.14
Class V	3.6	1.52
Class VI	33	20.7
Class VIIab	20.83	24.84

[2] The Goldthorpe class schema has been widely used in the in empirical studies in the United Kingdom. The new British National Statistics Socio-Economic Classification (NS-SEC) introduced in 2001 has been based on this schema (for a detailed description and application of the classification as well as for an explanation of its comparison with the Goldthorpe schema see: Rose and O'Reilly, 1997; 1998; Rose and Pevalin *eds.*, 2003). The table below shows the correspondence that exists between the Goldthorpe schema and the NS-SEC classification. It also shows the distribution of men in this classification, as well as the distribution of men in the class schema that results from the *Health Surveys for England* (the data used in the thesis for the analysis at the individual level). We can observe that both distributions are quite similar. There are only small differences, for example, classes I and V are slightly over-represented whereas class II is slightly under-represented.

The distribution of education across the Spanish and English population is shown in Tables C.3 and C.4. For all individuals, the most significant difference between both countries concerns their different distribution in the first two categories of education, that is, the percentage of individuals that have completed or not the general elementary education or basic vocational education. While in Spain 17% of women and 11.3% of men inadequately completed general elementary education, in England these figures were 38.7% and 30.9% respectively. The proportion of individuals that has completed this level of education or the equivalent level of vocational training was 51.6% for women and 48.4% for men in Spain, whereas in England it was 12.3% and 14.7% respectively. We can see, therefore, that the percentage of people with a lower educational level is higher in Spain than in England for all individuals. It is also interesting to note that in each country, women are at a disadvantage, since their levels of educational achievement are lower than those of men[3].

Goldthorpe schema	NEC-SEC classification	NEC-SEC Distribution (years 1996-1997)*	*Health Survey for England* distribution (years 1993-1995)
Class I	Higher managerial & professional occupations	16	21
Class II	Lower managerial & professional occupations	21.8	16.3
Class IIIa	Intermediate occupations	7.3	8.1
Class IV	Small employers & own account workers	13.7	13.5
Class V	Lower supervisory & technical occupations	13.9	7.8
Class VI	Semi-routine occupations	13.9	18.2
Classes IIIb and VIIab	Routine occupations	13.2	14.7

*: The equivalence between Goldthorpe schema and the NS-SEC classification and the data are taken from Rose and Pevalin *eds.* (2003: 24).

[3] It is interesting to observe that age has a mediating effect between education and gender as differences found between men and women diminish in the younger groups.

The gender gap increases in the other education categories, men presenting higher rates of attainment. In relation to the performance of both countries in these three levels of education – i.e. levels 2ab, 3ab and 3c- England presents higher percentages for all levels irrespective of gender, especially for the intermediate vocational and intermediate general levels. Hence, the English population, especially the female one, was more educated than the Spanish population in the mid-1990s. Within both countries, men achieved a higher level of education than women did.

Table C.3
Education in Spain (%)

Educational level	Women (n=9769)	Men (n=9349)
1a Inadequately completed General Elementary Education	16.99	11.28
1bc Gral. Elementary Education or Basic Vocational	51.61	48.39
2ab Intermediate Vocational or Intermediate General	17.11	21.81
3ab Lower-level Tertiaty Certificate	6.62	8.51
3c Higher Education: Upper Level Tertiary Certificates	7.67	10.00

Table C.4
Education in England (%)

Educational level	Women (n=13776)	Men (n=12263)
1a Inadequately completed General Elementary Education	38.69	30.91
1bc Gral. Elementary Education or Basic Vocational	12.26	14.75
2ab Intermediate Vocational or Intermediate General	29.14	27.82
3ab Lower-level Tertiaty Certificate	10.82	12.61
3c Higher Education: Upper Level Tertiary Certificates	9.09	13.91

Table C.5
Social class and educational level for women in Spain (%)

Social Class	Educational level: 1a Inadequately completed General Elementary Education	1bc Gral. Elementary Education or Basic Vocational	2ab Intermediate Vocational or Intermediate General	3ab Lower-level Tertiaty Certificate	3c Higher Education: Upper Level Tertiary Certificates
Class I: Higher grade professionals, administrators and managers	3 (-7.1)	11.9 (-11.6)	9.8 (-3.9)	17.1 (8.5)	58.2 (38.2)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	3.8 (-2)	11.5 (-2.8)	23.1 (0.7)	26.9 (4)	34.6 (5)
Class IIIab: Higher-grade routine nonmanual employees	0.6 (-9)	16.9 (-10.9)	42.7 (14)	23.2 (14.4)	16.5 (7.2)
Class IVabc: Small proprietors and employers and self-employed workers	21.7 (2.9)	58.9 (2.6)	12 (-3.3)	4.7 (-1.9)	2.7 (-4.7)
Class V: Lower-grade technicians and supervisors of manual workers	0 (-4.1)	11.2 (-5.6)	10.2 (-1.7)	22.4 (6.1)	56.1 (17.5)
Class VI: Skilled manual workers	7.9 (-6)	54.2 (1)	23.9 (4.6)	9.5 (3.1)	4.5 (-3.2)
Class VIIab: Nonskilled manual workers and agricultural workers	20.7 (3.1)	60.9 (4.4)	13.5 (-3.2)	3.8 (-3.7)	1.2 (-8.1)
Class VIII: Unemployed	1.3 (-4.5)	37.2 (-2.5)	30.1 (3.9)	12.2 (2.7)	19.2 (5.2)
Class IX: Full-time home-tasks makers	20.8 (6)	64.3 (11.6)	10.7 (-10.1)	2.6 (-10.2)	1.7 (-14)

(*): Numbers in brackets are unstandardised residuals. N = 9769
Pearson Chi-Square = 3903.5; Degrees of freedom = 32; Significance value = 0.000

Table C.6
Social class and educational level for women in England (%)

Social Class	1a Inadequately completed General Elementary Education	1bc Gral. Elementary Education or Basic Vocational	2ab Intermediate Vocational or Intermediate General	3ab Lower-level Tertiaty Certificate	3c Higher Education: Upper Level Tertiary Certificates
	Educational level				
Class I: Higher grade professionals, administrators and managers	7.8 (-14.8)	5.1 (-6.4)	20.9 (-4.6)	23.2 (11.3)	43 (43.7)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	16.9 (-19)	10.2 (-3.8)	26.1 (-3)	24.9 (23.3)	21.9 (23)
Class IIIab: Higher-grade routine nonmanual employees	33.4 (-5.6)	18.3 (11.4)	39.1 (12.2)	6.5 (-8.9)	2.7 (-13.8)
Class IVabc: Small proprietors and employers and self-employed workers	39.8 (0.5)	14 (1.5)	32.7 (1.8)	9.1 (-1.4)	4.4 (-4.6)
Class V: Lower-grade technicians and supervisors of manual workers	66.4 (6.5)	8.9 (-1.4)	20.1 (-2.5)	4.7 (-2.7)	0 (-4.4)
Class VI: Skilled manual workers	67.7 (9.7)	11 (-0.7)	16.5 (-4.9)	3.9 (-4.4)	0.9 (-5.6)
Class VIIab: Nonskilled manual workers and agricultural workers	63.8 (23.7)	9.6 (-92.5)	22.3 (-234.1)	3.1 (-266)	1.2 (-271)
Class VIII: Unemployed	47.2 (0.8)	8.3 (-0.7)	22.2 (-0.8)	8.3 (-0.5)	13.9 (-1)
Class IX: Full-time home-tasks makers	74.2 (10.3)	6.7 (-2.9)	13 (-5.2)	2.7 (-4.7)	3.3 (-3.5)

(*): Numbers in brackets are unstandardised residuals. N = 13776
Pearson Chi-Square = 5235.9; Degrees of freedom = 32; Significance value = 0.000

It is also interesting to observe how education is distributed among the social classes. Tables C.5 to C.8 show the association between current social class and education for men and women. The previous two tables showed that overall, the English population was more educated than the Spanish one. In these tables we can see that the distribution of this resource is not equal among social classes in either of these two countries. The magnitude, sign and pattern of the standardised residuals from the four tables linking class and education show that although education is allocated unevenly and in favour of the privileged social classes in both countries, the gap does seem to be significantly larger in England. This can be seen above all in the comparison of the residuals for the first and the last level of education for both men and women. The residuals for classes I and II for the first level of education for women are -14.8 and -19 in England while in Spain they are -7.1 and -2. In contrast, the residuals for the same classes for the highest level of education are 43.7 and 23 in England and, 38.2 and 5 in Spain. The residuals for the remaining categories of education show a similar pattern. Hence, education seems to be distributed unequally among women in different social classes in both Spain and England, although the gap is greatest in the latter. The residuals from Tables C.7 and C.8 that show the association for men suggest a similar conclusion.

Table C.7
Social class and educational level for men in Spain (%)

Social Class	Educational level: 1a Inadequately completed General Elementary Education	1bc Gral. Elementary Education or Basic Vocational	2ab Intermediate Vocational or Intermediate General	3ab Lower-level Tertiaty Certificate	3c Higher Education: Upper Level Tertiary Certificates
Class I: Higher grade professionals, administrators and managers	3.6 (-6.8)	23.5 (-10.7)	17.1 (-3)	14 (5.6)	41.9 (30.9)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	3.9 (-2.7)	26.5 (-3.9)	29 (1.9)	18.7 (4.4)	21.9 (4.7)
Class IIIab: Higher-grade routine nonmanual employees	2.7 (-6.6)	26.6 (-8.1)	36.7 (8.2)	19.5 (9.8)	14.4 (3.6)
Class IVabc: Small proprietors and employers and self-employed workers	16.6 (6.6)	60 (6.6)	15.7 (-5.3)	4.8 (-5.7)	2.9 (-9.2)
Class V: Lower-grade technicians and supervisors of manual workers	1.7 (-4.9)	20.8 (-6.8)	22.8 (0.4)	23.5 (8.9)	31.2 (11.6)
Class VI: Skilled manual workers	12.2 (1.5)	60.4 (9)	19.5 (-2.6)	5.6 (-5.1)	2.3 (-12.8)
Class VIIab: Nonskilled manual workers and agricultural workers	21.4 (12.6)	62 (8.2)	13.9 (-7)	1.9 (-9.5)	0.8 (-12.1)
Class VIII: Unemployed	3.7 (-2.6)	42.5 (-1)	23.1 (0.3)	9.7 (0.6)	20.9 (4.6)
Class IX: Full-time home-tasks makers	21.4 (-10.8)	50 (-11.5)	14.3 (15.1)	3.6 (7.4)	10.7 (7.6)

(*): Numbers in brackets are unstandardised residuals. N = 9349
Pearson Chi-Square = 4225.5; Degrees of freedom = 32; Significance value = 0.000

Table C.8
Social class and educational level for men in England (%)

Social Class	1a Inadequately completed General Elementary Education	1bc Gral. Elementary Education or Basic Vocational	2ab Intermediate Vocational or Intermediate General	3ab Lower-level Tertiaty Certificate	3c Higher Education: Upper Level Tertiary Certificates
	Educational level				
Class I: Higher grade professionals, administrators and managers	10 (-18.9)	7.6 (-9.3)	20 (-7.4)	21 (11.8)	41.4 (36.9)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	15.8 (-12)	10.7 (-4.6)	31.5 (3)	19.3 (8.3)	22.7 (10.8)
Class IIIab: Higher-grade routine nonmanual employees	19.8 (-6.2)	13.1 (-1.4)	47.3 (11.8)	13.1 (0.4)	6.7 (-6)
Class IVabc: Small proprietors and employers and self-employed workers	37.6 (4.8)	21.7 (7.2)	27.4 (-0.6)	8.2 (-4.9)	5.1 (-9.5)
Class V: Lower-grade technicians and supervisors of manual workers	44.2 (7.6)	20.7 (4.7)	24.3 (-2)	9.5 (-2.6)	1.3 (-10.3)
Class VI: Skilled manual workers	44.4 (11.3)	21.6 (8.3)	26.8 (-0.9)	6.5 (-8.2)	0.7 (-16.5)
Class VIIab: Nonskilled manual workers and agricultural workers	55 (18.2)	14.2 (-0.6)	23.9 (-3.1)	5.2 (-8.5)	1.7 (-13.7)
Class VIII: Pensioners	91.7 (3.8)	0 (-1.3)	8.3 (-1.3)	0 (-1.5)	0 (-1.7)
Class IX: Unemployed	36.6 (0.7)	19.5 (0.8)	29.3 (0.2)	12.2 (-0.2)	2.4 (-2)
Class X: Students	21.2 (-3.3)	4.5 (-4.8)	49.5 (7.9)	18.4 (3)	6.3 (-3.1)
Class XI: Full-time home-tasks makers	50 (0.4)	50 (1.3)	0 (-0.6)	0 (-0.3)	0 (-0.5)

(*): Numbers in brackets are unstandardised residuals. N = 12263
Pearson Chi-Square = 4225.4; Degrees of freedom = 32; Significance value = 0.000

As discussed in Chapter 3, the model that explains the association between class and health introduces age and marital status as control variables. Tables C.9 and C.10 reveal that the distribution of civil status in England and Spain is similar, although there are some minor differences. Men marry more in England and remain single more in Spain. About two thirds of women marry in both countries, although a larger proportion remains single in Spain. The rate of marital breakdown is approximately three times higher in England than in Spain for all individuals. In both countries there are more widows than widowers.

Table C.9
Civil status in Spain (%)

	Women (n=8769)	Men (n=9349)
Single	25.7	35.53
Married or cohabiting	61.02	60.55
Separated or divorced	2.2	1.36
Widowed	11.08	2.56

Table C.10
Civil status in England (%)

Civil status	Women (n=13776)	Men (n=12263)
Single	17.74	21.18
Married or cohabiting	63.21	70.02
Separated or divorced	7.77	4.94
Widowed	11.28	3.86

As for the association between social class and civil status, in Tables C.11 to C.14, we can observe that there is a significant association between the two variables. The sign and value of the standardised residuals shows that although most of the associations between class categories and civil status categories are significant, they do not show a clear social pattern. The only exception is the pattern found for widowed men and women in England: the movement from class I towards class VIIab implies an increasing percentage of widows. That is, as we move to the right in the social scale we find ever increasing percentages of widowed individuals. Moreover, the difference between the expected count and the observed count is statistically significant.

One point that should be mentioned in relation to the association between specific class categories and civil status is that the large majority of female full-time homemakers are married or cohabiting, especially in the Spanish case (90.7%). In both countries and for all classes, more men than expected marry, and fewer men remain single.

The next group of variables incorporated into the models in Chapters 5 and 6 are types of behaviour or lifestyle, which are included as explanatory variables. As discussed in Chapter 2, lifestyle variables should be analysed as they may partly mediate the relationship between class and health on the one hand, and between education and health on the other hand. Lifestyle has been operationalised through a series of variables that measure individuals' smoking behaviour, drinking behaviour, exercise patterns and association between height and weight. As for the other independent variables studied here, the tables presented in the rest of this section show the distribution of these variables and consider whether the association between class and personal behaviour shows any clear and statistically significant social pattern.

Table C.11
Social class and civil status for women in Spain (%)

Social Class	Civil Status: Single	Married or co-habiting	Separated or divorced	Widowed
Class I: Higher grade professionals, administrators and managers	36.3 (4.4)	54.8 (-2.7)	4.6 (3.3)	4.3 (-4.2)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	30.8 (0.5)	61.5 (0.1)	3.8 (0.6)	3.8 (-1.1)
Class IIIab: Higher-grade routine nonmanual employees	40.2 (6.4)	52 (-2.6)	5.7 (5.3)	2.2 (-6)
Class IVabc: Small proprietors and employers and self-employed workers	17.8 (-4)	65.1 (3.4)	2.2 (0.2)	14.8 (2.9)
Class V: Lower-grade technicians and supervisors of manual workers	44.9 (3.8)	49 (-2.5)	3.1 (0.8)	3.1 (-2.4)
Class VI: Skilled manual workers	37.1 (6.6)	49 (-4.3)	5.3 (5.9)	8.6 (-2)
Class VIIab: Nonskilled manual workers and agricultural workers	32.7 (4.6)	48.9 (-5.3)	6.2 (9.4)	12.2 (1.4)
Class VIII: Unemployed	91 (16.1)	8.3 (-8.2)	0.6 (-1.4)	0 (-4.3)
Class IX: Full-time home-tasks makers	3.7 (-28.4)	90.7 (24.4)	0.6 (-6.8)	4.9 (-11.9)

(*): Numbers in brackets are unstandardised residuals. N = 9769
Pearson Chi-Square = 6008.6; Degrees of freedom = 24; Significance value = 0.000

Table C.12
Social class and civil status for women in England (%)

Social Class	Civil Status: Single	Married or co-habiting	Separated or divorced	Widowed
Class I: Higher grade professionals, administrators and managers	21.8 (2.9)	64.8 (1.6)	8.1 (1.4)	5.2 (-5.7)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	14.7 (-4)	69.5 (4.6)	7.9 (0.3)	7.9 (-5.5)
Class IIIab: Higher-grade routine nonmanual employees	16.3 (-2.3)	66.4 (2.7)	7 (-2.7)	10.3 (-2)
Class IVabc: Small proprietors and employers and self-employed workers	7.8 (-6.4)	71.7 (2.9)	8.4 (0.7)	12 (0.6)
Class V: Lower-grade technicians and supervisors of manual workers	14.5 (-1.1)	60.3 (-0.5)	8.9 (0.6)	16.4 (2.2)
Class VI: Skilled manual workers	16.1 (-0.8)	56.9 (-1.7)	7.1 (-0.5)	20 (5.4)
Class VIIab: Nonskilled manual workers and agricultural workers	15.8 (-2.7)	59.4 (-2.8)	9.2 (3)	15.6 (7.6)
Class VIII: Pensioners	34 (2.7)	30 (-3)	8 (0.1)	28 (3.5)
Class IX: Unemployed	83.3 (9.3)	11.1 (-3.9)	5.6 (-0.8)	0 (-2)
Class X: Students	95.1 (33.8)	4.3 (-13.3)	0.3 (-4.5)	0.3 (-5.9)
Class XI: Full-time home-tasks makers	13.3 (-1.9)	60.9 (-0.6)	6.4 (-0.9)	19.4 (4.4)

(*): Numbers in brackets are standardised residuals. N = 13776
Pearson Chi-Square = 1799.4; Degrees of freedom = 24; Significance value = 0.000

Table C.13
Social class and civil status for men in Spain (%)

