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Author(s):	Alt, James E.
Date	2002
Type	Working Paper
Series	Estudios = Working papers / Instituto Juan March de Estudios e Investigaciones, Centro de Estudios Avanzados en Ciencias Sociales 2001/173
City:	Madrid
Publisher:	Centro de Estudios Avanzados en Ciencias Sociales

CREDIBILITY, TRANSPARENCY, AND INSTITUTIONS:
AN EXPLORATION AND AN EXAMPLE

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Scholars advising on the future of European fiscal and monetary policy have argued that the design of institutions matters. In particular they have suggested that "transparent" institutions would, if implemented, bring about desirable effects on the fiscal policy outcomes that were required as conditions of participation in the European Monetary Union. For example, Alesina, Roubini, and Cohen (1997) and Alesina and Perotti (1999) suggest that institutional reform increasing the transparency of the budget process could provide effective fiscal discipline. This paper, still in a very preliminary stage, surveys these arguments. Drawing on the literature about monetary and fiscal institutions, it inquires about the role of policy credibility and the relationship between transparency and credibility. It briefly examines a formal model relating transparency and accountability, and uses this to derive observable implications about the transparency of institutions. It reviews available sources of data for the comparative quantitative analysis of transparency and policy, but regrettably (since some of the data are not publicly available) cannot yet report empirical results. It does, however, propose that another sort of institution, found in about half the American states, offers a "substitute" for transparency in the sense of improving the ability of investors to learn about policy from noisy signals, as in the formal model. Data on relative state bond yields empirically supports this analysis. While the results are encouraging, I cannot yet conclude that the overall evidence on transparency is strong.

Relative to my own thought development, amusingly enough, chronologically this paper is backwards. My interest in transparency was stimulated by the recent discussion of European institutions and undertaken with a view to having some empirical work done on the American states (where the data were available) by spring 2001 and comparable work on OECD countries by some time later that year. Recently, months after beginning that inquiry, I stumbled across a valuable formal model of Ferejohn's (1999) that analyzes a situation in which the choice of a transparent institution (strictly, the degree of uncertainty surrounding a signaled action by the agent) was made as part of the game, such that principal and agent alike could prefer more transparency. The link established in that model between transparency, signal extraction, and credibility reaffirmed my belief that the balanced budget laws I had begun analyzing several years earlier (described in the final section below) could produce policy credibility in a way that made them, if not a "transparent institution," then a close substitute that also offered the reduction of uncertainty about hidden action. So please

read what follows, after (I) the brief introduction to the political economy of institutions, as (II) an examination of how the literature on monetary and fiscal policy could be synthesized to frame conjectures about institutional transparency and credibility. Then (III) takes a quick look at a formal model and some data that could be used to examine those conjectures, and (IV) a model and some empirical work on a very closely-related conjecture that will be generalized when more data is available.

The Political Economy of Institutions

As is by now well-known, the "political economy of institutions" refers to research that attempts to answer simultaneously two central questions: How do institutions evolve in response to individual incentives, strategies, and choices, and how do institutions affect the performance of political and economic systems? It uses an economic approach, constrained maximizing and strategic behavior by self-interested agents, to explain the origins and maintenance of political processes and institutions and the formulation and implementation of public policies. At the same time, by focusing on how political and economic institutions constrain, direct, and reflect individual behavior, it stresses the political context in which market phenomena take place and attempts to explain collective outcomes like production, resource allocation, and public policy in a unified fashion. In contrast to either economics or political science in isolation, this positive political economy emphasizes both "economic" behavior in the political process and "political" behavior in the marketplace.

Institutions are rules, procedures, norms, or conventions that are designed self-consciously to determine "who has the power to do what when?" This view emphasizes two important features of many collective choice situations. The sequence in which the choice process unfolds is important. Moreover, the individuals comprising the group are not symmetrically endowed with powers. Institutions help individuals deal with certain fundamental problems of exchange, collective choice, and collective action. If nothing were ever chosen by vote, there would be no problem of cyclical instability. If there were no social (i.e., Prisoners') dilemmas, we would have less need to deal with problems of

communication, cooperation, or coordination. If information were freely available, specialization and delegation would not produce agency costs. If there were no non-simultaneous exchange, ex post opportunism would not be a concern. However, all these problems exist, and institutions are ubiquitous. Political economists largely agree that in the presence of these problems, institutions increase predictability, reduce uncertainty, or induce stability in human interactions. Much of the analysis below is about whether and how institutions evolve to deal with opportunism and agency costs.

Choices are made in an institutional context, the context is at least partly of human design, and this very design limits, constrains, channels, and determines *what* is available to choose, *how* choices from this feasible set are made, and *who* gets to make these choices. Political studies like economics is about choice, but choice is not driven exclusively by initial endowments and scarcity as economists often claim. Political studies, like sociology on the other hand, is about limitations on choice, but the limitations are drawn as much from self-conscious group deliberation about how its members wish to structure choice-making activity as they are from cultural forces, historical habit, and other impersonal factors. In short, if economics is about autonomous exchange and sociology about tradition and historical legacy, then the comparative advantage of political science lies in studying self-consciously designed collective choices.

There is a sharp division between those who model institutions as (1) rules, procedures, and choice *mechanisms* taken as pre-existing, and (2) *equilibria* in some underlying social game. Those who take institutions as pre-existing define them to include diverse things like informal norms, complex formal organizations, and a variety of rules, procedures, and choice mechanisms that channel political and economic activity. Two contributions have been particularly influential. In one, structure-induced equilibrium (see Shepsle and Weingast 1987), vetoes, gate-keeping, or agenda power arise in jurisdictions, which are specified domains of responsibility or control like divisions in firms or specialized committees in legislatures, perhaps backed by further rules requiring self-restraint by other actors. The other, the Romer-Rosenthal "setter model" (Rosenthal, 1990), has a little more structure: a proposer who places a proposal in play, a defined sequence of moves which result in the proposal being subject to a "take it or leave it" choice, and a "status quo" which is the

reversion point if the choice is to "leave it." This little sketch of political action turns out, like supply and demand curves, to help analysts make straightforward predictions in some institutionally complex situations.