Social Class	Civil Status: Single	Married or co-habiting	Separated or divorced	Widowed
Class I: Higher grade professionals, administrators and managers	23.3 (-6.1)	72.6 (4.5)	1.8 (1.1)	2.2 (-0.8)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	11.6 (-5)	86.5 (4.1)	0.6 (-1.1)	1.3 (-1)
Class IIIab: Higher-grade routine nonmanual employees	26.9 (-3.7)	69 (2.8)	2.4 (2.3)	1.7 (-1.6)
Class IVabc: Small proprietors and employers and self-employed workers	19.8 (-10.7)	75.5 (7.7)	1.2 (-0.5)	3.5 (2.3)
Class V: Lower-grade technicians and supervisors of manual workers	20.5 (-4.9)	73.8 (2.9)	2.3 (1.5)	3.4 (0.9)
Class VI: Skilled manual workers	25.2 (-9.1)	70.3 (6.6)	1.8 (1.9)	2.7 (0.6)
Class VIIab: Nonskilled manual workers and agricultural workers	37.9 (1.6)	57.6 (-1.6)	1 (-1.1)	3.4 (2.3)
Class VIII: Pensioners	13.3 (-1.4)	53.3 (-0.4)	6.7 (1.8)	26.7 (5.8)
Class IX: Unemployed	97 (11.9)	3 (-8.6)	0 (-1.3)	0 (-1.9)
Class X: Students	99.2 (34.8)	0.8 (-25)	0 (-3.8)	0 (-5.2)
Class XI: Full-time home-tasks makers	25 (-0.9)	71.4 (0.7)	0 (-0.4)	3.6 (0.3)

(*): Numbers in brackets are standardised residuals. N = 9349
Pearson Chi-Square = 2623.7; Degrees of freedom = 24; Significance value = 0.000

Table C.14.
Social class and civil status for women in England (%)

Table A.4.II.14: Social Class and marital status for men in England (%)

Social Class	Civil Status: Single	Married or co-habiting	Separated or divorced	Widowed
Class I: Higher grade professionals, administrators and managers	10.8 (-11.3)	82.5 (7.5)	3.7 (-2.8)	2.9 (-2.4)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	17.5 (-3.5)	74.7 (2.4)	4.8 (-0.2)	3 (-2)
Class IIIab: Higher-grade routine nonmanual employees	38.1 (11.4)	55.7 (-5.3)	3.2 (-2.4)	3 (-1.3)
Class IVabc: Small proprietors and employers and self-employed workers	11.9 (-8.9)	79 (4.3)	6.6 (3)	2.5 (-2.9)
Class V: Lower-grade technicians and supervisors of manual workers	9.2 (-7.9)	78.1 (3)	5.7 (1)	7 (4.8)
Class VI: Skilled manual workers	20.2 (-1)	68.6 (-0.8)	5.8 (1.7)	5.4 (3.8)
Class VIIab: Nonskilled manual workers and agricultural workers	30.2 (8.2)	58.7 (-5.7)	5.9 (1.8)	5.1 (2.7)
Class VIII: Pensioners	100 (5.9)	0 (-2.9)	0 (-0.6)	0 (-0.5)
Class IX: Unemployed	95.1 (10.3)	4.9 (-5)	0 (-1.4)	0 (-1.6)
Class X: Students	96.7 (29.9)	3.3 (-14.5)	0 (-4)	0 (-3.8)
Class XI: Full-time home-tasks makers	50 (0.6)	50 (-0.4)	0 (-0.3)	0 (-0.3)

(*): Numbers in brackets are standardised residuals. N = 12263
Pearson Chi-Square = 2020.6; Degrees of freedom = 24; Significance value = 0.000

Tables C.15 to C.16 present the distribution of smoking status for both women and men. We can observe that approximately two thirds of the Spanish and English population are non-smokers. The percentage of non-smokers is slightly higher in England than in Spain for all individuals. Spain presents a larger amount of light and moderate smokers than England, while England has higher percentages of heavy smokers than Spain.

Table C.15
Smoking behaviour in Spain (%)

Smoking behaviour	Women (n=9769)	Men (n=9349)
Non smoker	67.68	68.24
Light smoker (1-10 cigarretes a day)	10.83	11.07
Moderate smoker (11-20 cigarretes a day)	15.79	15.65
Heavy smoker (> 20 cigarretes a day)	5.69	5.04

Table C.16
Smoking behaviour in England (%)

Smoking behaviour	Women (n=13776)	Men (n=12263)
Non smoker	71.08	71.03
Light smoker (1-10 cigarretes a day)	9.22	9.21
Moderate smoker (11-20 cigarretes a day)	10.41	10.49
Heavy smoker (> 20 cigarretes a day)	9.29	9.26

Regarding the link between different social classes and smoking status, no clear social pattern is observed. In fact, the chi-square test shows that the association between social class and smoking behaviour is non-significant in most cases. The association between class and smoking behaviour is statistically non-significant, except in the case of men in England[4]. Although the link between class and smoking behaviour is significant for men in England, the magnitude and sign of the residuals in Table C.17 suggests no clear social pattern.

Drinking behaviour is another indicator used to measure individuals' lifestyles. Individuals' drinking status is presumed to be associated with their general health condition. Tables C.18 and C.19 present the distribution of dinking behaviour among the English and the Spanish population. In general, we can observe that, in contrast to what we saw for smoking, drinking behaviour presents significant dissimilarities between the two countries. In England most individuals, around 60%, are classified as low level drinkers, approximately 20% are considered moderate drinkers and around 15% are non-drinkers. The remaining 5% is distributed unevenly among the rest of the categories. In Spain, around 40% of all individuals are non-drinkers and approximately 35% are low-level drinkers. Between 10 and 15% of the population has a very low drinking status. Approximately the same percentage is classified as moderate drinkers. Drinking does, therefore, seem to be heavier in England than in Spain for both men and women.

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[4] The exact values for the Pearson chi-square test are the following: 25.6 for Spanish women; 20 for Spanish men; and 26.6 for British women. None of these is significant with 95% confidence level. The degrees of freedom are 24 in all cases.

Table C.17
Social class and smoking behaviour for men in England (%)

Social Class	**Smoking behaviour** Non smoker	Light smoker (1-10 cigarretes a day)	Moderate smoker (11-20 cigarretes a day)	Heavy smoker (>20 cigarretes a day)
Class I: Higher grade professionals, administrators and managers	70.3 (-0.5)	8.7 (-0.9)	10.8 (0.5)	10.2 (1.6)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	72.2 (0.6)	9.1 (-0.1)	9.3 (-1.7)	9.4 (0.2)
Class IIIab: Higher-grade routine nonmanual employees	71.6 (0.2)	7.4 (-1.9)	10.9 (0.4)	10.2 (0.9)
Class IVabc: Small proprietors and employers and self-employed workers	71.2 (0.1)	9.5 (0.3)	10.6 (0.1)	8.8 (-0.7)
Class V: Lower-grade technicians and supervisors of manual workers	72.9 (0.7)	8.7 (-0.5)	11 (0.5)	7.4 (-1.9)
Class VI: Skilled manual workers	71.8 (0.4)	9.4 (0.3)	10.2 (-0.4)	8.6 (-1)
Class VIIab: Nonskilled manual workers and agricultural workers	70.3 (-0.4)	10.3 (1.5)	10 (-0.6)	9.4 (0.2)
Class VIII: Unemployed	58.5 (-0.9)	22 (2.7)	14.6 (0.7)	4.9 (-0.8)
Class IX: Full-time home-tasks makers	50 (-0.4)	0 (-0.4)	50 (1.8)	0 (-0.4)

(*): Numbers in brackets are standardised residuals. N = 12263
Pearson Chi-Square = 46.1; Degrees of freedom = 24; Significance value = 0.03

Table C.18
Drinking behaviour in Spain (%)

Drinking behaviour	Women (n=9769)	Men (n=9349)
Non drinker	38.58	39.74
Very low	11.26	10.78
Low	34.84	33.99
Moderate	12.62	13.02
High	3.7	2.47

Table C.19
Drinking behaviour in England (%)

Drinking behaviour	Women (n=13776)	Men (n=12263)
Non drinker	15.27	15.51
Very low	2.77	2.94
Low	58.99	58.78
Moderate	19.27	19.06
High	3.7	3.71

With respect to the association between class and drinking status, the overall link between these two variables is non-significant for all cases except Spanish women[5]. Therefore, the association between these two variables does not seem to be statistically significant. The divergence in the drinking behaviour among classes is non significant. Table C.20 provides some information about the association between drinking behaviour and social class for Spanish women. We can observe that most privileged social classes appear to drink less than we would expect if being part of this class category and drinking behaviour were not related. Women from classes IVabc to class IX also show statistically significant drinking behaviour significant and in the

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[5] The value of the Pearson chi-square is 49.6 for Spanish men, 71.4 for British women and 59.7 for British men. The degrees of freedom are 32 in all cases. Neither of these tests was accepted with a 95% confidence level.

following direction: more women than expected display drinking behaviour that could have a negative effect on their health.

An individual's lifestyle is also characterised by the level of physical activity that her principal activity requires. The physical exercise an individual does and, especially, the intensity of this, may have an impact on her health. Thus, the intensity of physical activity is another indicator selected here to study the effect of lifestyle on health. Tables C.21 and C.22 provide information on the physical exercise patterns in Spain and England. Generally, Spanish and English populations carry out daily activities that could be characterised as sedentary. Thus, 60% of the English population are classified as inactive. Approximately 20% are considered to perform light physical exercise in their principal activity. Around 15% carry out moderate activity. The percentage of individuals classified as vigorously active is very small. Spain presents a similar pattern although there are some slight differences. Around 60% of women and 40% of men develop a practical activity that requires light physical exercise; 30% of individuals have an inactive principal activity, and around 7% of men do a vigorous activity.

TableC.20
Social class and drinking behaviour for women in Spain (%)

Social Class	**Drinking behaviour**				
	Non drinker	**Very Low**	**Low**	**Moderate**	**High**
Class I: Higher grade professionals, administrators and managers	47.3 (2.9)	10.3 (-0.6)	32.9 (-0.7)	8.4 (-2.5)	1.1 (-2)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	38.5 (0)	15.4 (0.6)	30.8 (-0.4)	15.4 (0.4)	0 (-0.8)
Class IIIab: Higher-grade routine nonmanual employees	46.1 (2.7)	7.7 (-2.4)	33.5 (-0.5)	10.2 (-1.5)	2.6 (-0.2)
Class IVabc: Small proprietors and employers and self-employed workers	35.5 (-1.3)	13.4 (1.6)	36.6 (0.8)	11.9 (-0.5)	2.7 (-0.2)
Class V: Lower-grade technicians and supervisors of manual workers	34.7 (-0.8)	16.3 (1.5)	38.8 (0.9)	9.2 (-1)	1 (-1)
Class VI: Skilled manual workers	38.9 (0.1)	12 (0.6)	34.2 (-0.3)	12.4 (-0.2)	2.5 (-0.4)
Class VIIab: Nonskilled manual workers and agricultural workers	38 (-0.3)	12.2 (10)	33.2 (-0.9)	13.6 (1)	2.9 (0.4)
Class VIII: Unemployed	39.1 (0.1)	12.2 (0.3)	28.8 (-1.4)	17.9 (1.9)	1.9 (-0.6)
Class IX: Full-time home-tasks makers	36.9 (-1.7)	10.6 (-1.4)	36.5 (1.8)	13.1 (0.9)	2.9 (0.9)

(*): Numbers in brackets are standardised residuals. N = 9769
Pearson Chi-Square = 85.5; Degrees of freedom = 32; Significance value = 0.000

Table C.21
Physical exercise in Spain (%)

Level of physical exercise	Women (n=9769)	Men (n=9349)
Inactive	30.63	36.56
Light activity	61.06	42.97
Moderate activity	7.63	13.53
Vigorous activity	0.69	6.94

Table C.22
Physical exercise in England (%)

Level of physical exercise	Women (n=13776)	Men (n=12263)
Inactive	65.98	60.73
Light activity	22.07	23.92
Moderate activity	11.89	15.20
Vigorous activity	0.06	0.15

With respect to the link between class and exercise, the chi-square tests show that there is a moderate significant association between them. The value of the standardised residuals (see Tables C.23 to C.26) is considerably high for some class categories, suggesting that for these categories there is an association between these two variables that is statistically significant. However, the pattern of the association is not clear as the sign and magnitude of the residuals does not show a clear pattern across social classes. Thus, there is a significant link between the level of physical activity and most class categories, but the direction of this association is not unidirectional or unequivocal.

Table C.23
Social class and physical exercise for women in Spain (%)

Social Class	Level of physical exercise: Inactive	Light activity	Moderate activity	Vigorous activity
Class I: Higher grade professionals, administrators and managers	32.9 (0.9)	61.6 (0.2)	4.8 (-2.1)	0.7 (0)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	30.8 (0)	57.7 (-0.2)	11.5 (0.7)	0 (-0.4)
Class IIIab: Higher-grade routine nonmanual employees	61.4 (12.5)	32.9 (-8.1)	5.7 (-1.6)	0 (-1.9)
Class IVabc: Small proprietors and employers and self-employed workers	26.3 (-2)	62 (0.3)	9.8 (2)	1.9 (3.9)
Class V: Lower-grade technicians and supervisors of manual workers	32.7 (0.4)	52 (-1.1)	14.3 (2.4)	1 (0.3)
Class VI: Skilled manual workers	23.5 (-3.5)	63.3 (0.8)	12.3 (4.6)	1 (0.9)
Class VIIab: Nonskilled manual workers and agricultural workers	19.4 (-7)	67.3 (2.8)	11.3 (4.6)	2 (5.6)
Class VIII: Unemployed	35.3 (1)	60.9 (0)	3.8 (-1.7)	0 (-1.1)
Class IX: Full-time home-tasks makers	17.2 (-15.7)	74.5 (11.1)	7.9 (0.7)	0.4 (-2.2)

(*): Numbers in brackets are standardised residuals. N = 9769
Pearson Chi-Square = 1960.3; Degrees of freedom = 24; Significance value = 0.000

Table C.24
Social class and physical exercise for women in England (%)

Social Class	Level of physical exercise: Inactive	Light activity	Moderate activity	Vigorous activity
Class I: Higher grade professionals, administrators and managers	66.6 (0.2)	24.1 (1.3)	9.2 (-2.4)	0.1 (0.8)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	61.6 (-3)	25.63 (4.1)	12.8 (1.4)	0 (-0.5)
Class IIIab: Higher-grade routine nonmanual employees	70.1 (3.5)	20.9 (-1.7)	9 (-5.7)	0 (-0.2)
Class IVabc: Small proprietors and employers and self-employed workers	58.6 (-2.4)	25.3 (1.9)	16.1 (3.3)	0 (-0.6)
Class V: Lower-grade technicians and supervisors of manual workers	63.6 (-0.4)	19.2 (-0.9)	17.3 (2.3)	0 (-0.3)
Class VI: Skilled manual workers	71.6 (1.4)	19 (-1.4)	9.2 (-1.6)	0.2 (1.7)
Class VIIab: Nonskilled manual workers and agricultural workers	63.6 (-1.7)	21.4 (-0.9)	15 (5.2)	0.1 (0.2)
Class VIII: Unemployed	72.2 (0.5)	16.7 (-0.7)	11.1 (-0.1)	0 (-0.1)
Class IX: Full-time home-tasks makers	77.9 (2.7)	12.7 (-3.8)	9.4 (-1.3)	0 (-0.4)

(*): Numbers in brackets are standardised residuals. N = 13776
Pearson Chi-Square = 176.5; Degrees of freedom = 24; Significance value = 0.000

Table C.25
Social class and physical exercise for men in Spain (%)

Social Class	Inactive	Light activity	Moderate activity	Vigorous activity
	Level of physical exercise			
Class I: Higher grade professionals, administrators and managers	44 (3.7)	43.9 (0.4)	9.2 (-3.6)	2.9 (-4.6)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	43.2 (1.3)	39.4 (-0.7)	16.1 (0.9)	1.3 (-2.7)
Class IIIab: Higher-grade routine nonmanual employees	64.7 (12)	29.2 (-5.4)	5.6 (-5.6)	0.6 (-6.2)
Class IVabc: Small proprietors and employers and self-employed workers	23.7 (-8.7)	50.4 (4.6)	16 (2.8)	9.9 (4.3)
Class V: Lower-grade technicians and supervisors of manual workers	50.7 (4)	36.6 (-1.7)	11.1 (-1.3)	1.7 (-3.4)
Class VI: Skilled manual workers	25.9 (-9.2)	48.8 (4.6)	17.1 (5)	8.3 (2.7)
Class VIIab: Nonskilled manual workers and agricultural workers	22.9 (-9.4)	47.1 (2.6)	17.6 (4.6)	12.5 (8.7)
Class VIII: Unemployed	41.8 (1)	43.3 (0.1)	12.7 (-0.3)	2.2 (-2.1)
Class IX: Full-time home-tasks makers	17.9 (21.8)	82.1 (-11.9)	0 (-8.9)	0 (-8.1)

(*): Numbers in brackets are standardised residuals. N = 9349
Pearson Chi-Square = 1580.6; Degrees of freedom = 24; Significance value = 0.000

Table C.26
Social class and physical exercise for men in England (%)

Social Class	Level of physical exercise			
	Inactive	**Light activity**	**Moderate activity**	**Vigorous activity**
Class I: Higher grade professionals, administrators and managers	69.8 (5.8)	22.1 (-1.9)	8.1 (-9.1)	0 (-1.5)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	61.7 (0.5)	27.4 (3.1)	10.9 (-4.9)	0.1 (-1.2)
Class IIIab: Higher-grade routine nonmanual employees	64.2 (1.4)	23.9 (0)	11.9 (-2.6)	0 (-1.5)
Class IVabc: Small proprietors and employers and self-employed workers	51.1 (-5)	24.5 (0.5)	24.2 (9.3)	0.1 (-0.5)
Class V: Lower-grade technicians and supervisors of manual workers	59.7 (-0.4)	21.8 (-1.4)	18.4 (2.5)	0.1 (-0.4)
Class VI: Skilled manual workers	55.1 (-3.4)	25.6 (1.7)	19.1 (4.6)	0.3 (2)
Class VIIab: Nonskilled manual workers and agricultural workers	57.2 (-1.9)	23.6 (-0.3)	18.8 (3.9)	0.4 (2.6)
Class VIII: Unemployed	78 (1.4)	14.6 (-1.2)	7.3 (-1.3)	0 (-0.3)
Class IX: Full-time home-tasks makers	100 (0.8)	0 (-0.7)	0 (-0.6)	0 (-0.1)

(*): Numbers in brackets are standardised residuals. N = 12263
Pearson Chi-Square = 406.4; Degrees of freedom = 24; Significance value = 0.000

The last indicator to account for individuals' living habits included in the research is the Body Mass Index (BMI), which is a measure of the association between an individual's height and weight. As explained in Chapter 2, the BMI is an index constructed from an individual's height and weight. The values of this index are classified in four possible categories: underweight, normal, overweight and obese. An individual's BMI is an adequate reflection of her lifestyle since it captures information from a variety of personal habits such as the adequacy of nutrition or the practice of sport.