Others, like Schotter (1981) and Greif (1997), define institutions as equilibria in an underlying social game. This approach emphasizes the *self-enforcing* characteristic and *coordinating* function of institutions. If self-enforcing, they avoid the instabilities in collective choice and collective action which they are supposed to ameliorate. Models of such institutions focus on the conditions regarding common knowledge, shared information, and enforcement strategies which must be satisfied (Calvert 1995). If institutions as equilibria solve *cooperation* problems by being self-enforcing, they solve *coordination* problems by fostering "focal points". Kreps (1990) shows how coordination of beliefs offers an equilibrium strategy for dealing with unforeseen contingencies in repeated interactions. Ideally, the formal analysis of self-enforcing regimes or constitutions would treat both aspects. Hardin (1989) proposes that *written* constitutions hasten the process of convergence to shared conventions of behavior among individuals.

Consistent with this latter approach is the "historical-institutional analysis" of institutions governing exchange in the absence of a centralized legal system. These span the game-theoretic analysis of agency relations among medieval Mediterranean traders (Greif 1997) to the modern conception of political democracy as a commitment device (Masten 2000). The situation in politics is generally that both rulers and ruled could benefit from private investments promoted by bargains limiting the wealth that the state can appropriate from citizens. In the same way, politicians can gain from deals with each other, as when legislators trade votes in pursuit of the majorities necessary to enact legislation of benefit to their constituents or parties bargain to form coalitions based on shared policy commitments. Of course, the fact that some bargains would be mutually beneficial bargains does not mean that they will be realized, since differences in the timing and the rates at which benefits accrue raise the risk of reneging or opportunism. Without "commitment", the assurance that when the time comes others will uphold their end of the bargain, investors and legislators alike will be reluctant to take the risks and bear the costs necessary to achieve joint gains (North and Weingast 1989).

Political bargains, of which institutions are an example, must be self-enforcing since in general there will be no independent third party with the power to compel the agreed performance. Moreover, were there any party powerful enough to enforce promises, it would also be powerful enough to abrogate commitments and transgress the interests of others. Moreover, the self-enforcement of political bargains often requires collective action. Because the sanctions that any individual can impose are usually small, deterrence of opportunism is likely to require the threat of multilateral action (Masten 2000). Whether violent, like protests, or peaceful, like the market responses discussed below, carrying out such action requires coordination. Even if the probability of success increases with numbers of participants, private disincentives to participate must be overcome. To do so, would-be collective enforcers must settle on the definition and find a way of communicating the occurrence of an infraction and the appropriate response to it.

As Masten notes, "constitutions, legislative rules, and other widely shared norms or expectations about the allocation of decision authority may serve this coordination function." The final section of this paper reviews the effects of a class of laws that fit this description exactly. To what extent does the case for transparent institutions also rest on this same sort of ability to facilitate information, verification, and coordination in the control of political agents? I try to define more precisely what a transparent fiscal institution is so that we can judge. The definition is quite loose but it is good to get something down on paper.

II.   Monetary and Fiscal Policy

There are many descriptions and analyses of political institutions and economic policy. From among these I restrict the field to fiscal and monetary policy. In practice, this involves reviewing the domestic politics and policy of central bank independence, the size of government, and fiscal balance and the politics of the government budget, but I am not going into the details here. My purpose is to provide an abstract, positive analysis of institutions (how they work).

Much of the literature studies the effects of institutions on performance. Here, in fiscal and monetary policy, the field is divided into three main, generic analyses of the effects of institutions. One treats (fiscal) institutions as a response to the "common pool resource" problem, in which politicians spending more on their constituencies to the extent that they do not internalize the full costs of their spending and taxing decisions. Overall, the literature asks, "Do governments with centralized, hierarchical systems of fiscal decision making generate different and/or superior fiscal performance?" (Alesina, Roubini, and Cohen 1997, 235-239). One could also ask, "Do larger numbers of veto players provide stability or impede and impair fiscal performance?"

A second approach examines policy as the outcome of a game involving multiple principals and multiple agents, with opportunistic politicians who bargain over policy and rational voters who hold them accountable through retrospective voting. Political institutions affect outcomes through two channels. First, the rules governing legislative bargaining and the nature of elections affect party competition directly and through this competition affect fiscal policy. The question is often whether the principal(s) manage to play the agents off against each other or vice-versa. Much of the Persson and Tabellini (2000) view of policy is like this. Even restricting attention to the size of government they analyze conditions under which more decentralization means less corruption, majoritarian elections do as well. Proportional systems predict more welfare/social security spending. A big electoral cycle indicates lack of transparency. Well-placed checks and balances allow voters to induce politicians to discipline each other, so presidential systems produce generally smaller rents, more targeted spending on narrow minorities, and probably, a smaller size of total government spending. Independent of this, the "transparency" of institutions affects the cost

of monitoring and assessing performance and thus the potential for agency problems. One review alleges that "hierarchical-transparent procedures have positive effects on fiscal discipline" (Alesina et al. 240), but the evidence in not compelling, and I discuss the need and possibility of more and better tests below.

In contrast, the literature on monetary policy focuses almost entirely on the credibility problem and the relative benefits of having an independent authority manage the money supply. In part this is because economists have focused on commitment as a solution to intertemporal, time-consistency problems, to which much more attention has been paid in monetary policy analysis. Less attention to legislative bargaining and the common-pool problem in monetary policy also reflect its lesser importance of distributional conflict. Credibility does occasionally appear in studies of fiscal stabilization and reform (Perotti 1999) but is not a major theme.

Thus, little connection is drawn between the insights of the two policy literatures. Even so, I believe that to some extent these differences and similarities between monetary and fiscal institutions arise from differences and similarities in the choice problems facing politicians. On the whole my message is that there are some unexploited similarities that can be developed in institutional analyses. I sketch below an analysis of institutions as devices that make political signals more credible, and consider how the source and target of the signals affects the nature of the institutions. I also provide a framework for analyzing the effects of fiscal transparency.

Institutional design

We might imagine that monetary policy institutions and fiscal policy institutions will share key characteristics, given that they facilitate the achievement of the government's objectives in two key economic policy areas. However, there are obvious differences in institutional characteristics in these two policy areas – and these differences appear to be

similar across countries. Further, the literatures on these institutions appear to focus on very different goals for these institutions.

The debate on monetary policy institutions focuses on the virtues of rules versus discretion (Kydland and Prescott 1977), and the benefits of independent central banks. The ostensible objective for this institutional set up is to enable the government to credibly signal to agents that they will not engage in opportunistic policy setting, and that inflationary expectations can be lowered. A commitment device is needed, and retrospective mass voting is not good enough, though how an independent authority differs from multiple veto players is not discussed. By contrast, the debate on fiscal institutions concentrates on the benefits of fiscal transparency and fiscal rules (such as deficit targets, balanced budget amendments). These institutions seem to be aimed at facilitating better monitoring of the actions of politicians by capital markets. Further, the literature has recently focused on the benefits of centralized decision making process for addressing the common pool resource problem. However, there is an opposing literature that models and measures the extent to which centralization of decision making increases corruption.

A casual impression of the literature suggests that there is not much overlap between monetary and fiscal institutions. Theory and practice seem to have progressed in different streams. This is a puzzle, as we might expect institutions to emerge and evolve in systematic ways. There is a rich literature on why institutions emerge and develop in certain ways, and what they are designed to do. For example, Coase (1937) and Williamson (1986) argue that institutions can be understood as transaction cost economizing solutions. Horn (1995) argues that institutions are designed to generate durability over a policy space. Ferejohn (1999) models the impact of transparency on accountability, trust, and commitment. At a general level, institutions should be thought of as endogenous to the preferences of the relevant actors. As Riker (1980) puts it, institutions are the 'congealed tastes' of agents.

This suggests that there could be (at least) two reasons why monetary and fiscal institutions look so different. First, they could be designed to do different things or accomplish different objectives and emerge in response to different problems. As such, the institutions in each policy area are the appropriate response to policy area-specific problems.

The second reason is simply that relevant links have not been isolated. Institutional solutions that have been applied only in monetary policy may be usefully adopted in the fiscal policy area and vice versa.

A profitable approach to addressing these issues is to conceive of institutions as credible signaling devices. The differences and similarities between monetary and fiscal institutions can be formalized in terms of differences between what it is that agents are attempting to signal through the selection and design of an institution, and to whom the signal is primarily directed. In terms of the content of the signal it is possible to distinguish between private information with respect to preferences, type, or actions (a signal extraction problem), and a commitment to certain policy outcomes. In terms of the intended recipient of the signal, the two groups that seem appropriate are voters and capital markets. The signal must be credible (i.e. costly). It must deliver some benefits to the government or they will have no incentive to incur the costs.

In thinking about appropriate institutional design (and the information content of the signals that it is sending by establishing various institutions) it is necessary to think about what concern the government is responding to. It has to be in the government's interest to establish these institutions. The government has multiple constituencies. The institutions have to provide signals to all of these groups – accordingly, institutions may sometimes be in conflict with each other. So what do these groups look for in a signal?

- *Voters*

Are voters concerned about adverse selection (hidden information) or moral hazard (hidden action)? Are voters concerned more about the underlying 'type' of the incumbent or about their actions? There is survey evidence that American voters are more concerned about moral hazard than adverse selection (consistent with a view that all politicians are the same and that we need to keep them honest). This may also be consistent with the apparent success of retrospective voting models over prospective voting models (people seem more concerned about rewarding/punishing past behavior than selecting a 'good' government that will deliver

the best outcomes in the future). If this is the case, then they will reward (electorally) credible signals that the government will not engage in morally hazardous behavior. Alternatively, if voters are concerned about the underlying 'type' (quality, competence) of the incumbent, they will reward credible signals of type (i.e. actions that are more costly for lower quality types). If voters are also risk averse (or, more powerfully, loss averse) they will also be concerned about policy outcome durability or stability. Institutions that induce stability over future policy outcomes will therefore increase rewards based of some measure of the capitalized stream of benefits.

- *Capital markets*

Capital market participants are concerned about the risk that they face. If they perceive a high risk of default (either through outright repudiation, renegotiation or through inflating away the nominal value of the debt) they will increase the risk premium (which will affect the general level of interest rates in the economy) or be less willing to extend credit. Assuming that the government wants to maximize resources available to it, the government has an incentive to provide signals to capital markets that induce them to lower risk premia.

Capital markets will therefore value institutions that provide a credible commitment to stability in the aggregate financial position and in the price level. It is plausible to imagine that capital markets are more concerned about adverse selection than about moral hazard; the characteristics of the government that they are particularly exposed to is opportunism. They will therefore reward institutions that provide a credible signal of underlying type (e.g. propensity to opportunism).