As with other lifestyle variables, the information on differences or similarities for this indicator between men and women and between England and Spain are captured in frequency tables (see Tables C.27 and C.28). We can observe that around half of the population has a normal BMI and 30% are overweight. English men are an exception, since half are overweight and approximately 35% have a normal BMI. The clearest difference between both countries in the distribution of the BMI across the population is found in relation to the obese population. Around 15% of English men and women are obese, whereas in Spain approximately 10% are included in this category. There are around 4% more underweight men in Spain as compared to England.

Table C.27
Body Mass Index in Spain

Body Mass index	**Women (n=9769)**	**Men (n=9349)**
Underweight	8.20	8.39
Normal	46.58	46.86
Overweight	35.87	35.12
Obese	9.36	9.64

Table C.28
Body Mass Index in England

Body Mass index	Women (n=13776)	Men (n=12263)
Underweight	7.22	4.40
Normal	43.84	36.57
Overweight	32.24	44.62
Obese	16.70	14.41

Regarding the association between social class and the BMI, there is a clear and significant link between these variables as the chi-square test as the standardised residuals suggest (see Tables C.29 to C.32). The pattern of this link is not clear in the Spanish case, while it follows a social gradient in the English case. Clear examples of the English social gradient are the positive and large residuals that the professional classes present for the "normal" category, and the large and negative residuals that categories V to VIIab present for the "obese" category. In almost all cases, the sequence of the residuals conforms to the social gradient. In other words, on the one hand, the most privileged social classes present more individuals than expected with a normal BMI and, on the other hand, the less privileged classes are obese to a greater extent than would be expected if class and BMI were unrelated.

Table C.29
Social class and BMI for women in Spain (%)

Social Class	Body Mass Index Underweight	Normal	Overweight	Obese
Class I: Higher grade professionals, administrators and managers	6.8 (-1)	46.1 (-0.1)	36.8 (0.3)	10.3 (0.6)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	0 (-1.5)	53.8 (0.5)	46.2 (0.9)	0 (-1.6)
Class IIIab: Higher-grade routine nonmanual employees	8.3 (0.3)	49 (0.8)	34.4 (-0.5)	8.3 (-0.8)
Class IVabc: Small proprietors and employers and self-employed workers	9.2 (0.9)	44.1 (-1)	37.2 (0.6)	9.5 (0.1)
Class V: Lower-grade technicians and supervisors of manual workers	10.2 (0.7)	42.9 (-0.6)	34.7 (-0.2)	12.2 (0.9)
Class VI: Skilled manual workers	8 (-0.1)	50.1 (1.4)	30.7 (-2.3)	11.2 (1.6)
Class VIIab: Nonskilled manual workers and agricultural workers	7.7 (-0.6)	46.4 (-0.1)	37 (0.6)	9 (-0.4)
Class VIII: Unemployed	12.8 (2)	41.7 (-0.9)	37.2 (0.3)	8.3 (-0.4)
Class IX: Full-time home-tasks makers	8.1 (-0.2)	45.7 (-0.9)	36.9 (1.2)	9.3 (-0.2)

(*): Numbers in brackets are standardised residuals. N = 9769
Pearson Chi-Square = 42.8; Degrees of freedom = 24; Significance value = 0.04

Table C.30
Social class and BMI for women in England (%)

Social Class	**Body Mass Index** Underweight	Normal	Overweight	Obese
Class I: Higher grade professionals, administrators and managers	5.3 (-2.1)	51.1 (3.3)	29.9 (-1.2)	13.7 (-2.2)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	5.9 (-2.6)	47.4 (3)	31.8 (-0.4)	14.8 (-2.5)
Class IIIab: Higher-grade routine nonmanual employees	7.7 (1.2)	45.7 (2.9)	32.5 (0.3)	14.1 (-4.1)
Class IVabc: Small proprietors and employers and self-employed workers	3.6 (-3.6)	42.5 (-0.5)	36 (1.8)	17.9 (0.8)
Class V: Lower-grade technicians and supervisors of manual workers	7.5 (0.1)	37.4 (-1.4)	32.7 (0.1)	22.4 (2.1)
Class VI: Skilled manual workers	8 (0.6)	38.8 (-1.6)	33.5 (0.5)	19.7 (2.5)
Class VIIab: Nonskilled manual workers and agricultural workers	7.1 (-0.2)	37.3 (-5.8)	33.6 (1.4)	22 (7.6)
Class VIII: Unemployed	19.4 (2.7)	44.4 (0.2)	22.2 (-1.1)	13.9 (-0.4)
Class IX: Full-time home-tasks makers	8.2 (0.6)	37.3 (-1.8)	34.2 (0.6)	20.3 (1.6)

(*): Numbers in brackets are standardised residuals. N = 13776
Pearson Chi-Square = 391.8; Degrees of freedom = 24; Significance value = 0.000

Table C.31
Social class and BMI for men in Spain (%)

	Body Mass Index			
Social Class	**Underweight**	**Normal**	**Overweight**	**Obese**
Class I: Higher grade professionals, administrators and managers	8.2 (-0.2)	49.4 (1.1)	33.2 (-1)	9.2 (-0.4)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	11 (1.1)	44.5 (-0.4)	32.9 (-0.5)	11.6 (0.8)
Class IIIab: Higher-grade routine nonmanual employees	8.4 (0.2)	44.8 (-0.8)	38.2 (1.3)	8.6 (-0.9)
Class IVabc: Small proprietors and employers and self-employed workers	9 (0.8)	45.9 (-0.5)	34.4 (-0.5)	10.7 (1.4)
Class V: Lower-grade technicians and supervisors of manual workers	9.7 (0.8)	50.3 (0.9)	30.2 (-1.4)	9.7 (0.3)
Class VI: Skilled manual workers	7.7 (-1.2)	46.8 (0)	36 (0.8)	9.5 (-0.3)
Class VIIab: Nonskilled manual workers and agricultural workers	8.5 (0.1)	46.1 (-0.4)	35.7 (0.4)	9.7 (0.1)
Class VIII: Unemployed	13.4 (2)	42.5 (-0.8)	32.1 (-0.6)	11.9 (0.9)
Class IX: Full-time home-tasks makers	14.3 (1.1)	53.6 (0.5)	21.4 (-1.2)	10.7 (0.3)

(*): Numbers in brackets are standardised residuals. N = 9349
Pearson Chi-Square = 31.4; Degrees of freedom = 24; Significance value = 0.4

Table C.32
Social class and BMI for men in England (%)

Social Class	Body Mass Index Underweight	Normal	Overweight	Obese
Class I: Higher grade professionals, administrators and managers	2.3 (-5.3)	35.1 (3)	49.1 (3.3)	13.6 (-1.1)
Class II: Lower-grade professionals, administrators and managers, and higher grade technicians	3.3 (-2.2)	38.1 (3.1)	46.1 (1)	12.4 (-2.3)
Class IIIab: Higher-grade routine nonmanual employees	7.3 (4.2)	41.5 (2.5)	40.7 (-1.8)	10.6 (-3.1)
Class IVabc: Small proprietors and employers and self-employed workers	2.2 (-4.2)	30.5 (-4)	49.6 (3)	17.7 (3.5)
Class V: Lower-grade technicians and supervisors of manual workers	3.4 (-1.4)	30.8 (-2.9)	47.4 (1.3)	18.4 (3.2)
Class VI: Skilled manual workers	4.2 (-0.5)	35.4 (-0.9)	44.6 (0)	15.8 (2.1)
Class VIIab: Nonskilled manual workers and agricultural workers	6.1 (3.4)	39.2 (1.8)	39.6 (-3.1)	15.1 (2.7)
Class VIII: Unemployed	17.1 (3.9)	61 (2.6)	14.6 (-2.9)	7.3 (-1.2)
Class IX: Full-time home-tasks makers	50 (3.1)	50 (0.3)	0 (-0.9)	0 (-0.3)

(*): Numbers in brackets are standardised residuals. N = 12263
Pearson Chi-Square = 632; Degrees of freedom = 24; Significance value = 0.000

C.2. Summary

In this appendix, we have analysed the distribution of the independent variables of the research, emphasizing their association with social class. Hence we have seen the distribution of education, civil status and lifestyle variables for men an women in England and Spain. The analysis suggests some interesting findings that I will summarise in the following paragraphs.

In relation to the degree of stratification that both countries presented in the mid-1990s, we have seen that there are some differences. Regarding women, dissimilarities in both countries are such that their situation in Spain is characterised by being largely outside the labour market and, when within it, occupying mainly unskilled, manual jobs. Women in England, on the other hand, are mainly in the labour market, occupying positions which are, similarly to men, distributed among all class categories. The distribution of men across social classes is more similar in both countries. One significant divergence is that England has a higher proportion of professionals, whereas Spain has a higher proportion of skilled manual workers. In any event, the detailed analysis of the social structures has shown that there are some significant differences in the social structure of both countries. Women in England occupy more higher-grade routine non-manual jobs, whereas in Spain they are largely found in skilled manual positions. English men are distributed among class categories V, VI and VIIab, whereas Spanish men are principally found in skilled and unskilled manual jobs.

Education is also distributed differently in the two countries. The level of educational achievement is higher in England for both men and women. One similarity in the two countries is that there is a gender gap favouring men, that is, women are in general less educated in both countries. In relation to the distribution of education among social classes, there are inequalities favouring the most privileged classes, and these are greater in England. The analysis of the chi-square test as well as of the standardised residuals has shown that for both men and women the differences in educational achievement are greater between the extremes of the social class continuum in England than in Spain.

The appendix has also analysed the association between civil status and social class. We have seen that although there is a significant association between these variables the sign and direction of the pattern is not clear. In relation to the distribution of civil status itself, this is similar in the two countries, that is, approximately two-thirds marry and the rest remain single. The only significant differences are firstly that marriages break up more frequently in England and secondly, that more people remain single in Spain.

Personal habits of men and women in both countries have also been analysed. We have seen that they are similar in both countries. In relation to smoking behaviour, most individuals (about two-thirds) are non-smokers and the association between smoking and class in not statistically significant, that is, smoking behaviour does not present a clear social pattern. Regarding drinking behaviour, England and Spain show some divergence, as the English population tends to consume more alcohol than the Spanish one. Class and drinking behaviour does also not present a significant social pattern. Another indicator of lifestyle that is analysed in this research is the degree of physical exercise that individuals do. The appendix has shown that Spanish and English populations mostly perform sedentary activities. Physical exercise and social class have a statistically significant association, although the pattern and direction of the association are unclear. The final indicator of lifestyle considered in this thesis is the association between individuals' weight and height. We have observed that approximately half of the population in both countries displays a normal association between height and weight and that around 30% are overweight. The link between social class and BMI is statistically significant and, contrary to the rest of the lifestyle variables, does present a clear social pattern in the English case. The social gradient in England is clear, that is, the movement from the professional classes to the other extreme of the class continuum implies that more individuals are underweight, overweight and obese than what we would have expected if class and BMI were independent.

APPENDIX D

D.1 Logit models for the Spanish case

Table D.1: Logistic regression for perceived health status. Coefficients (C) and Odds Ratio (OR) for models fitted to women, (standard errors in parentheses). Number of observations: 5742. Reference categories (RC) in parenthesis.

Model	**(1)**		**(2)**		**(3)**		**(4)**		**(5)**	
Log-likelihood	-4748.1		-3159.1		-3113.6		-3077.7		-2759.03	
Log-likelihood change			1589		45.5		35.9		318.7	
Social class (RC: Class VII)	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**
Class I	**0.885**	**2.42**	**0.678**	**1.956**	0.19	1.29	0.174	1.19	0.04	1.04
	(0.14)	(0.33)	(0.14)	(0.3)	(0.2)	(0.21)	(0.2)	(0.24)	(0.17)	(0.2)
Class II	0.56	1.75	0.196	1.21	-0.23	0.72	-0.253	0.775	-0.42	0.651
	(0.46)	(0.82)	(0.48)	(0.61)	(0.49)	(0.42)	(0.49)	(0.4)	(0.51)	(0.38)
Class IIIab	**1.22**	**3.39**	**0.822**	**2.227**	**0.43**	**1.54**	**0.518**	**1.68**	**0.49**	**1.63**
	(0.14)	(0.48)	(0.17)	(0.4)	(0.18)	(0.25)	(0.19)	(0.32)	(0.2)	(0.33)
Class IVabc	0.162	1.18	**0.58**	**1.78**	**0.52**	**1.7**	**0.54**	**1.72**	**0.46**	**1.58**
	(0.1)	(0.12)	(0.13)	(0.24)	(0.14)	(0.16)	(0.14)	(0.2)	(0.15)	(0.24)
Class V	**1.15**	**3.15**	**1.28**	**3.6**	**0.76**	**2.14**	**0.83**	**2.3**	**0.85**	**2.34**
	(0.29)	(0.92)	(0.4)	(1.4)	(0.31)	(0.9)	(0.4)	(0.9)	(0.33)	(1.01)
Class VI	**0.568**	**1.76**	**0.455**	**1.57**	**0.334**	**1.39**	**0.37**	**1.45**	**0.44**	**1.56**
	(0.1)	(0.18)	(0.11)	(0.22)	(0.14)	(0.2)	(0.14)	(0.21)	(0.16)	(0.25)
Class VIII	**1.4**	**4.02**	0.18	1.2	-0.152	0.858	-0.009	0.9	0.005	1
	(0.25)	(1.03)	(0.5)	(0.7)	(0.5)	(0.42)	(0.5)	(0.5)	(0.27)	(0.53)
Class IX	0.054	1.05	**0.355**	**1.42**	**0.37**	**1.317**	**0.336**	**1.39**	**0.3**	**1.35**
	(0.07)	(0.07)	(0.09)	(0.1)	(0.09)	(0.1)	(0.09)	(0.1)	(0.08)	(0.11)
Age (RC: 25-34 years old)										
35-44 age group			**-0.38**	**0.684**	**-0.3**	**0.74**	**-0.29**	**0.74**	**-0.26**	**0.77**
			(0.09)	(0.06)	(0.09)	(0.07)	(0.09)	(0.07)	(0.12)	(0.07)
45-54 age group			**-0.99**	**0.371**	**-0.81**	**0.44**	**-0.8**	**0.4**	**-0.62**	**0.53**
			(0.09)	(0.03)	(0.09)	(0.04)	(0.09)	(0.06)	(0.12)	(0.05)
55-65 age group			**-1.46**	**0.23**	**-1.2**	**0.3**	**-1.2**	**0.35**	**-0.78**	**0.45**
			(0.09)	(0.03)	(0.09)	(0.03)	(0.09)	(0.04)	(0.12)	(0.05)
Civil status (RC: Single)										
Married or cohabiting			**-0.38**	**0.674**	**-0.23**	**0.79**	**-0.26**	**0.77**	-0.19	0.82
			(0.09)	(0.09)	(0.1)	(0.09)	(0.12)	(0.06)	(0.1)	(0.11)
Separated or divorced			**-0.413**	**0.66**	**-0.34**	**0.7**	-0.34	0.7	-0.13	0.87
			(0.2)	(0.1)	(0.2)	(0.09)	(0.18)	(0.14)	(0.19)	(0.19)
Widowed			-0.244	0.78	-0.15	0.854	-0.17	0.84	-0.02	0.97
			(0.11)	(0.06)	(0.11)	(0.16)	(0.19)	(0.16)	(0.12)	(0.2)

Education (RC: Level 1)						
Level 2	**0.592**	**1.8**	**0.57**	**1.77**	**0.511**	**1.66**
	(0.08)	(0.15)	(0.06)	(0.1)	(0.09)	(0.1)
Level 3	**0.99**	**2.7**	**0.91**	**2.64**	**0.9**	**2.46**
	(0.13)	(0.35)	(0.1)	(0.25)	(0.1)	(0.34)
Level 4	**1.33**	**3.78**	**1.31**	**3.73**	**1.22**	**3.4**
	(0.19)	(0.7)	(0.14)	(0.7)	(0.2)	(0.7)
Level 5	**1.16**	**3.2**	**1.3**	**3.3**	**1.21**	**3.4**
	(0.19)	(0.6)	(0.19)	(0.64)	(0.2)	(0.7)
Smoke (RC: Non-smoker)						
Light smoker			0.01	1.01	0.02	1.0
			(0.1)	(0.1)	(0.08)	(0.12)
Moderate smoker			0.14	1.14	**0.22**	**1.24**
			(0.9)	(0.1)	(0.09)	(0.1)
Heavy smoker			**0.22**	**1.24**	**0.29**	**1.34**
			(0.1)	(0.1)	(0.14)	(0.02)
Drink (RC: Non-drinker)						
Very low			**-0.41**	**0.66**	**-0.42**	**0.65**
			(0.1)	(0.07)	(0.1)	(0.07)
Low			**-0.4**	**0.66**	**-0.38**	**0.67**
			(0.07)	(0.05)	(0.08)	(0.05)
Moderate			**-0.41**	**0.66**	**-0.422**	**0.64**
			(0.1)	(0.07)	(0.11)	(0.05)
Fairly high			**-0.97**	**0.37**	**-0.913**	**0.4**
			(0.2)	(0.16)	(0.22)	(0.08)
High			**-0.71**	**0.48**	**-0.832**	**0.43**
			(0.4)	(0.2)	(0.35)	(0.18)
Very high			**-1.64**	**1.93**	-1.38	0.26
			(0.7)	(0.13)	(0.77)	(0.2)
Physical exercise (RC: No activity)						
Light activity			**0.2**	**1.22**	0.09	1.09
			(0.08)	(0.1)	(0.09)	(0.1)
Moderate activity			**0.4**	**1.47**	**0.269**	**1.3**
			(0.1)	(0.19)	(0.1)	(0.15)
Vigorous activity			0.05	1.05	-0.07	0.93
			(0.3)	(0.3)	(0.3)	(0.32)
Relation between weight and height (BMI) (RC: Normal)						
Underweight			**-0.22**	**0.8**	**-0.302**	**0.74**
			(0.1)	(0.09)	(0.12)	(0.07)
Overweight			0.041	1.04	0.08	1.08
			(0.07)	(0.07)	(0.07)	(0.08)
Obese			-0.154	0.857	**-0.191**	**0.85**
			(0.1)	(0.09)	(0.08)	(0.07)
Short term dimension of objective health					**-0.62**	**0.534**
					(0.03)	(0.02)
Indicator of long term objective health					**-0.72**	**0.482**
					(0.05)	(0.02)

Table D.2: Standard deviation of the sheaf coefficients for the social class and education dummies from Table D.1					
Model	**1**	**2**	**3**	**4**	**5**
Class (nine categories)	.4	.232	.14	.17	.16
Class (seven categories)	.35	.27	.16	.19	.17
Education	-	-	0.343	0.33	0.3

Table D.3: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table D.1				
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**	**From 1 to 5 for class From 3 to 5 for education**
Class (nine categories)	61.3	76.6	71.6	73.33
Class (seven categories)	22.85	54.3	45.7	51.4
Education	-	-	3.8	12.5

Table D.4: Logistic regression for perceived health status. Coefficients (C) and Odds Ratio (OR) for models fitted to women, (standard errors in parentheses). Number of observations: 5837
Reference categories (RC) in parenthesis.

Model	**(1)**		**(2)**		**(3)**		**(4)**		**(5)**	
Log-likelihood	-4423.6		-2829.4		-2804.6		-2765.7		-2478.7	
Log-likelihood change			1594.2		24.8		38.9		287	
Social class (RC: Class VII)	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**
Class I	**0.54**	**1.71**	**0.67**	**1.9**	**0.282**	**1.32**	**0.352**	**1.42**	**0.4**	**1.46**
	(0.1)	(0.17)	(0.1)	(0.2)	(0.14)	(0.14)	(0.14)	(0.2)	(0.15)	(0.22)
Class II	**0.478**	**1.61**	**0.531**	**1.70**	0.172	1.2	0.24	1.27	0.43	1.54
	(0.21)	(0.33)	(0.21)	(0.37)	(0.25)	(0.3)	(0.25)	(0.3)	(0.28)	(0.44)
Class IIIab	**0.83**	**2.29**	**0.778**	**2.17**	**0.427**	**1.53**	**0.561**	**1.75**	**0.585**	**1.79**
	(0.12)	(0.28)	(0.12)	(0.27)	(0.15)	(0.22)	(0.16)	(0.28)	(0.17)	(0.3)
Class IVabc	**0.23**	**1.27**	**0.489**	**1.64**	**0.4**	**1.49**	**0.403**	**1.49**	**0.387**	**1.47**
	(0.07)	(0.1)	(0.1)	(0.17)	(0.1)	(0.12)	(0.1)	(0.15)	(0.1)	(0.16)
Class V	**0.77**	**2.17**	**1.04**	**2.85**	**0.62**	**1.87**	**0.691**	**1.99**	**0.77**	**2.07**
	(0.17)	(0.37)	(0.2)	(0.63)	(0.23)	(0.43)	(0.23)	(0.47)	(0.2)	(0.35)
Class VI	**0.13**	**1.14**	**0.142**	**1.15**	0.053	1.08	0.071	1.09	0.03	1.03
	(0.06)	(0.07)	(0.09)	(0.1)	(0.09)	(0.08)	(0.09)	(0.09)	(0.09)	(0.08)
Class VIII	**1.37**	**3.937**	0.242	1.27	-0.054	0.94	-0.06	0.94	-0.004	0.99
	(0.3)	(1.2)	(0.6)	(0.8)	(0.6)	(0.6)	(0.6)	(0.6)	(0.66)	(0.66)
Class IX	-0.03	0.96	0.549	1.74	0.427	1.53	0.466	1.6	0.7	2.02
	(0.42)	(0.4)	(0.6)	(0.99)	(0.5)	(0.9)	(0.58)	(0.9)	(0.6)	(1.27)
Age (RC: 25-34 years old)										
35-44 age group			**-0.3**	**0.73**	**-0.24**	**0.78**	**-0.231**	**0.79**	**-0.212**	**0.8**
			(0.12)	(0.08)	(0.1)	(0.08)	(0.1)	(0.08)	(0.11)	(0.09)
45-54 age group			**-0.76**	**0.46**	**-0.62**	**0.53**	**-0.606**	**0.544**	**-0.417**	**0.657**
			(0.1)	(0.05)	(0.1)	(0.05)	(0.1)	(0.06)	(0.11)	(0.07)
55-65 age group			**-1.29**	**0.27**	**-1.1**	**0.33**	**-1.05**	**0.3**	**-0.681**	**0.5**
			(0.09)	(0.03)	(0.1)	(0.03)	(0.1)	(0.03)	(0.11)	(0.05)
Civil status (RC: Single)										
Married or			0.047	1.04	0.09	1.1	0.09	1.09	0.191	1.21
cohabiting			(0.08)	(0.1)	(0.09)	(0.1)	(0.09)	(0.1)	(0.1)	(0.12)
Separated or			-0.212	0.8	-0.21	0.8	-0.2	0.818	-0.185	0.83
divorced			(0.22)	(0.19)	(0.24)	(0.19)	(0.25)	(0.2)	(0.2)	(0.22)
Widowed			**-0.54**	**0.8**	-0.33	0.71	-0.319	0.72	-0.381	0.686
			(0.16)	(0.09)	(0.27)	(0.1)	(0.27)	(0.2)	(0.29)	(0.2)
Education (RC: Level 1)										
Level 2					**0.33**	**1.46**	**0.327**	**1.4**	**0.33**	**1.4**
					(0.09)	(0.11)	(0.1)	(0.13)	(0.08)	(0.1)
Level 3					**0.813**	**2.25**	**0.821**	**2.27**	**0.829**	**2.2**
					(0.1)	(0.21)	(0.1)	(0.3)	(0.14)	(0.33)
Level 4					**0.731**	**2.07**	**0.756**	**2.13**	**0.779**	**2.17**
					(0.1)	(0.26)	(0.17)	(0.3)	(0.18)	(0.4)
Level 5					**0.96**	**2.61**	**1.03**	**2.82**	**1.054**	**2.88**
					(0.18)	(0.4)	(0.18)	(0.52)	(0.15)	(0.56)

Smoke (RC: Non-smoker)				
Light smoker	**-0.25** (0.08)	**0.779** (0.08)	**-0.26** (0.11)	**0.766** (0.08)
Moderate smoker	-0.023 (0.07)	0.97 (0.09)	-0.024 (0.08)	0.99 (0.09)
Heavy smoker	-0.17 (0.1)	0.839 (0.12)	-0.18 (0.16)	0.83 (0.1)
Drink (RC: Non-drinker)				
Very low	**-0.25** (0.1)	**0.775** (0.09)	**-0.252** (0.1)	**0.77** (0.08)
Low	**-0.438** (0.08)	**0.646** (0.05)	**-0.373** (0.08)	**0.68** (0.05)
Moderate	**-0.411** (0.1)	**0.662** (0.07)	**-0.4** (0.09)	**0.7** (0.08)
Fairly high	**-0.666** (0.23)	**0.513** (0.12)	**-0.6** (0.18)	**0.53** (0.13)
High	-0.394 (0.6)	0.675 (0.5)	-0.07 (0.65)	0.93 (0.6)
Very high	**-1.64** (0.7)	**0.19** (0.14)	-1.37 (0.78)	0.276 (0.17)
Physical exercise (RC: No activity)				
Light activity	**0.21** (0.08)	**1.23** (0.1)	0.094 (0.08)	1.08 (0.09)
Moderate activity	**0.338** (0.08)	**1.4** (0.12)	**0.205** (0.11)	**1.22** (0.19)
Vigorous activity	**0.417** (0.11)	**1.53** (0.1)	**0.309** (0.14)	**1.36** (0.17)
Relation between weight and height (BMI) (RC: Normal)				
Underweight	**-0.22** (0.1)	**0.8** (0.07)	**-0.264** (0.1)	**0.767** (0.09)
Overweight	**0.15** (0.07)	**1.16** (0.09)	**0.193** (0.08)	**1.21** (0.09)
Obese	-0.177 (0.11)	0.833 (0.07)	-0.133 (0.12)	0.87 (0.1)
Short term dimension of objective health			**-0.56** (0.04)	**0.58** (0.02)
Indicator of long term objective health			**-0.824** (0.16)	**0.438** (0.02)

Table D.5: Standard deviation of the sheaf coefficients for the social class and education dummies From Table D.4					
Model	**1**	**2**	**3**	**4**	**5**
Class (nine categories)	.3	.26	.17	.201	.2
Class (seven categories)	.255	.15	.12	.14	.127
Education	-	-	0.29	0.31	0.3

Table D.6: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table D.4				
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**	**From 1 to 5 for class From 3 to 5 for education**
Class (nine categories)	36.6	58.5	50.9	51.2
Class (seven categories)	41.2	52.9	45	50.2
Education	-	-	-6.9	3.44

D.2. Further analysis of the relationship between social class and the subjective dimension of health for the Spanish case

D.2.1. Predicted probabilities for the ordered probit models

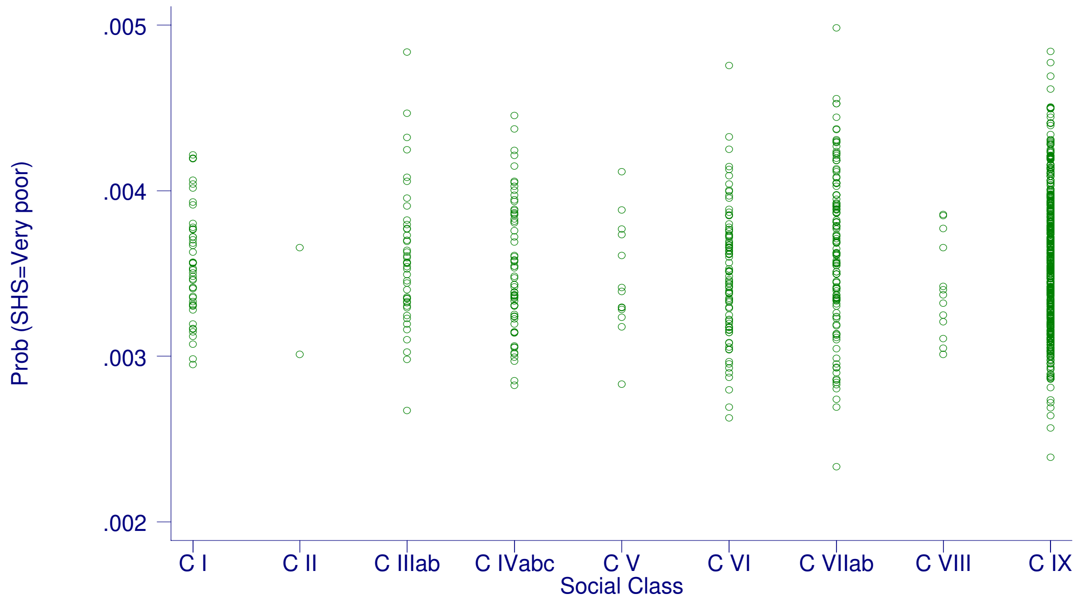
To further examine the nature of the relationship between social class and health and the differences among social classes in this association, I have calculated the predicted probabilities of being, on the one hand, in good health and, on the other, in poor health. I have performed this analysis not in order to predict the probabilities of having good or bad self-perceived health, but with the aim of analysing how these probabilities differ among social classes as well as how they vary when we change the value of the explanatory variables. The information obtained in this analysis will allow additional testing of the adequacy of the explanatory model.

I will start by presenting the simulations for the model that contains all the variables of the analysis for subjective health, that is, model (5) in Tables 5.13 and 5.16 in Chapter 5. To compute the predicted probabilities of being healthy or unhealthy I have proceeded in the following way. Firstly, I have set the class variable equal to its seventh category (that is, unskilled or nonskilled manual workers and agricultural workers). The rest of the variables included in the model (education, age, civil status, smoke, drink, sport, BMI, short-term and long-term dimensions of health) have been given their mean values. Secondly, I have simulated the estimated probabilities for each category of subjective health status (SHS) –that is, very poor, poor, fair, good and very good-.

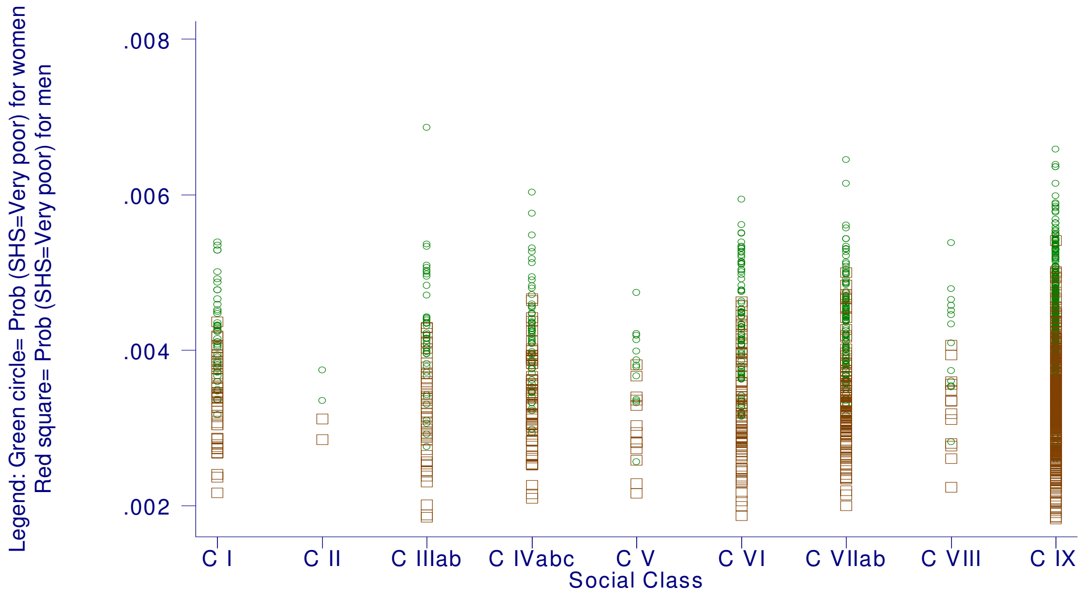
Graphs D.1 to D.4 give the results. The probability of having very poor health for each social class is shown in Graph D.1. We can observe that as we move from social class I (i.e. professionals, administrators and managers) to the last category (i.e. full time homemakers) the probability of being in a poor health widens and increases simultaneously, although the evolution is not perfectly gradual from each category to the next. However, some gaps are remarkable, such as the one between class I and class VIIab, or between class I and class IX. The probability of an individual in the first category of being unhealthy is lower than that of classes VIIab and IX. Graph D.2 presents the results for women and men separately. We can see that the same trend holds for each sex and that women have a greater probability of being unhealthy than men do.

If we now turn to the probability of being healthy (Graph D.3), it can be seen that as we move to the right in the class axis, the probability of good health widens and disperses. The trend is not perfectly clear, but the first categories of class seem to have a better chance of enjoying good health, as they present high scores in the predicted probabilities and the dispersion is less pronounced than the one presented by the other class categories. Thus, the range of probabilities for class I is (0.693, 0.723) whereas for class IX it is (0.691, 0.718). Graph D.4 gives the results separately for women and men. Once again, men are more likely than women to be healthy. Hence, the range of probabilities is (0.702, 0.741) for men and (0.678, 0.7) for women.

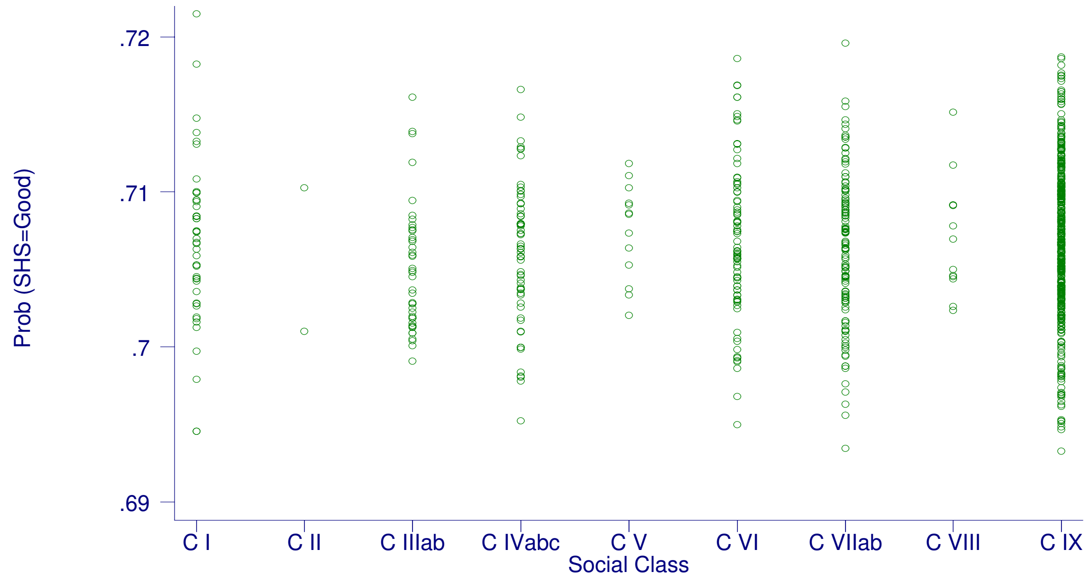
Graph D.1. Predicted probabilities of having a very poor health (Class set at class VII, other variables at their mean)