Objectives of fiscal institutions

Suppose that voters are concerned about constraining morally hazardous behaviors and stability over fiscal policy settings. Capital markets are concerned about obtaining information on the type of the incumbent (e.g. propensity to opportunistic behavior) and ensuring that fiscal policy remains broadly sustainable. In sum, institutions are chosen to credibly signal type to capital markets and to credibly signal policy stability and the absence of moral hazard to voters. (See summary table below.) The incumbent is willing to bear the necessary costs associated with establishing these institutions in order to reduce the risk premium and to obtain voter support.

	Private information	Policy Outcomes
Voters	*Fiscal transparency*: this provides some ability for voters to monitor, and therefore to constrain, morally hazardous actions (that were previously hidden). This can be seen as assisting them with the signal extraction process. This is a response to the 'fiscal illusion' literature that is often cited in discussions of fiscal transparency. But how much do voters care? Further, how much additional information is actually provided? It is not clear that transparency provides much information with respect to the underlying type of the government. Although transparency increases the costs of accounting distortion etc, such distortions remain feasible. Given that this is likely to be the only cost, this does not appear to be a particularly credible signal of type. *Fiscal rules*: Signal that a high quality type because no one else would be able to do this, while maintaining current policy settings (high types find it easier to finance necessary spending cuts out of efficiencies etc)	*Scope of decision making*: Reducing the scope of discretionary decision making provides a credible signal that policy outcomes will be relatively stable. *Fiscal rules*: Provides some assurance that the fiscal position will not get too out of control in the future (it bounds the upper limit of the size of any eventual fiscal tightening e.g. debt can only rise to 60% rather than 90%).
Capital markets	*Fiscal transparency*: For the above reasons, it is not a very credible signal of type. Thus, this institution will not be rewarded by capital markets. *Fiscal rules*: If binding, provides a more credible signal of type. There are costs associated with satisfying this constraint. High types are more likely to be able to satisfy this at lower cost than low types.	*Fiscal rules:* reduce the chance that debt will spiral out of control. *Scope of decision making*: a standing appropriation for debt servicing may provide a credible signal of a commitment to continued repayment.

Policy stability is not often emphasized in discussions of fiscal institutions. However, the notion of fiscal institutions as a commitment to stability in policy settings could be important. Can we understand variation in fiscal institutions on the basis of voter preferences for stability in policy settings? By establishing institutions that reduce the scope of discretionary decision making (or increase the cost of making discretionary reductions in spending), for example, recipients of public transfers have more certainty over future receipts. To the extent that these voters are forward looking, they will reward the incumbent on the basis of some measure of the capitalized benefits. This insight is not new (Landes and Posner 1975, Horn 1995, Moe 1990), although it has not been directly applied to fiscal institutions before.

Objective of monetary institutions

Suppose that voters are more concerned about stability over future policy outcomes (i.e. low and/or stable inflation) while capital markets are primarily concerned about the underlying type of agent. Of these, the policy outcome signal has been the column that has been emphasized. Monetary rules, or establishing an independent central bank, is used to credibly commit to stable policy outcomes.

	Private information	Policy Outcomes
Voters	Relying on a monetary rule/ independent central bank provides a credible signal that you will not operate in an opportunistic manner (it is credible because you no longer have access to the policy levers).	Signal that inflationary outcomes will be similar to projected inflation outcomes, because the government has less ability to be opportunistic. This means that inflationary expectations will converge to the inflation target. This is credible because of the rule – there are costs associated with deviating once it is established (hands are bound).
	It may be a signal of type (e.g. that you are a competent/responsible type). A good macroeconomic manager can give up a policy lever at lower cost than can a poor manager who will need everything available to win re-election.	
Capital markets	May be a credible signal of type; this may induce a reduction in the risk premium that attaches to domestic debt.	Essentially the same argument; lower real rates.

Comparison

This raises at least three questions:

- *Why is there not even greater demand for formal rules in fiscal policy?*

One reason that rules are demanded is perhaps to enhance stability in policy outcomes. There are already lots of rules in the set of fiscal institutions – mandated spending, indexation etc together with aggregate fiscal rules. These rules induce stability. When these rules come into conflict (e.g. when tightening is required to meet a deficit target), voters would like this to be a political choice – more so than with monetary policy, fiscal policy decisions have very clear distributive implications. Thus, even more formalized rules (e.g. detailed spending rules) may not be demanded by voters.

- *Why is transparency not given more emphasis in monetary policy?*

Transparency may be more important in fiscal policy because hidden action is more of a concern. In the context of monetary policy, the hidden action problem can be readily resolved by removing all discretion (e.g. by making the central bank genuinely independent). Where this is not the case, there are some calls for greater transparency. However, independence is seen as the first-best solution to the time inconsistency problem.

- *Moral hazard or adverse selection?*

There are many reasons (incompleteness of contracting being one of them) that we might imagine that providing agents with incentives to reduce possible moral hazard will be a very imperfect approach. Often it is far better to find agents who are firmly inclined towards your objectives, emphasizing the relative importance of 'type' versus incentives. However, is this of direct use to us in selecting institutions? Even if voters would be better off by voting in good types, do we think that voters do this? Do voters discriminate between competing politicians or parties to select the agent who is of a 'welfare maximizing' type? Do voters think they do? There isn't much evidence, but the little there is (McCloskey and Zaller 1984) suggests that voters do not think that such an agent exists, believing instead that all

politicians are likely to be opportunistic if given the chance. The main way to decide whether a situation actually involves moral hazard or adverse selection is by whether we observe no change in behavior when the incentives governing behavior clearly do change. For example, do politicians subject to term limits (no, or at least different or weaker reelection incentives) behave differently from politicians subject to reelection incentives (Fearon 1999). Besley and Case (1995), in the deepest study of taxing and spending behavior by governors subject to and free from term limits, find significantly different behavior, a clear suggestion that this indicates moral hazard.

In the case we examine below, the signal that the incumbent is sending is that the government's financial statements have greater informational content. That is, they will be better able to tell whether a deteriorating financial position is due to poor fiscal management or stochastic shocks, and thus voters and capital markets should be better able to believe the government. This signal is credible to the extent that the government is unable to continue to distort or manipulate the financial statements.

Suppose also that the desired characteristic in some possible signaling game involving types (for example, honesty) was of no value in getting into the position in which one played the game. Then surely adverse selection would be unlikely, or at least any equilibrium involving separating types would be unlikely. Is fiscal "responsibility" (an unwillingness to distort or manipulate) of value in gaining elective office? If not, again moral hazard is more likely to be the problem we seek institutions to ameliorate.

Finally, selecting types in the voting process (as opposed to disciplining/rewarding past action) is likely to be informationally demanding. If this is true, then voters may be more likely to coordinate on some strategy involving a reaction to moral hazard. If voters (as a collective) are more concerned about the hidden action problem, then creating institutions (such as transparency) which better allow voters to monitor, will receive voter support. I think the institution question is probably mostly about moral hazard. Are capital markets more concerned about adverse selection issues than voters? I have not been able to develop a satisfactory argument as to why this might be. My guess is that capital markets are largely interested in transparency because it helps with the hidden action problem.

Summary

The punch line is that the institutions are designed to do similar things, but the way that it is done is different between the two policy areas. As a general statement in the literature, monetary and fiscal institutions are designed to credibly signal stable policy outcomes to voters (economic agents); and to credibly signal underlying 'type' to the capital markets. Monetary institutions (monetary rule, independent central bank) are designed to credibly signal a stable/low inflation rate to other agents and to credibly signal that you are not an opportunistic actor to capital markets. Similarly, fiscal institutions are designed to credibly signal stability in the level of net transfers with downside protection (mandated spending, standing appropriations, baselines) and some constraint on the size of any future fiscal tightening (fiscal rule) to voters, and to credibly signal that you are not an opportunistic actor to capital markets. Further, for fiscal policy, transparent fiscal institutions may represent a way of resolving voter concerns about hidden action.

The important difference for our purposes between a game of adverse selection and one of moral hazard is that in the former case, a "good" agent continues to be good for all the future, whereas in the latter each future period is a new case in which performance could be good or bad. So clearly, as Fearon (1999) argues, for equal costs of monitoring the payoff to solving a problem of adverse selection is "bigger" than for moral hazard. However, one final thought is that a transparent institution has some of this future payoff too. If one chooses transparency, one becomes better able to distinguish behavior in all future episodes of what could be a repeated game of moral hazard.

Transparency, Policy, and Accountability

Fiscal transparency is often held to be important (Alesina and Perotti 1996; IMF, OECD). Standard arguments for fiscal transparency relate to remedying fiscal illusion. Fiscal transparency increases the ability of voters and capital markets to monitor the government and to constrain opportunism. However, there is no conceptual (or empirical) analysis of

whether and how transparency might matter. Further, no attention has been given as to why governments might have an incentive to establish transparent fiscal institutions.

- *The Ferejohn (1999) model*

A remedy, as I indicated above, is Ferejohn's analysis of a situation in which political agents are induced to make their actions more transparent and thus more controllable in order to attract more resources and support. The model involves a principal who divides income between two activities, one private, one agent-based (public). Thus, the principal has an outside option to pursue if the agent's (public) output looks unpromising. There is also an agent who designs an information structure (strictly, the stochastic variability of a signal of action). Based on this "agreement" the principal decides how much to invest, after which the agent observes the state of world (there is a shock, another random element reflecting the agent's superior information about whether the policy outcome was due to her action or to chance). Then the principal observes the return on investment (as well as the signal about the action taken) and decides about whether or not to reappoint the agent based on a "firing rule" (that is a binary choice, keep or throw out).

If we think of the principal as the median (all) voter(s), then the binary choice for reappointment is the vote. At the margin the principal's choice is to pay a little more in tax or keep it back and invest it privately. That choice is based on what the agent delivers in return for being entrusted with this public investment, which is (loosely) based on the agent's ability to extract rents (which depends on the information structure, how observable the action is). An important feature of the model is that the principal has the possibility of monitoring by using an action threshold rule or an outcome threshold rule, and there are circumstances in which each might lead to a different reappointment result. Moreover, there are circumstances in which transparency can make the agent (and obviously, the principal) better off. The empirical intuition of this model is that there would be equilibria in which more transparent institutions would produce lower uncertainty about the sort of actions taken by a political incumbent, more voter confidence in the incumbent (or in voters' ability to distinguish a good

agent from a bad one, or good performance from bad performance), and therefore higher investment, or perhaps willingness to pay higher taxes.

There is no empirical work of which I am aware that uses this model, though Lassen (2000) examines the size of government in a closely-related framework. He drops the choice of information structure and action monitoring so there is only uncertainty and output monitoring. He adds contestability (the efficacy of elections), and obtains the results that lower efficacy (higher probability of no change in incumbents even with an adverse vote) reduces the size of government but transparency of institutions (measured with a very heterogeneous index) induces (implicitly) greater trust or confidence and (explicitly) a greater size of government.

- *Fiscal Transparency*

The thought experiments above suggested that the main effect of fiscal transparency provisions is probably to mitigate the costs associated with moral hazard. The existence of fiscal transparency can provide a credible signal that opportunistic behavior is less likely (e.g. Alesina and Perotti 1996). There are numerous accounts (e.g. Easterly 1999) of how governments distort their financial position so as to achieve some fiscal target. An argument based on adverse selection is less convincing. It is harder to see how fiscal transparency provisions represent a credible signal of type, because the costs are not high enough to make it so. The only identifiable costs relate to the increased cost of accounting manipulation. Thus, transparent financial reporting better enables voters and capital markets to extract information on the source of the government's financial performance (the signal extraction process). In particular, transparency better allows capital markets to better understand whether deviations from expectations are the result of opportunism or stochastic shocks.