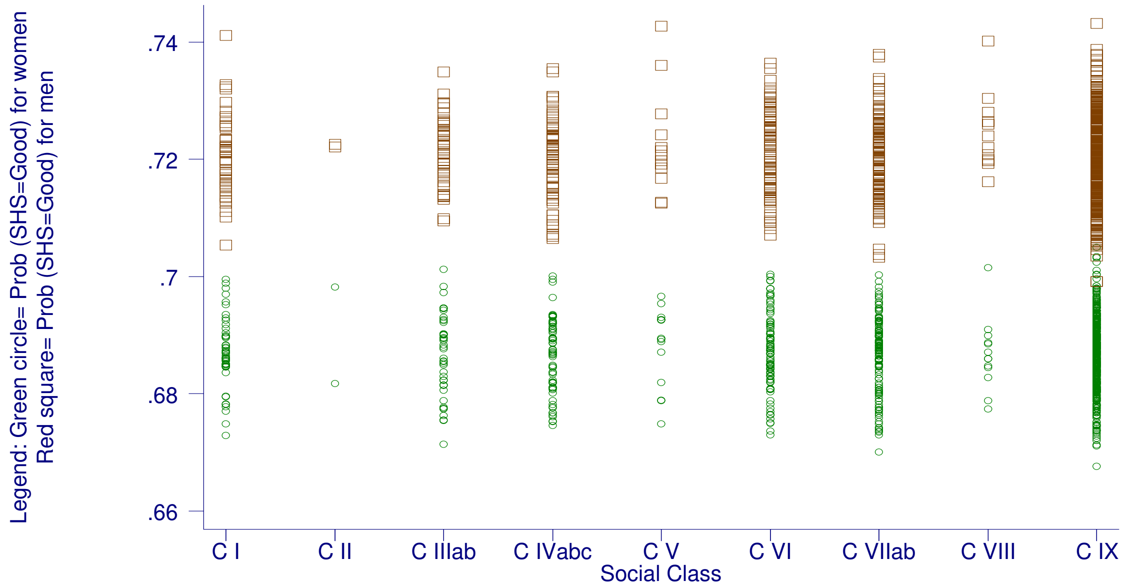
Graph. D.2. Predicted probabilities of having a very poor health by gender (Class set at class VII, other variables at their mean)



Graph D.3. Predicted probabilities of having a good health (Class set at class VII, other variables at their mean)



Graph D.4. Predicted probabilities of having a good health by gender (Class set at class VII, other variables at their mean)

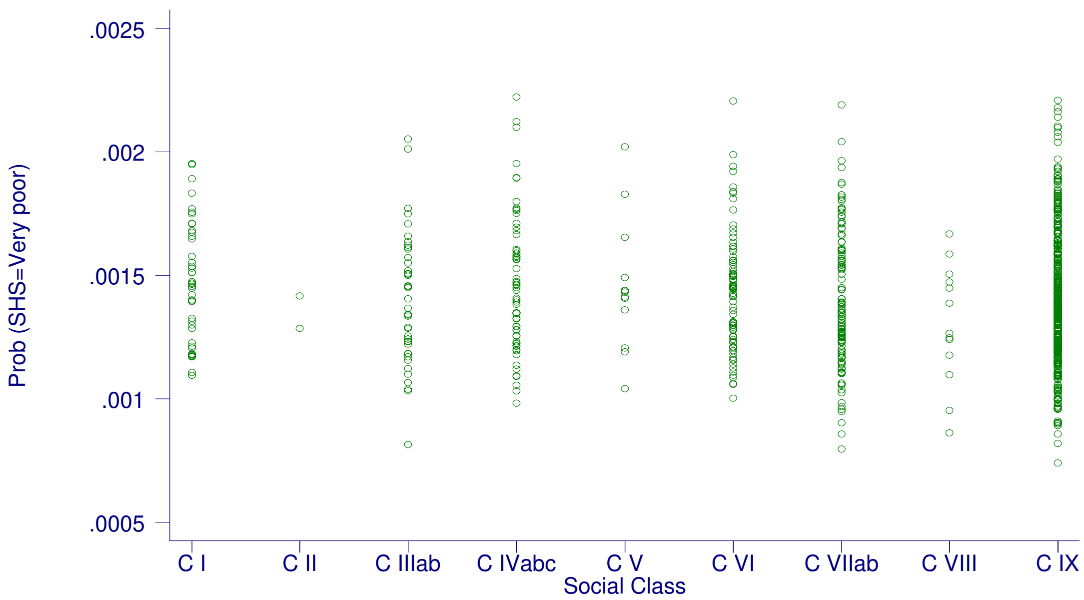


It is also interesting to see how the predicted probabilities of the previous graphs are transformed when the value of one of the explanatory variables changes. This analysis provides another test for the adequacy of the explanatory mechanisms posited in this thesis. I have focused on the study of the role of education. For that purpose I have re-run the simulations for the final model, changing the value of education from its mean to its maximum value and leaving the remaining variables set at their previous values (i.e. class at category VII and the other variables at their mean). The change in the predicted probabilities will therefore show how the probabilities of being healthy or unhealthy vary when an individual changes her level of education from the mean to the maximum. The results are presented in Graphs D.5 to D.12.

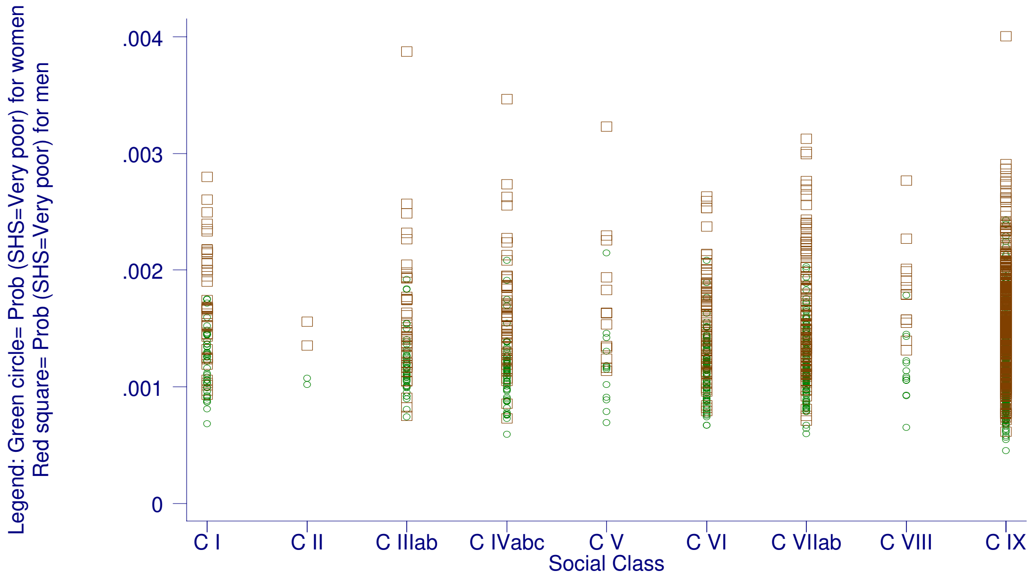
Graph D.5 shows that the probability of being unhealthy decreases greatly when education increases to its maximum value. The range of probabilities decreases from (0.0024, 0.005) in Graph D.1 to (0.0007, 0.0022) in Graph D.5. When we disaggregate by gender (see Graph D.6), we observe a similar decrease in the range of probabilities. We can also see that differences among women and men diminish. The probability of enjoying good health, on the other hand, results in a general increase changing the probabilities range from (0.692, 0.722) in Graph D.3 to (0.722, 0.754) in Graph D.7. Therefore, one first effect of increasing the educational achievement of individuals is to increases their probability of good health. A second effect that the graphs capture is a reduction in the differences in the predicted probabilities between social classes.

It seems, therefore, that results from this simulation exercise provide further support for some parts of the explanatory model presented in this research, and in particular for mechanism (2). It has been shown that dissimilarities in the health status of social classes can be reduced when they achieve similar educational levels. Hence, education is a significant mediator between class and health.

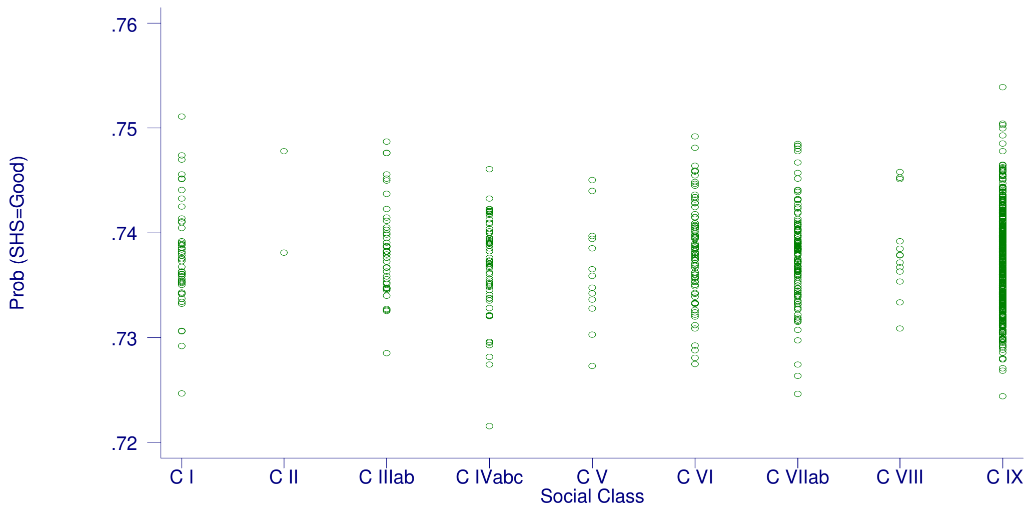
Graph D.5. Predicted probabilities of having a very poor health (Class set at class VII, education at its maximum value and other variables at their mean)



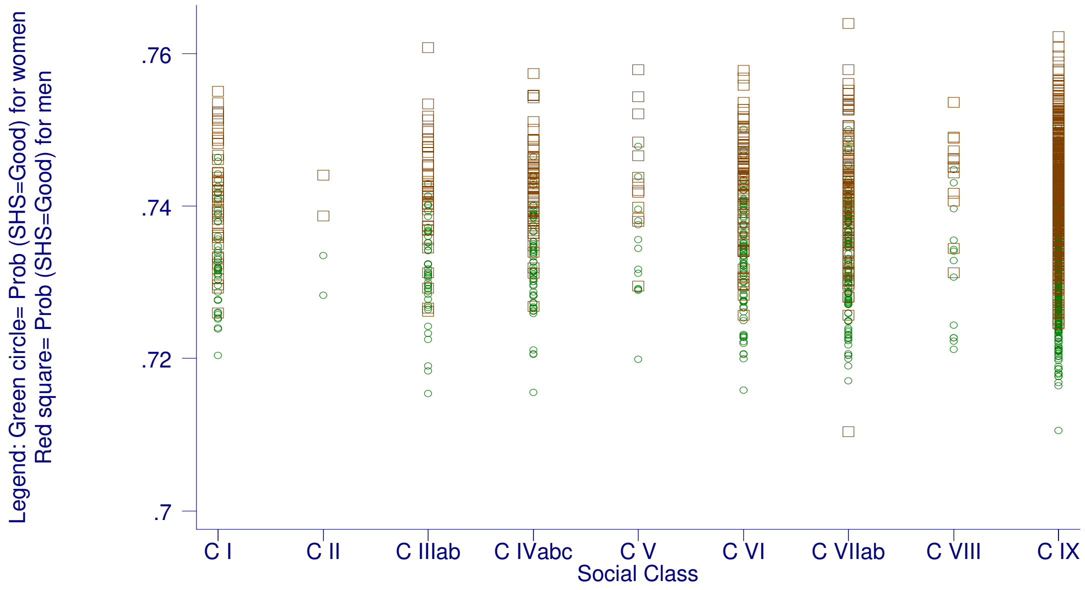
Graph D.6. Predicted probabilities of having a very poor health by gender (Class set at class VII, education at its maximum. value and other variables at their mean)



Graph D.7. Predicted probabilities of having a good health
(Class set at class VII, education at its maximum. value and other variables at their mean)



Graph D.8. Predicted probabilities of having a good health by gender (Class set at class VII, education at its maximum. value and other variables at their mean)



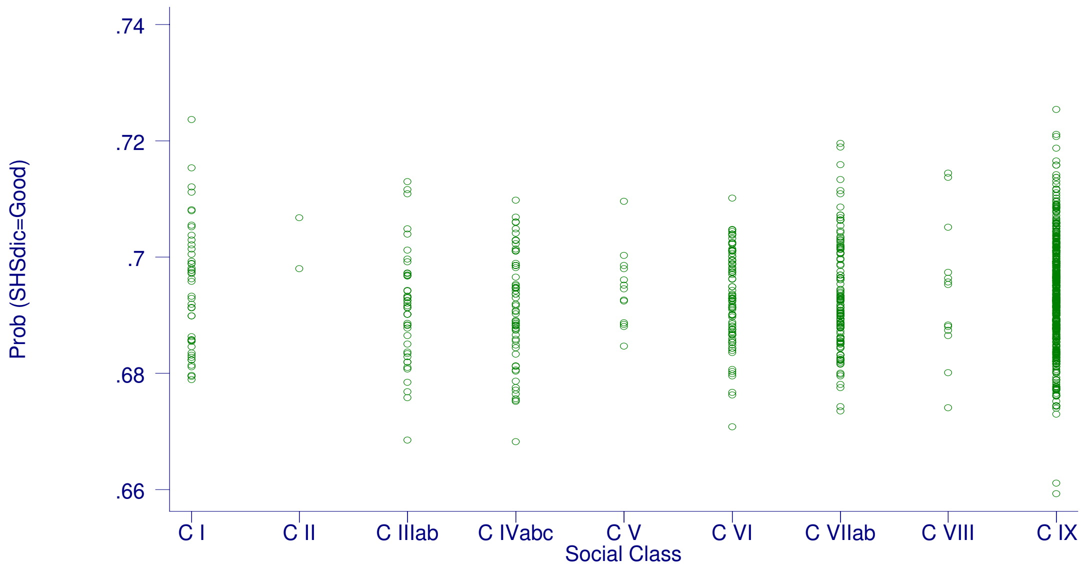
D.2.2. Predicted probabilities for the logit models

This section includes a series of graphs that reproduce a similar exercise to the simulation exercise performed with the ordered probit models, but in this case carried out for the logit models run for subjective health as a binary variable. Subjective health status has been re-coded in two values. The values "very poor", "poor" and "fair" have been re-coded as "not good health" and, the values "good" and "very good" as "good health". All the graphs show the predicted probabilities of having good health and poor health for all individuals. The difference in each set of graphs is the value at which the variables have been set. Graphs D.9 and D.10 present the predicted probabilities that have been calculated with class set at class VII, education at its minimum value, and all other variables at their mean value. The next set of graphs, Graphs D.11 and D.12, presents the predicted probabilities calculated with class set at class VII, and the remaining variables at their mean value. The last set of graphs, Graphs D.13 and D.14, have been computed with class set at category VII, education at its maximum value, and the remaining variables at their mean value.

Thus, this design makes it possible to analyse the effect that increasing education has on the probabilities of having good or poor health. Hence, the range of probabilities of having good health is (0.66, 0.722) when education is set at its minimum value, (0.765, 0.798) when education is set at its mean value, and (0.768, 0.799) when education is set equal to its maximum value. The range of probabilities of having a poor health for the same sequence is (0.278, 0.34), (0.203, 0.233) and (0.201, 0.231). Hence, an increase in education, *certeris paribus,* does lead to higher probabilities of being healthy and, accordingly, lower probabilities of having poor health. The impact of education is especially great when we move from its minimum to its mean level. The positive effect on health, on the other hand, of moving from education at its mean value to education at its maximum value is still positive but much lower.

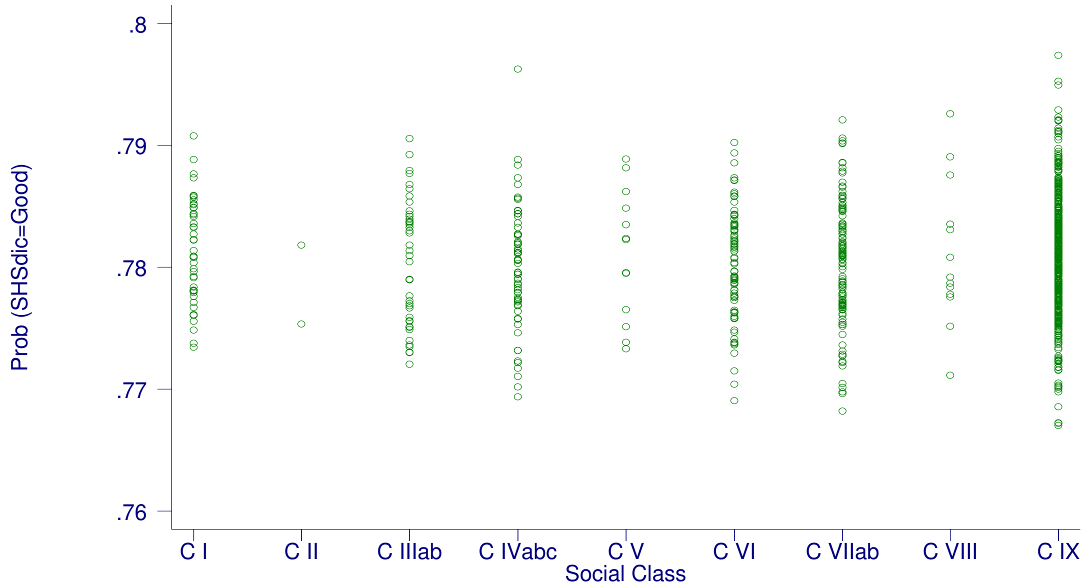
The evidence presented in this appendix provides further data with which to assess the validity of the second explanatory mechanism presented in Chapter 2. The simulation exercises have made it possible to test, first, the influence on health of increasing education, second the impact of increasing education on the health gap among social classes, and third the effect that increasing education has in the health gap between women and men. We have seen that as education increases, the probability of good health rises for all individuals, and that differences in achieving good health among social classes, on the one hand, and between men and women, on the other hand, decrease. The evidence, therefore, provides support for the association posited in mechanism (2) between class, education and health.