- *Further Testable implications*

In addition to the "size of government" test suggested by Lassen (above), both voters and capital markets support fiscal transparency because it reduces hidden action and therefore

assists in the signal extraction process. Voters reward politicians by (presumably) increasing their support at the next election. Capital markets may respond by reducing the risk premium charged on public debt (as discussed below). Loosely, we may expect bondholders to reduce the general risk premium that they charge because they are less concerned that the government will be hiding things from them. However, the additional information means that poor financial management by the government is more likely to be punished by the bondholders.

The following are possible hypotheses:

1. Countries/states with more transparent financial reporting procedures should have lower risk premia on their public debt

2. There should be more volatility in the risk premium, because with transparent procedures, more information will be available to the capital markets. If capital markets are roughly efficient, each new piece of information should be impounded into the bond price.

3. There should be a smaller adverse capital market reaction to consecutive deficits; it may be that in a non-transparent environment consecutive deficits were used as a proxy for opportunism. Now this proxy is no longer required, as opportunism can be more directly identified (and punished).

- *Measures of Transparency*

Transparency relates to how informative is budget information. It answers the question, do the financial statements provide comprehensive, verifiable information and can the reported numbers be believed? For example, the IMF Fiscal Transparency web site lists (not exhaustively) that governments should:

1. Provide the public with full information on the past, current, and projected fiscal activity of government;

2. Commit publicly to timely publication of fiscal information;

3. Specify the fiscal policy objectives, macroeconomic framework, policy basis for the budget, and identifiable major fiscal risks in budget documents;

4. Classify and present budget data in a way that facilitates policy analysis and promotes accountability;

5. Clearly specify procedures for the execution and monitoring of approved expenditures;

6. Provide timely, comprehensive, and reliable fiscal reporting and identify deviations from the budget;

7. Subject the integrity of fiscal information to public and independent scrutiny.

I use these 'definitions' to form a judgment on which of the possible measures are really related to fiscal transparency. In the American states there is recorded systematic data on several aspects of transparency. The most promising measures of fiscal transparency in NASBO (1995) include whether the budget reflects generally accepted accounting principles (GAAP), facilitating investor and voter coordination (p. 5); how detailed are budget formats? (p. 25); whether there are multi-year expenditure forecasts (p. 32); and who prepares or revises revenue estimates, and whether they are published, or how frequently (p. 3). Measures indirectly related to fiscal transparency include the frequency of the budget cycle (p. 1), whether projected operating expenses are published (p. 32), whether transfers of appropriations are allowed (p. 34), and whether the budget includes performance measures (pp. 50, 57).

NCOSL (1998) includes measures that speak to the veracity of the reported figures, and how easy it is for voters to monitor. These include whether the budget revenue forecast is made by an independent body and whether it is binding, whether there are multiple appropriations bills (no = transparent), and whether a nonpartisan staff writes the appropriations bill. More indirect measures of transparency include whether legislative intent is clearly recorded on budget items, whether there is public input and/or subcommittee hearings during the budget process, whether there are rule restrictions on amending the budget (this may be hierarchy rather than transparency), whether executive transfer of appropriations is permitted, and whether legislatures are allowed to make open-ended

appropriations (no = transparent). No systematic data is available to my knowledge on the extent of extra-budgetary items or hidden and/or contingent liabilities.

For comparative purposes, there are rough (self-reported) measures of fiscal transparency for OECD countries. Additionally, the IMF Fiscal Transparency Project has collected data from all of its members on their financial reporting practices. As far as I know this is not publicly available.

A Substitute for Transparency?

Titles like Eichengreen's (1992) *Golden Fetters* and President Clinton's complaint that he felt like an accountant for bond traders (Wills 1997) recognize the ability of financial markets to discipline fiscal policy. Indeed, both Briffault (1996) and the U.S. General Accounting Office (1993) conclude that the most important factors motivating compliance with balanced budget requirements in American states appear to be financial bond markets and "the tradition and expectation of balance." Moreover, there is evidence that fiscal institutions affect the level and composition of borrowing and the incidence of deficits in the American states (Poterba and Rueben 1999; Poterba 1994; Kiewiet and Szakaly 1996; Bohn and Inman 1995). Alt and Lowry (1994) find that after a recession states with laws that limit their government's ability to carry deficits forward into the next fiscal year regain fiscal balance more quickly than those that do not. Together, these studies imply that institutions have indirect effects on the cost to governments of borrowing money through their effects on fiscal policy.

However, fiscal institutions also have *direct* effects on states' borrowing costs by making it easier for investors to discern the intentions of elected officials. In particular, I consider a type of strict balanced budget law that requires states to run an offsetting surplus in the year following a fiscal deficit (hereafter I call these "no carryover" or NOCA laws). Laws that restrict state governments' ability to carry forward a deficit improve the ability of investors to extract information from noisy signals by focusing on the fiscal balance in the year following a deficit. I will show how such NOCA laws can make it easier for imperfectly

informed bond market investors to distinguish between political officials who choose to comply with the tradition and expectation of balance and those who do not, even without direct court enforcement. The short version of the argument is that a government that wants to be recognized as responsible will try to adopt behavior that will send a credible signal to investors, investors try to determine which option the government will choose if it is going to be responsible, and NOCA laws allow each to focus on the same responsible behavior. An observable result is that investors respond more sharply to consecutive deficits, but are more forgiving of one-time deficits, in states that have these laws. We observe this response in bond yields after repeat deficits in states with such laws.