Graph D.9. Predicted probabilities of having a good health
(Class set at class VII, education at its minimum. value and other variables at their mean)

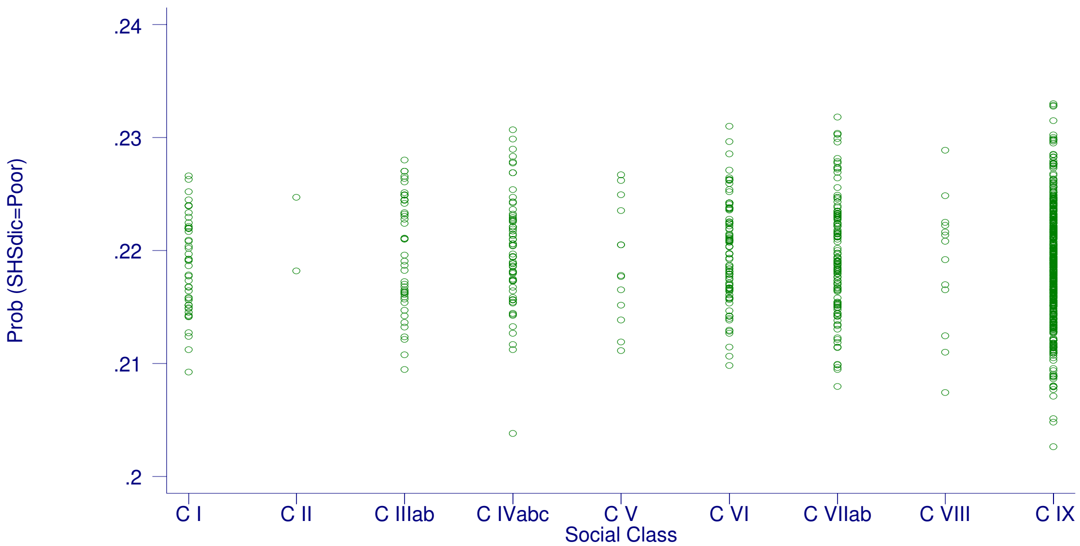


Graph D.10. Predicted probabilities of having a poor health
(Class set at class VII, education at its minimum. value and other variables at their mean)

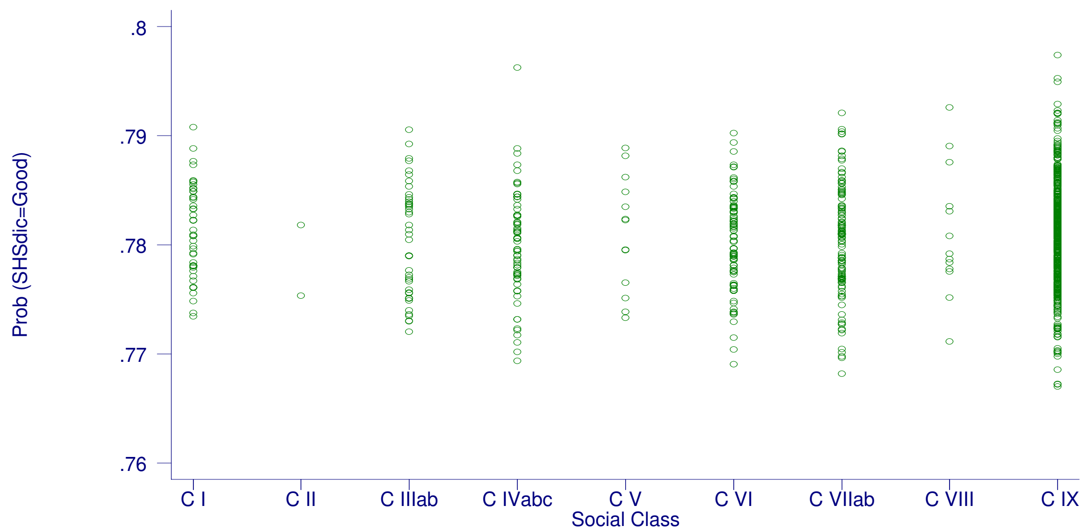
Graph D.11. Predicted probabilities of having a good health
(Class set at class VII and other variables at their mean)



Graph D.12. Predicted probabilities of having a poor health
(Class set at class VII and other variables at their mean)



Graph D.13. Predicted probabilities of having a good health
(Class set at class VII, education at its maximum value and other variables at their mean)



Graph D.14. Predicted probabilities of having a poor health
(Class set at class VII, education at its maximum and other variables at their mean)

APPENDIX E

E.1. Logit models for the British case

Table E.1: Logistic regression for perceived health status. Coefficients (C) and Odds Ratio (OR) for models fitted to women, (standard errors in parentheses). Number of observations: 9131. Reference categories (RC) in parenthesis.

Model	**(1)**		**(2)**		**(3)**		**(4)**		**(5)**	
Log-likelihood	-7063.3		-4278.8		-4226		-4160.6		-3436.1	
Log-likelihood change			2784.5		52.8		65.4		724.5	
Social class (RC: Class VII)	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**
Class I	**1.266**	**3.54**	**1.11**	**3**	**0.653**	**1.98**	**0.64**	**1.9**	**0.546**	**1.7**
	(0.11)	(0.39)	(0.12)	(0.33)	(0.14)	(0.24)	(0.14)	(0.27)	(0.13)	(0.25)
Class II	**0.78**	**2.181**	**0.77**	**2.2**	**0.412**	**1.5**	**0.39**	**1.417**	**0.36**	**1.45**
	(0.06)	(0.13)	(0.06)	(0.16)	(0.08)	(0.1)	(0.08)	(0.09)	(0.07)	(0.1)
Class IIIab	**0.64**	**1.906**	**0.63**	**1.9**	**0.472**	**1.6**	**0.45**	**1.56**	**0.45**	**1.536**
	(0.05)	(0.1)	(0.05)	(0.13)	(0.05)	(0.08)	(0.07)	(0.11)	(0.06)	(0.09)
Class IVabc	**0.62**	**1.86**	**0.87**	**2.4**	**0.685**	**1.9**	**0.45**	**1.9**	**0.47**	**1.78**
	(0.09)	(0.18)	(0.1)	(0.3)	(0.1)	(0.16)	(0.1)	(0.2)	(0.11)	(0.26)
Class V	0.171	1.18	**0.44**	**1.55**	**0.421**	**1.52**	**0.38**	**1.47**	**0.39**	**1.6**
	(0.15)	(0.18)	(0.2)	(0.3)	(0.2)	(0.3)	(0.16)	(0.31)	(0.18)	(0.26)
Class VI	-0.08	0.92	-0.1	0.99	-0.08	0.922	-0.08	0.995	-0.02	0.844
	(0.1)	(0.09)	(0.11)	(0.11)	(0.11)	(0.14)	(0.11)	(0.11)	(0.12)	(0.12)
Class VIII	0.504	1.656	0.69	1.99	0.96	2.61	0.93	2.66	0.9	2.53
	(0.4)	(0.66)	(1.1)	(2.2)	(1.1)	(2.87)	(1.1)	(2.9)	(0.44)	(3.1)
Class IX	**-0.34**	**0.709**	**-0.63**	**0.52**	**-0.58**	**0.55**	**-0.51**	**058**	**-0.55**	**0.47**
	(0.11)	(0.08)	(0.16)	(0.08)	(0.16)	(0.09)	(0.17)	(0.1)	(0.13)	(0.08)
Age (RC: 25-34 years old)										
35-44 age group			**-0.193**	**0.824**	-0.08	0.918	-0.05	0.934	0.137	1.14
			(0.1)	(0.09)	(0.08)	(0.1)	(0.1)	(0.07)	(0.11)	(0.14)
45-54 age group			**-0.675**	**0.5**	**-0.465**	**0.628**	**-0.406**	**0.665**	-0.08	0.91
			(0.1)	(0.05)	(0.08)	(0.05)	(0.1)	(0.07)	(0.11)	(0.08)
55-65 age group			**-0.983**	**0.373**	**-0.708**	**0.492**	**-0.61**	**0.54**	0.021	1.021
			(0.1)	(0.04)	(0.08)	(0.05)	(0.1)	(0.04)	(0.11)	(0.13)
Civil status (RC: Single)										
Married or cohabiting			**0.23**	**1.2**	**0.22**	**1.3**	**0.2**	**1.3**	0.2	1.235
			(0.07)	(0.08)	(0.07)	(0.12)	(0.09)	(0.12)	(0.08)	(0.13)
Separated or divorced			-0.102	0.9	-0.06	0.94	-0.05	0.95	0.06	1.05
			(0.1)	(0.08)	(0.1)	(0.11)	(0.1)	(0.11)	(0.11)	(0.14)
Widowed			-0.217	1.24	-0.29	1.34	-0.31	1.34	0.03	1.43
			(0.09)	(0.08)	(0.16)	(0.21)	(0.1)	(0.22)	(0.1)	(0.27)
Education (RC: Level 1)										

Level 2	**0.468**	**1.59**	**0.424**	**1.52**	**0.42**	**1.53**
	(0.07)	(0.14)	(0.09)	(0.1)	(0.07)	(0.16)
Level 3	**0.66**	**1.93**	**0.61**	**1.84**	**0.62**	**1.95**
	(0.06)	(0.14)	(0.07)	(0.14)	(0.07)	(0.16)
Level 4	**0.758**	**2.13**	**0.7**	**2.02**	**0.803**	**2.57**
	(0.11)	(0.23)	(0.11)	(0.22)	(0.1)	(0.23)
Level 5	**0.851**	**2.34**	**0.762**	**2.14**	**0.915**	**2.52**
	(0.12)	(0.29)	(0.12)	(0.27)	(0.12)	(0.3)
Smoke (RC: Non-smoker)						
Light smoker			-0.04	0.952	0.084	1.088
			(0.09)	(0.09)	(0.08)	(0.09)
Moderate smoker			-0.031	0.968	-0.03	0.94
			(0.07)	(0.08)	(0.1)	(0.07)
Heavy smoker			0.007	0.992	0.03	1.097
			(0.09)	(0.08)	(0.08)	(0.09)
Drink (RC: Non-drinker)						
Very low			0.047	1.058	0.07	1.096
			(0.16)	(0.14)	(0.15)	(0.16)
Low			-0.021	0.98	-0.031	1.069
			(0.06)	(0.06)	(0.06)	(0.07)
Moderate			0.94	1.09	0.137	1.147
			(0.09)	(0.01)	(0.08)	(0.09)
Fairly high			-0.066	0.935	-0.04	0.96
			(0.13)	(0.15)	(0.14)	(0.16)
High			-0.046	1.04	-0.75	0.92
			(0.66)	(0.6)	(0.71)	(0.47)
Very high			0.744	2.105	0.593	1.81
			(0.79)	(1.67)	(0.79)	(1.44)
Physical exercise (RC: No activity)						
Light activity			**0.161**	**1.175**	0.1	1.1
			(0.05)	(0.07)	(0.06)	(0.06)
Moderate activity			**0.25**	**1.28**	**0.22**	**1.24**
			(0.08)	(0.11)	(0.07)	(0.09)
Vigorous activity			0.56	1.75	0.711	2.18
			(1.2)	(2.1)	(1.31)	(2.66)
Relation between weight and height (BMI) (RC: Normal)						
Underweight			**-0.298**	**0.74**	**-0.285**	**0.751**
			(0.12)	(0.06)	(0.14)	(0.1)
Overweight			**-0.356**	**0.7**	**-0.311**	**0.732**
			(0.06)	(0.04)	(0.07)	(0.04)
Obese			**-0.785**	**0.45**	**-0.613**	**0.541**
			(0.07)	(0.03)	(0.06)	(0.03)
Short term dimension of objective health					**-0.249**	**0.779**
					(0.02)	(0.01)
Indicator of long term objective health					**-1.22**	**0.3**
					(0.03)	(0.0)

Table E.2: Standard deviation of the sheaf coefficients for the Social class and education dummies from Table E.1					
Model	**1**	**2**	**3**	**4**	**5**
Class (nine categories)	.4	.388	.277	.26	.268
Class (seven categories)	.4	.37	.24	.23	.22
Education	-	-	0.338	0.31	0.33

Table E.3: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table E.1				
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**	**From 1 to 5 for class From 3 to 5 for education**
Class (nine categories)	3	30.75	35	33
Class (seven categories)	7.5	40	42.5	45
Education	-	-	8.26	2.36

Table E.4: Logistic regression for perceived health status. Coefficients (C) and Odds Ratio (OR) for models fitted to men, (standard errors in parentheses). Number of observations: 8448. Reference categories (RC) in parenthesis.

Model	**(1)**		**(2)**		**(3)**		**(4)**		**(5)**	
Log-likelihood	-6137.1		-3748.9		-3716.8		-3636.3		-3028.5	
Log-likelihood change			2388.2		32.1		80.5		607.8	
Social class (RC: Class VII)	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**	**C**	**OR**
Class I	**1.12**	**3.08**	**1.42**	**4.14**	**0.989**	**2.69**	**1.03**	**2.8**	**1.03**	**2.8**
	(0.07)	(0.24)	(0.08)	(0.43)	(0.11)	(0.32)	(0.09)	(0.34)	(0.13)	(0.37)
Class II	**0.737**	**2.09**	**0.88**	**2.4**	**0.569**	**1.76**	**0.57**	**1.78**	**0.531**	**1.95**
	(0.07)	(0.16)	(0.1)	(0.16)	(0.08)	(0.19)	(0.08)	(0.25)	(0.09)	(0.24)
Class IIIab	**0.664**	**1.94**	**0.731**	**2.07**	**0.526**	**1.7**	**0.403**	**1.452**	**0.41**	**1.65**
	(0.09)	(0.19)	(0.13)	(0.17)	(0.14)	(0.2)	(0.1)	(0.15)	(0.11)	(0.26)
Class IVabc	**0.388**	**1.47**	**0.517**	**1.67**	**0.4**	**1.49**	**0.373**	**0.986**	**0.275**	**1.3**
	(0.07)	(0.11)	(0.09)	(0.12)	(0.1)	(0.14)	(0.1)	(0.11)	(0.11)	(0.14)
Class V	-0.13	0.877	0.088	1.09	-0.014	0.985	-0.01	1.194	-0.02	0.98
	(0.08)	(0.07)	(0.11)	(0.09)	(0.11)	(0.11)	(0.12)	(0.11)	(0.1)	(0.1)
Class VI	0.08	1.083	**0.242**	**1.27**	**0.192**	**1.212**	**0.177**	**0.706**	0.14	1.1
	(0.07)	(0.07)	(0.09)	(0.08)	(0.07)	(0.11)	(0.09)	(0.07)	(0.08)	(0.08)
Class VIII	0.583	1.791	0.004	1.004	0.05	1.052	0.188	1.207	-0.02	0.974
	(0.3)	(0.7)	(0.4)	(0.4)	(0.4)	(0.42)	(0.4)	(0.49)	(0.41)	(0.4)
Class IX	-0.83	0.434	-1.57	0.206	-1.40	0.246	-1.01	0.361	-1.14	0.317
	(1.4)	(0.6)	(1.42)	(0.29)	(1.41)	(0.34)	(1.41)	(0.51)	(1.46)	(0.46)
Age (RC: 25-34 years old)										
35-44 age group			**-0.45**	**0.633**	**-0.38**	**0.683**	**-0.34**	**0.706**	**-0.28**	**0.75**
			(0.09)	(0.08)	(0.11)	(0.09)	(0.11)	(0.06)	(0.12)	(0.07)
45-54 age group			**-0.9**	**0.4**	**-0.76**	**0.463**	**-0.74**	**0.474**	**-0.44**	**0.63**
			(0.11)	(0.05)	(0.11)	(0.04)	(0.09)	(0.04)	(0.12)	(0.08)
55-65 age group			**-1.35**	**0.257**	**-1.16**	**0.312**	**-1.06**	**0.345**	**-0.51**	**0.59**
			(0.09)	(0.05)	(0.11)	(0.03)	(0.09)	(0.03)	(0.13)	(0.08)
Civil status (RC: Single)										
Married or cohabiting			**0.299**	**1.34**	**0.3**	**1.36**	**0.259**	**1.29**	**0.243**	**1.34**
			(0.07)	(0.12)	(0.07)	(0.12)	(0.09)	(0.11)	(0.08)	(0.1)
Separated or divorced			0.2	1.3	0.18	1.3	0.22	1.25	0.127	1.135
			(0.14)	(0.13)	(0.12)	(0.18)	(0.14)	(0.18)	(0.13)	(0.15)
Widowed			0.014	1.01	0.097	1.107	0.006	1	0.009	0.913
			(0.12)	(0.13)	(0.12)	(0.13)	(0.24)	(0.24)	(0.14)	(0.14)
Education (RC: Level 1)										
Level 2					**0.263**	**1.302**	**0.269**	**1.3**	**0.304**	**1.356**
					(0.06)	(0.08)	(0.06)	(0.08)	(0.07)	(0.1)
Level 3					**0.496**	**1.64**	**0.499**	**1.64**	**0.461**	**1.58**
					(0.06)	(0.1)	(0.08)	(0.1)	(0.07)	(0.11)
Level 4					**0.639**	**1.89**	**0.64**	**1.92**	**0.644**	**1.96**
					(0.09)	(0.16)	(0.11)	(0.21)	(0.1)	(0.19)
Level 5					**0.803**	**2.232**	**0.813**	**2.3**	**0.89**	**2.45**
					(0.1)	(0.28)	(0.12)	(0.29)	(0.11)	(0.28)

Smoke (RC: Non-smoker)				
Light smoker	0.033	1.03	-0.03	0.99
	(0.1)	(0.1)	(0.08)	(0.09)
Moderate smoker	**-0.18**	**-0.83**	**-0.18**	**0.83**
	(0.09)	(0.07)	(0.1)	(0.07)
Heavy smoker	-0.04	-0.95	-0.09	0.903
	(0.1)	(0.1)	(0.09)	(0.08)
Drink (RC: Non-drinker)				
Very low	0.05	1.05	0.07	1.072
	(0.19)	(0.2)	(0.17)	(0.18)
Low	-0.18	0.828	-0.1	0.85
	(0.06)	(0.07)	(0.07)	(0.06)
Moderate	-0.2	0.812	-0.13	0.871
	(0.08)	(0.08)	(0.08)	(0.08)
Fairly high	-0.16	0.848	-0.2	0.818
	(0.14)	(0.12)	(0.15)	(0.12)
High	0.54	1.72	0.6	1.83
	(0.48)	(0.54)	(0.55)	(0.66)
Very high	-0.84	0.429	-0.4	0.954
	(0.72)	(0.53)	(0.86)	(0.71)
Physical exercise (RC: No activity)				
Light activity	**0.42**	**1.52**	**0.257**	**1.29**
	(0.06)	(0.08)	(0.08)	(0.08)
Moderate activity	**0.633**	**1.88**	**0.481**	**1.61**
	(0.07)	(0.16)	(0.09)	(0.12)
Vigorous activity	-0.47	0.625	-0.99	0.37
	(0.54)	(0.45)	(0.63)	(0.49)
Relation between weight and height (BMI) (RC: Normal)				
Underweight	**-0.52**	**0.589**	**-0.43**	**0.646**
	(0.11)	(0.07)	(0.19)	(0.08)
Overweight	-0.01	0.988	0.038	1.04
	(0.05)	(0.06)	(0.07)	(0.07)
Obese	**-0.6**	**0.545**	**-0.39**	**0.672**
	(0.07)	(0.04)	(0.09)	(0.06)
Short term dimension of objective health			**-0.23**	**0.789**
			(0.02)	(0.02)
Indicator of long term objective health			**-1.25**	**0.285**
			(0.03)	(0.01)

Table E.5: Standard deviation of the sheaf coefficients for the social class and education dummies from Table E.4					
Model	**1**	**2**	**3**	**4**	**5**
Class (nine categories)	.44	.435	.351	.371	.38
Class (seven categories)	.44	.4	.35	.37	.38
Education	-	-	0.31	0.285	0.3

Table E.6: Percentage reduction of the class and education effects when moving from model 1 to models 2, 3, 4 and 5 in Table E.4				
Model change	**From 1 to 2**	**From 1 to 3**	**From 1 to 4 for class From 3 to 4 for education**	**From 1 to 5 for class From 3 to 5 for education**
Class (nine categories)	1.13	20.22	15.7	13.63
Class (seven categories)	9	20.45	15.9	13.6
Education	-	-	8	3.2

E.2. Further analysis of the association between class and the subjective health dimension for the British case

E.2.1. Predicted probabilities for the ordered probit models

Similarly to the Spanish case, I have calculated some predicted probabilities of being healthy or unhealthy in order to further examine the association between class and subjective health. The aim of this analysis is not to predict the characteristics which will lead an individual to have good health or, in contrast, poor health. The purpose of this section is to provide more empirical evidence directly related to the research question of the thesis (i.e. which factors explain the impact of class on health) and more specifically, to present more empirical evidence to assess whether mechanism (2) holds. For that reason, I am interested in examining the differences among social classes in terms of their chances of having good health, and how these differences evolve when the values of education are modified.

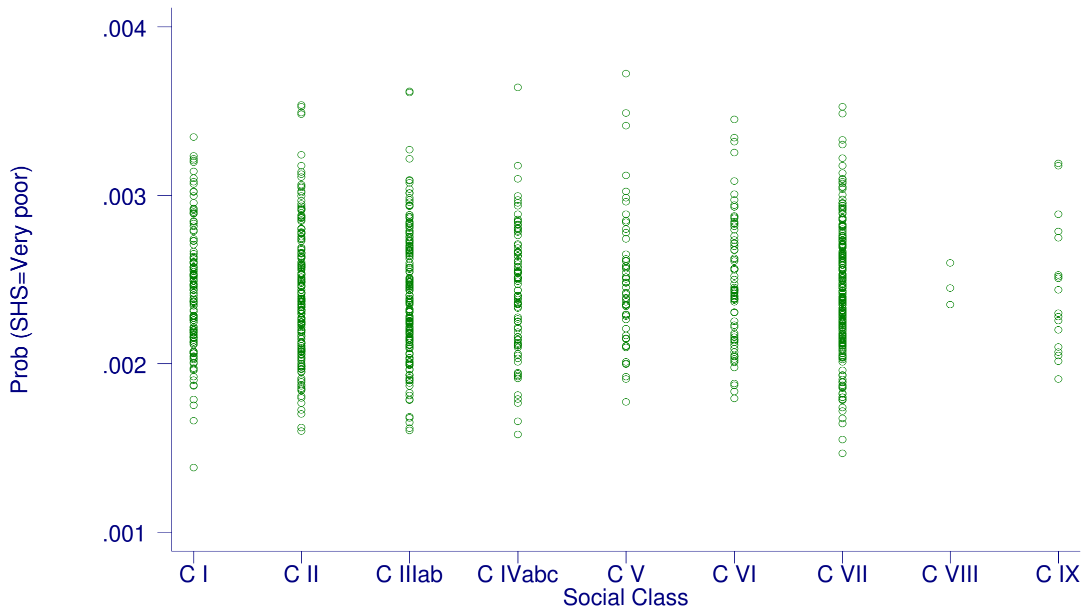
The procedure used to calculate the estimated probabilities is similar to the method followed in Appendix D. Briefly, I based the analysis on the final model (model (5)), which contains all the explanatory variables. Social class was set equal to its seventh value (the unskilled manual workers) and all the explanatory variables have been set at their mean. Then, I simulated the estimated probabilities for each category of the health variable. Graphs E.1 to E.4 show the results.

The first graph (Graph E.1) presents the probability of being unhealthy for all social classes. As a general pattern we can see that the predicted probabilities of having very poor health do differ among social classes. The range of probabilities of class I is (0.0013, 0.0033). The following classes have a wider and more disperse range of probabilities, although the variations are small. The unskilled or nonskilled manual workers show one of the widest ranges, some (0.0018, 0.0038). The pattern that social classes follow does not always resemble a perfect social gradient although, in most cases, as we move to the right of the class axis the minimum value of the range of probabilities increases.

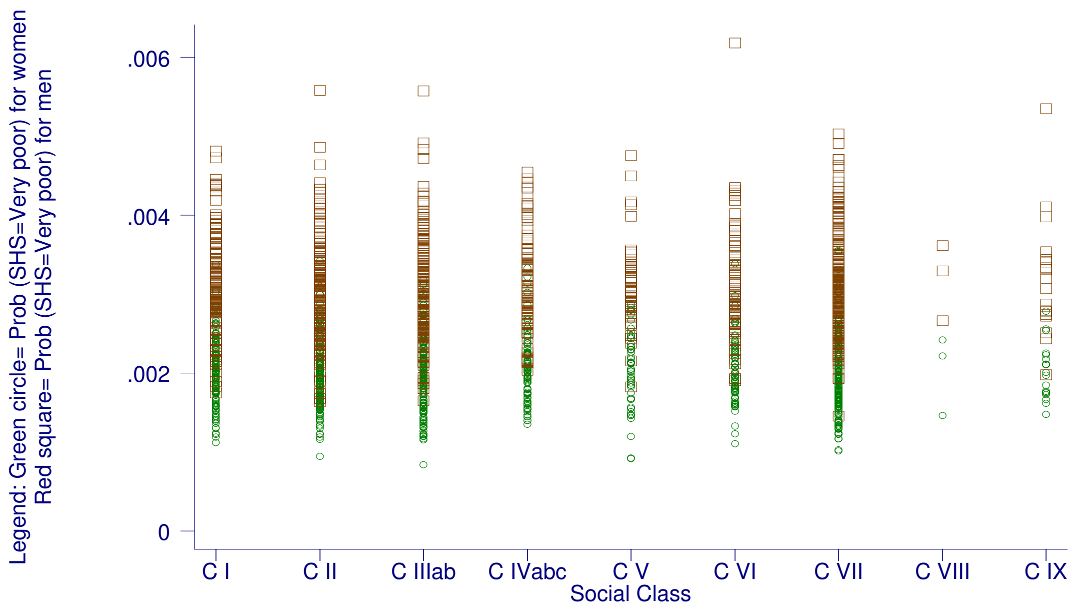
Graph E.2 shows that the probability of having very poor health should be analysed differently for men and for women. Separate analyses of women and men result in a much clearer picture of the probabilities of each social class. Analyses that omit this distinction should, therefore, be treated with precaution. We can see that although the probabilities of being unhealthy are very low for all individuals, women are more likely to be so than men. For women, as we move to the right of the social classes' axis, the minimum value of the probabilities range for each social class gradually increases. The maximum value of this rage increases and decreases which makes it difficult to establish a clear pattern. However, the unskilled manual workers score the highest value. The analysis for men also shows that the most privileged social classes are less likely than the other class categories to report very poor health. Hence, for many categories, both the lower and the upper limits of the probabilities range increase as we move from the higher professionals, administrators and managers to the full-time homemakers.

Graphs E.3 and E.4 present the other side of the coin: the probability of each social class of having good subjective health. The ranges of probabilities differ among social classes. Class I presents a range whose limits are (0.508, 0.528). The following class categories have a wider and most disperse range of probabilities. Class VI shows one of the widest ranges: (0.505, 0.529). In general, the lower limit of the probability range decreases from Class I onwards. Graph E.4 shows again that separate analyses should be performed for women and men. In this case, women are more likely to report good health than men are (e.g. range of probabilities for class I is (0.515, 0.542) for women and (0.483, 0.52) for men. In general, the lower limit of the range continues to diminish as we move from left to right in the x-axis.

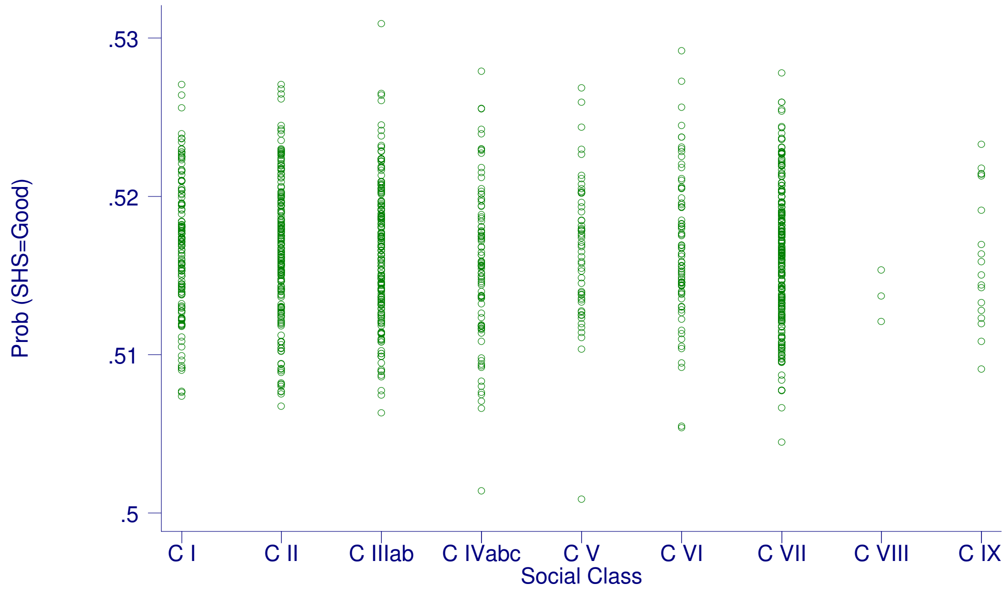
Graph E.1. Predicted probabilities of having a very poor health (Class set at class VII and other variables at their mean)



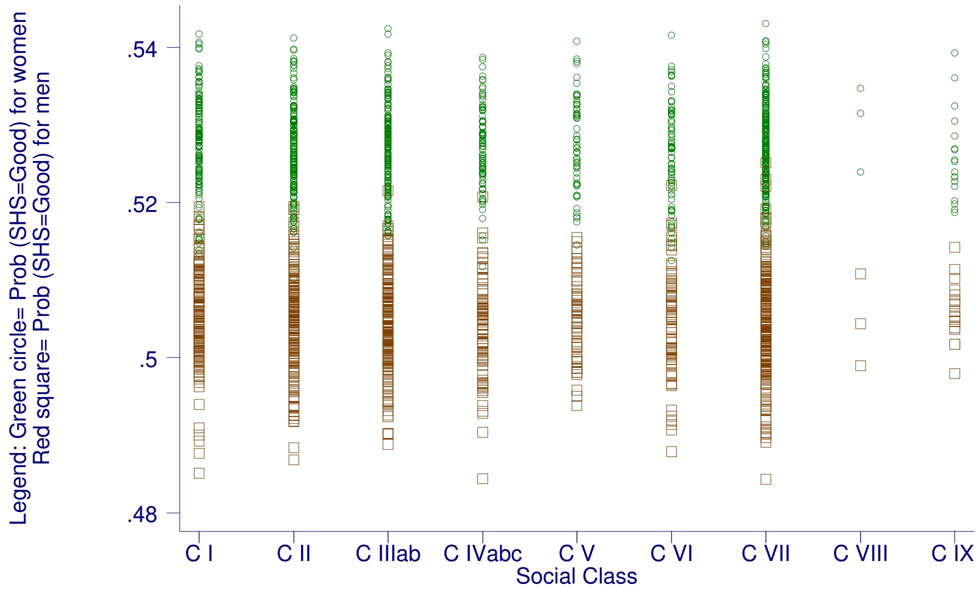
Graph E.2. Predicted probabilities of having a very poor health by gender (Class set at class VII and other variables at their mean)



Graph E.3. Predicted probabilities of having a good health (Class set at class VII and other variables at their mean)



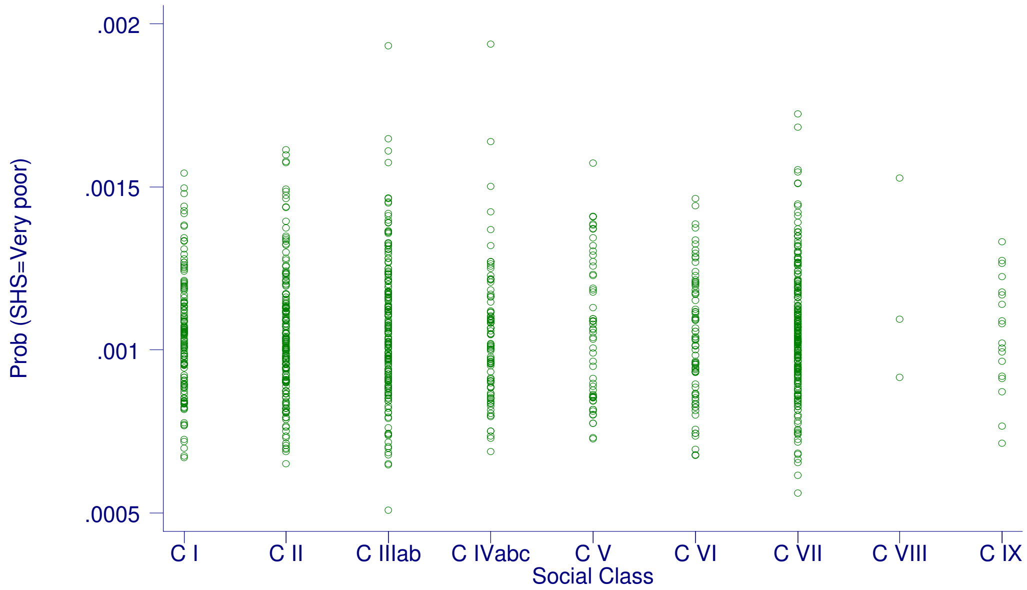
Graph E.4. Predicted probabilities of having a good health by gender (Class set at class VII and other variables at their mean)



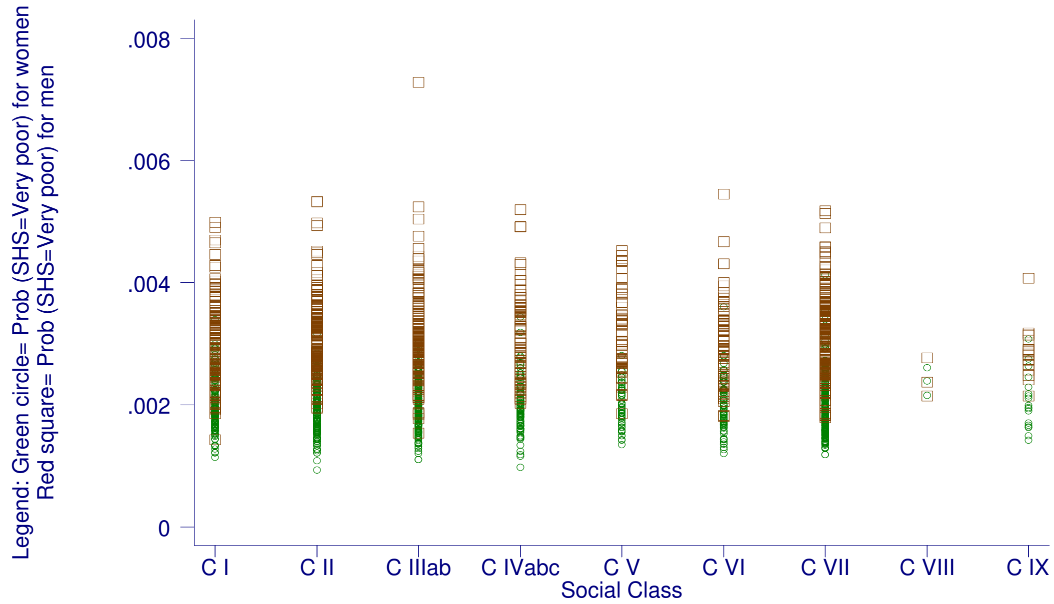
It is also interesting to analyse how the predicted probabilities for each social class vary when the value of one of the explanatory variables, specifically education, changes. This exercise will provide further empirical evidence to test the second mechanism of the theoretical framework. I have calculated the probabilities of having any category of subjective health with education set at its maximum value. Thus, class has been set at its seventh category, education at its maximum value, and the remaining variables at their mean. Comparing these results with those obtained with education set at its mean value will show how individuals' probability of being healthy or unhealthy changes as their educational achievement moves from the mean to the maximum value. If mechanism (2) holds, that is, if the class effect is partly explained by education, we would expect that, *certeris paribus,* the higher the individual's education, the greater her probability of being healthy. Graphs E.5 to E.8 provide some evidence to study this hypothesis.

Graph E.5 presents the predicted probabilities of having very poor health. If we compare this graph to the results of Graph E.1 we can see that the probability of being unhealthy slightly diminishes for all social classes. Thus, the range of probabilities that classes present declines from (0.0013, 0.0038) when education is set as its mean value to (0.0005, 0.0018) when education is equal at its maximum value. The effect of increasing education is different for men and women. Graph E.6 shows that although the range of probabilities declines in general, there is a distinct effect for men and for women. We see that the effect is slightly larger for women, for whom the probabilities range decreases from (0.0008, 0.003) in graph E.2 to (0.0007, 0.0022) in Graph E.6. Hence, as a result of the rise in education, the gap between women and men in the probability of being unhealthy diminishes. Thus, increasing education has two main results. First, a general albeit small reduction in the probability of not having good health. Second, greater similarity between men and women in terms of their chances of having very poor health. It should be noted that both changes are very small.