- *Legal Restrictions on the Ability to Carry Deficits Forward*

This section describes how laws that restrict the ability of a state to carry a deficit into the next fiscal year can affect the interest rate on state government bonds, despite the fact that these laws are rarely, if ever, enforced. It shows how balanced budget laws enhance investors' ability to extract information from noisy signals in a world of uncertainty and incomplete information. These laws establish a specific set of expectations for how governments will respond to deficits, and it would be very difficult for governments and investors to coordinate on other beliefs that would also avoid default. This leads to the prediction that interest rates will be more sensitive to consecutive deficits in states with strong balanced budget laws, while in these states the penalty for running one-time deficits will be less.

An example of a law that requires that the budget must include sufficient projected revenues in fiscal year t to pay off any general fund deficit occurring during fiscal year t-1 is Art. V, sec. 18 of the Michigan Constitution:

The governor shall submit to the legislature at a time fixed by law, a budget for the ensuing fiscal period setting forth in detail, for all operating funds, the proposed expenditures and estimated revenue of the state. Proposed expenditures from any fund shall not exceed the estimated revenue thereof. ... The amount of any surplus created or deficit incurred in any

fund during the last preceding fiscal period shall be entered as an item in the budget and in one of the appropriation bills.

Such provisions exist in laws of 17 of the 38 states that issue general obligation bonds. These are the restrictions that Alt and Lowry (1994) and Poterba (1994) found to hasten state government reactions to economic shocks. Crain (2000) finds they also increase expenditure volatility. The laws predate our sample, most having been passed in the early 20th or even late 19th century.

To see how the laws might work, suppose a state government and potential investors want to enter into a transaction involving the sale of bonds. To fulfill its financial obligations, the government must remain solvent after making the required interest payments. If the state's general fund budget (including interest payments) were always balanced or in surplus, there would be no possibility of default, and no problem. But suppose the government runs a deficit. In that case NOCA laws, like Hardin's (1989) constitutions, help individual investors to solve a coordination problem by establishing common expectations about behavior. They do so despite the fact that NOCA laws are rarely, if ever, enforced through external sanctions. Indeed, the laws themselves do not specify any sort of sanction for failure to comply.[1] Unlike contracts, which Hardin argues "are generally backed by external sanctions; constitutions are more nearly backed by … the difficulty of recoordinating on an alternative arrangement" (1989: 101-102). But what coordination problem do they solve?

We assume governments cannot credibly commit to follow *responsible* policies that maintain long run financial solvency. Given economic and political adjustment costs to raising taxes or decreasing spending on programs, governments face the temptation to behave *opportunistically*, doing nothing to offset an observed deficit or debt due to accumulated past operating deficits while blaming their failure to adjust on stochastic factors outside their

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[1] In fact there is no evidence of direct enforcement in the states. In *Wein v. Carey,* 41 N.Y. 2d 498, 505 (1977), a New York court found that there was no constitutional authority "to permit judicial review of a State budget plan directly."

control. However, individual investors might still reward responsible policies with lower interest rates if they could be confident about the nature of government policy.[2]

But what "responsible" policy should investors expect? One possibility is that the government extinguishes the imbalance by planning an offsetting surplus in the fiscal period immediately following a deficit. We call this strategy *compliance*, which is what it is where prescribed by NOCA laws, though governments could extinguish deficits even where such laws are absent. Another possibility suggested by the literature is that the government engages in economic *smoothing*. That is, it pays off the stock of debt due to past deficits at a rate just fast enough to eliminate the debt over the long run.[3] Of course, there are many other possibilities, but we simplify the analysis to the choice among a small number of very different policies like these.

NOCA laws create conditions under which investors can reasonably coordinate their expectations for responsible political behavior around compliance. The key is that it very difficult for investors to distinguish between a policy that calls for more gradual repayment and opportunism if actual budget performance is subject to stochastic shocks. Where there are NOCA laws, although the government could remain solvent by following a variety of other policies, there is no easy way to credibly communicate which policy is being followed should the government fail to comply with the law. Thus, investors are likely to interpret *any* behavior that they perceive to deviate from *compliance* with the NOCA law as *opportunism*, and any other sort of responsible behavior will not be rewarded. States that lack NOCA laws chose *not* to adopt a standard that requires an offsetting surplus immediately following a deficit. Responsible governments cannot credibly commit to such a policy in the face of the economic and political costs involved. Hence, investors have no reason to expect such

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[2] If NOCA laws were passed at the same time as the sale of bonds, we could analyze them as the equilibrium outcome of Ferejohn's transparency game. Instead, they create the institutional conditions under which the sale takes place. Since the laws are still on the books, it is reasonable to examine the possibility that politicians can act either opportunistically or responsibly when facing a deficit.

[3] If marginal costs of increased taxes or decreased spending are increasing and there is no uncertainty, smoothing minimizes the dead weight costs to the state economy from paying off a given stock of debt (Barro 1979; Roubini and Sachs 1989).

behavior and are more likely to view the alternative to governments behaving opportunistically as *smoothing*.

Note that this argument does not make any assumption about whether governments or investors would prefer the adoption of NOCA laws. These laws predate the data we analyze by many decades. Nor do I assume that governments in states with NOCA laws prefer complying with the NOCA standard rather than engaging in economic smoothing. Rather, the presence or absence of NOCA laws creates expectations about how governments will respond to deficits that lead to favorable outcomes if governments do in fact behave this way, and that governments cannot credibly commit to some alternative policy that would also maintain solvency.

- *Observable implications.*

To see how investors in states with NOCA laws are better able to extract information about the government's intentions by focusing on the outcomes, one can simulate fiscal performance under opportunism, smoothing, and compliance. These different strategies affect fiscal performance. Once that is determined, one can show how investors using Bayes' law can back out the probability of opportunistic behavior, conditional on observing consecutive deficits. For purposes of exposition, let us ignore capital projects and all forms of debt other than that resulting from past operating deficits.