Graph E.5. Predicted probabilities of having a very poor health
(Class set at class VII, education at its maximum and other variables at their mean)



Graph E.6. Predicted probabilities of having a very poor health by gender (Class set at class VII, education at its maximum and other variables at their mean)



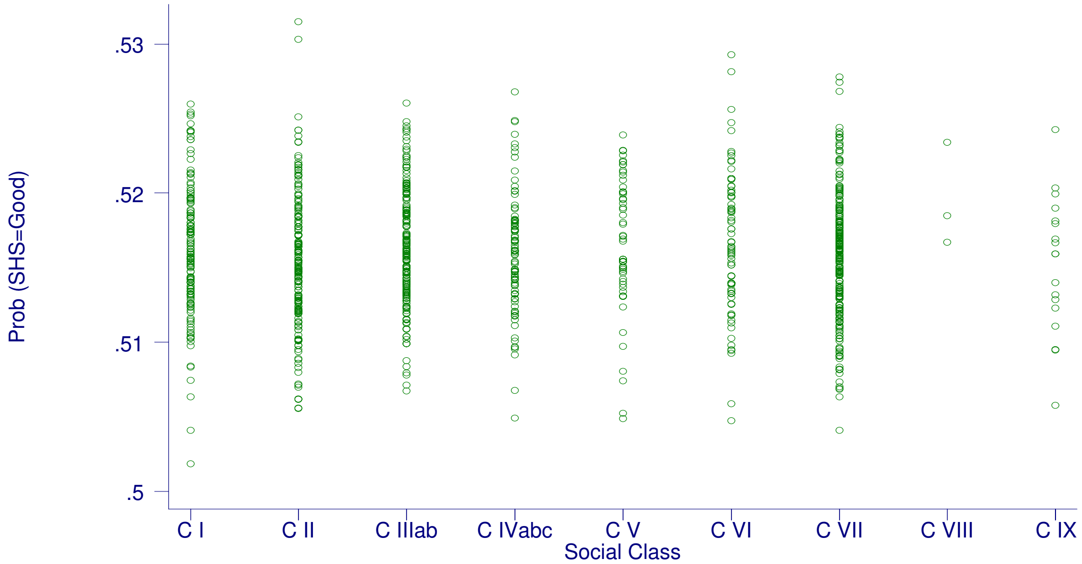
The effect of increasing education on the probability of having a good health, on the other hand, experiments a general increase (see Graph E.7). The probability range slightly increases from (0.5, 0.531) when education takes its mean value in Graph E.3 to (0.503, 0.533) when education takes its maximum value. The range of probabilities for each social class becomes more alike. When we disaggregate the analysis by gender, we can observe that more education brings a small decline in differences between men and women in the probabilities of enjoying a good health (see Graph E.8). Hence, there are three main consequences of higher educational achievement. Firstly, individuals experience better health perspectives. Second, differences among social classes decline. Finally, dissimilarities between men and women also shrink and become small. However, it should be noted that that these changes are minor and significantly smaller than the ones we presented for the Spanish data in Appendix D.

E.2.2. Predicted probabilities for the logit models

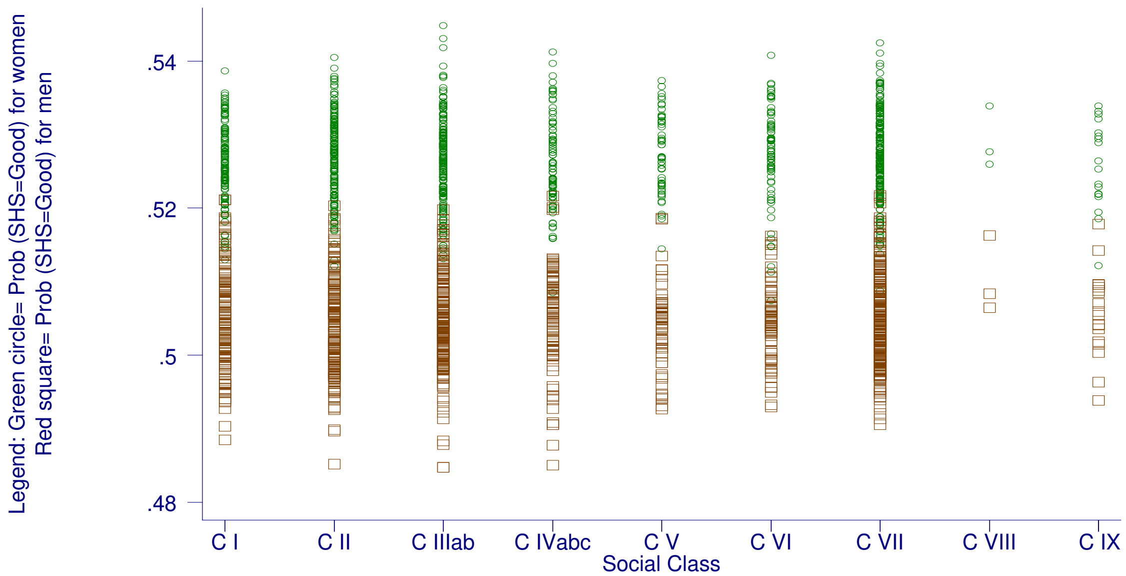
This section presents the predicted probabilities of being healthy or unhealthy run for the binary subjective health dimension. Similarly to the analysis done with the Spanish data in Appendix D, subjective health status has been re-coded in two values. The values "very poor", "poor" and "fair" have been re-coded as "not good health" and, the values "good" and "very good" as "good health". I have computed the simulations for all individuals for the final model, that is, model (5). The purpose of this analysis is also to examine the importance that education has as a link between class and health. I have therefore estimated the probabilities for the model changing the value at which education is set. First, I have set education at its min value (Graphs E.9 and E.10); secondly I have set education at its mean value (Graphs E.11 and E.12); thirdly education has been set at its maximum value (Graphs E.13 to E.14). I have run the simulations for the two values of the health variable. Social class has been set equal to its seventh category (the unskilled manual workers and agricultural workers) and the other explanatory variables have been set at their mean values.

The interesting part of this statistical exercise is to see whether the range of probabilities of being healthy or unhealthy varies as a consequence of changing the value of education. Hence, the range of probabilities of having good health is (0.68, 0.748) when education is set equal to its minimum value, (0.777, 0.818) when education is set at its mean value, and (0.841, 0.92) when education is set equal at its maximum value. On the other hand, the range of probability of having poor health is (0.252, 0.32) when education is set equal at its minimum value, (0.182, 0.222) when education is set equal to its mean value, and (0.09, 0.159) when education is set at its maximum value. Similarly to the Spanish data in Appendix D, we can see how an individual's probability of having a good health condition increases, *certeris paribus*, as the level of educational achievement increases. Symmetrically, the probability of poor health gradually decreases as an individual's education increases. Hence, the results of this simulation confirm the significant mediating role that education has on the association between class and health. The observed link is as was expected: the higher an individual's level of education, the greater her chances of enjoying good health. The link in this case is stronger than the one we in the simulations computed for the ordered probit models.

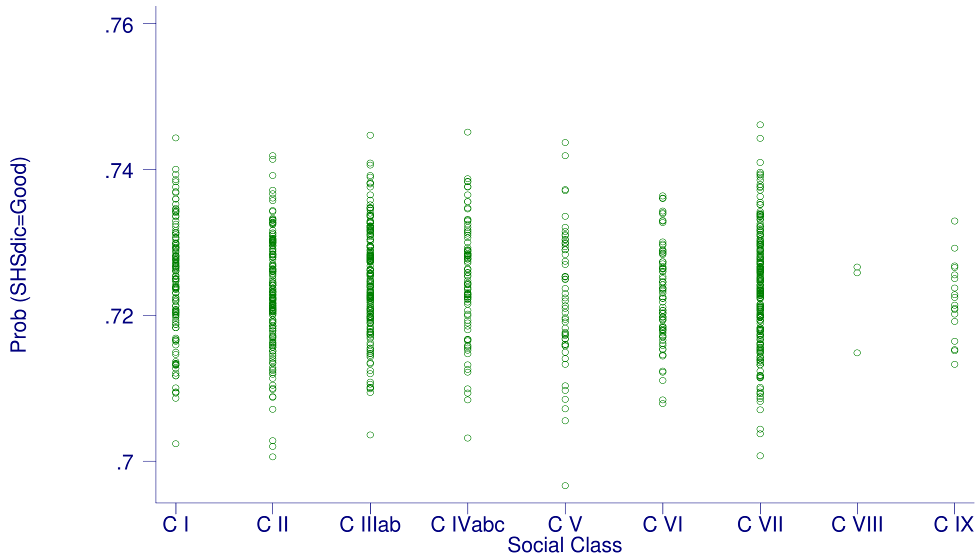
Graph E.7. Predicted probabilities of having a good health
(Class set at class VII, education at its maximum and other variables at their mean)



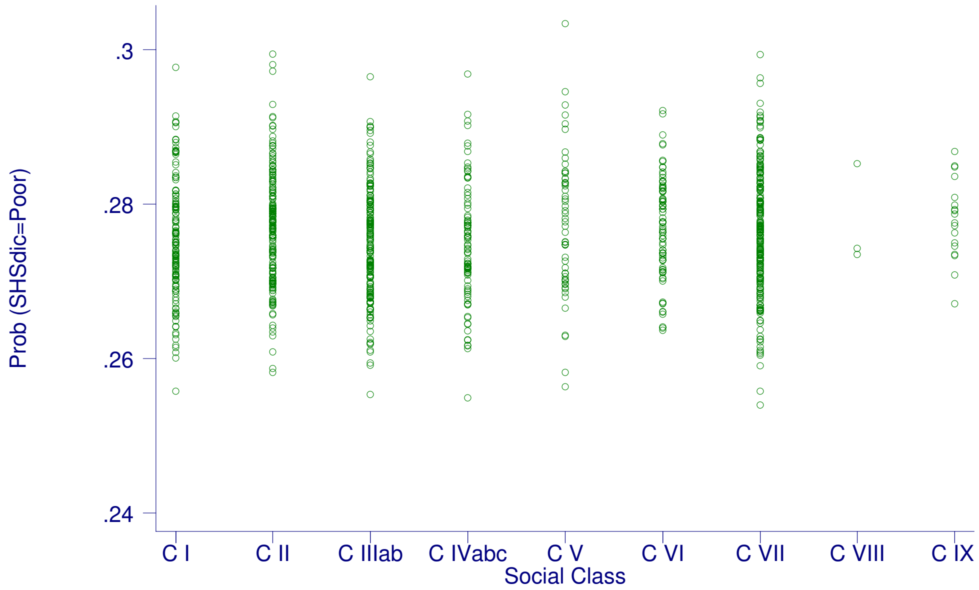
Graph E.8. Predicted probabilities of having a good health by gender
(Class set at class VII, education at its maximum and other variables at their mean)



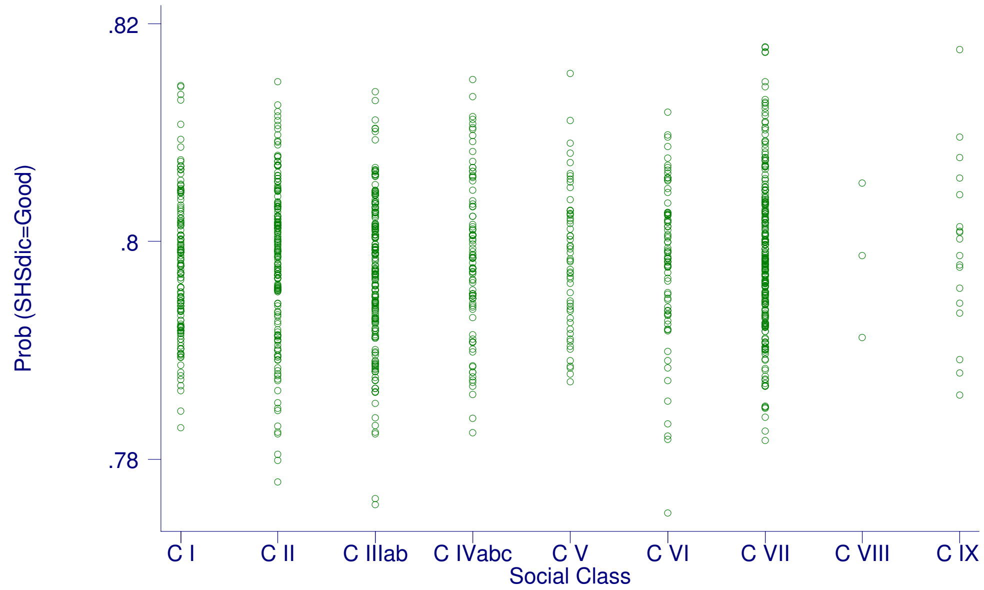
Graph E.9. Predicted probabilities of having a good health (Class set at class VII, education at its minimum and other variables at their mean)



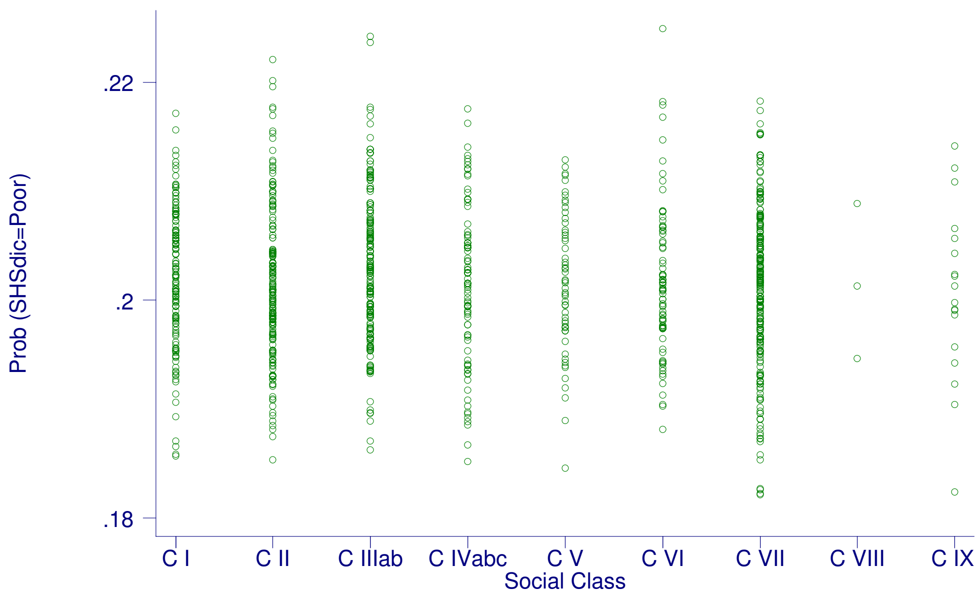
Graph E.10. Predicted probabilities of having a poor health
(Class set at class VII, education at its minimum and other variables at their mean)



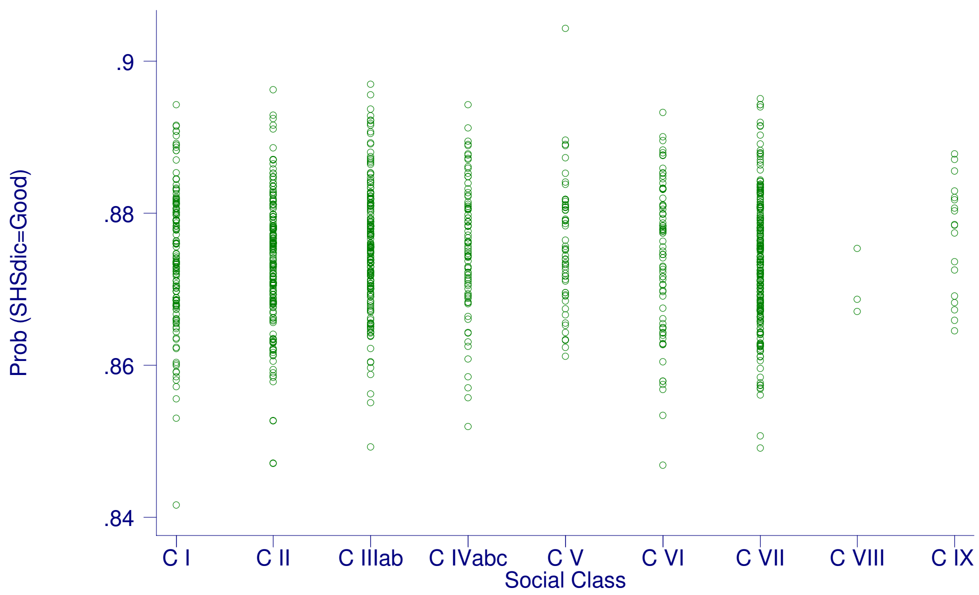
Graph E.11. Predicted probabilities of having a good health (Class set at class VII and other variables at their mean)



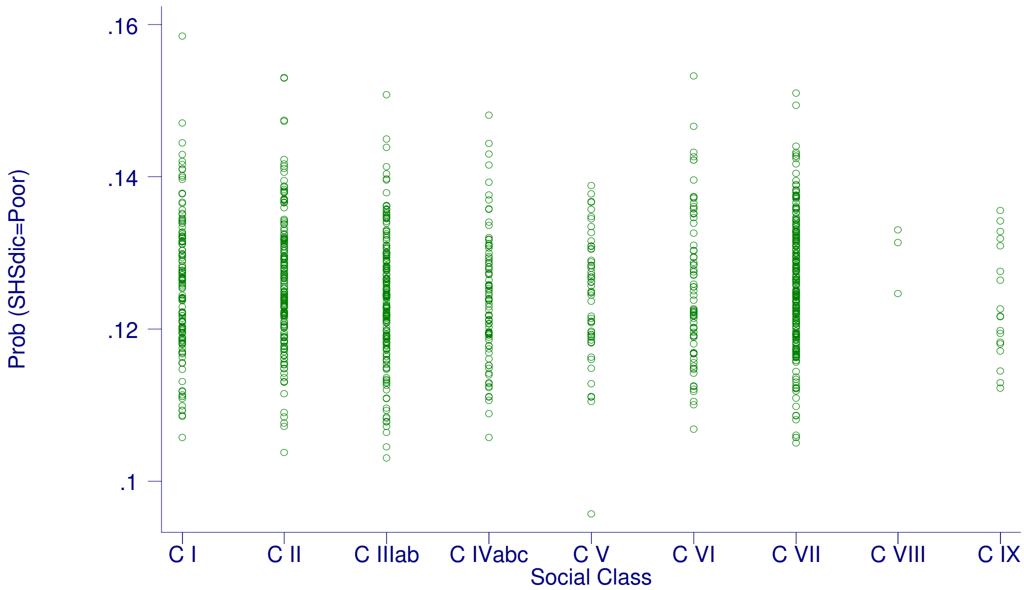
Graph E.12. Predicted probabilities of having a poor health (Class set at class VII and other variables at their mean)



Graph E.13. Predicted probabilities of having a good health (Class set at class VII, education at its maximum value and other variables at their mean)



Graph E.1.4. Predicted probabilities of having a poor health
(Class set at class VII, education at its maximum value and other variables at their mean)



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