To relate opportunism and responsibility to outcomes, assume that for any period t, the state's outstanding debt at the end of the previous period, D_{t-1}, is common knowledge.[4] The interest rate to be charged during t is r_t, so *ceteris paribus* the debt at the end of period t will be $(1+r_t)D_{t-1}$. State government officials set budget targets, which include a planned difference between program expenditures and revenues of d_t, at the beginning of the period. Negative values of d_t indicate that planned revenues exceed program expenditures. If this difference is greater than interest payments on the stock of debt, then officials plan to retire some of the debt. Investors do not know d_t and political officials cannot credibly

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[4] Assume time is broken into discrete periods, and all accounts are settled at the end of each period.

communicate this information. Finally, the actual levels of revenues and spending may not be equal to their planned levels due to stochastic factors s_t, whose mean and variance are common knowledge. Thus, the end-of-period debt observed by investors is $D_t = (1+r_t)D_{t-1} + d_t + s_t$. Since D_t and r_t are known, investors face the problem of extracting information about d_t but are only able to observe $d_t + s_t$.

When $D_{t-1} - D_{t-2} > 0$, the observed stock of debt has increased. In that case, we assume that opportunistic governments plan to make interest payments but do not respond otherwise, so that $d_t = -r_t D_{t-1}$. Governments following a strategy of compliance offset the previous year's deficit by setting $d_t = -(1+r_t)(D_{t-1} - D_{t-2})$. In the case of smoothing, $d_t = -r_t(1+r_t)D_{t-1}$.[5] NOCA laws often say nothing about what policy to follow if the previous year did not end in deficit. So when the stock of debt is positive but the previous year ended in a surplus we assume that opportunistic governments set $d_t = 0$ while responsible governments adopt smoothing. So that the results do not depend on behavior in the event of a surplus, when the cumulative stock of debt is negative we assume that all governments spend the cumulative surplus all at once, so that $d_t = -(1+r_t)D_{t-1}$.

Using these three different decision rules (opportunism, smoothing, compliance), one can simulate fiscal performance over a two-year period 10,000 times, assuming that s_t has a standard Normal distribution and r_t is constant at $r = .05$, and calculate the probability of running consecutive deficits in both years 1 and 2. If the initial stock of debt due to past operating deficits is zero, the chance of running consecutive deficits is about one in four if the government behaves opportunistically ($p = .253$) or engages in smoothing ($p = .242$). Under compliance, it is half as large, only about one in eight (.126). Even if the size of the initial stock of debt is three times the standard deviation in annual shocks, the probabilities are still .252 for opportunism, .249 for smoothing, and .142 for compliance. All estimated probabilities are significantly different from zero, and all differences in estimated

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[5] Roubini and Sachs (1989, p. 912) show that if the real interest rate on government debt, r, and the growth rate of GNP, n, are both constant, then the tax rate that minimizes deadweight costs to the economy is $t = (r-n)b_t + g^p_t$, where b_t is government debt as a share of GNP, and g^p_t is discounted permanent government spending as a share of GNP. State income is held constant in our model, so $n = 0$ and $t = rb_t + g^p_t$. This implies that politicians should plan to pay r times the balance each year.

probabilities are significantly different from zero except for the difference between opportunism and smoothing.

These results show why investors in states with NOCA laws are better able to extract information from fiscal results in years following a deficit, whether the initial stock of debt is zero or positive. Assume investors share an *ex ante* belief that the government is opportunistic with probability π. Suppose further that when a state with a NOCA law runs a deficit, investors expect the government either to comply with the NOCA standard or be opportunistic. Then, in NOCA states, investors' prior beliefs are that government responds to a deficit by smoothing with probability zero and by complying with the NOCA standard with probability 1-π. Similarly, in states without NOCA laws, investors believe the government engages in smoothing with probability 1-π and complies with the NOCA standard with probability zero. Using Bayes' law and our simulated probabilities, if $\pi = 0.5$, then the *ex post* probability that the government is opportunistic conditional on observing consecutive deficits with zero initial debt is .501 in states that lack NOCA laws, and .668 in states with NOCA laws. Under our assumptions, in NOCA states, the simple observation of consecutive deficits raises the probability of opportunism from one-half to two-thirds, while making effectively no difference elsewhere.[6]

The presence of a NOCA law thus improves the ability of investors to update their beliefs about the government's intentions simply by focusing on fiscal performance in the year following deficits. An observable, empirical consequence of this is that when a state with a NOCA law runs *repeated* deficits, investors should punish this behavior *more* heavily than in a state that lacks such a law. Even so, average interest rates could actually be lower in states with NOCA laws, as previous research has suggested. This can happen if repeated deficits are relatively rare in such states and their investors are relatively *less* concerned about one-time deficits because they know they can better update their information about the government's behavior following a deficit. The evidence below is consistent with each of these conjectures.

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[6] These probabilities are .503 and .640, respectively, if the initial debt stock equals three times the standard deviation in the annual shocks. Qualitatively, these results would be robust to adding a small positive probability for smoothing in NOCA states.

- *Estimation Results*

If data are consistent with the model just outlined, a regression of state bond yields on deficits and consecutive deficits interacted with whether or not the deficit occurs in a state with a NOCA law should reveal a higher (lower) interest rate penalty for consecutive (initial) deficits in states with NOCA laws, controlling for other relevant factors that affect state bond yields. As explained in Lowry and Alt (2001), the only time series of state-level data on comparable bond yields comes from a survey of bond traders asked about yields relative to the bonds of New Jersey. Those responses, asked twice a year, are the dependent variable. Controls include economic conditions relevant to ability to pay off debt and possibility of default (essentially, income and the debt stock), plus unemployment to control for the business cycle, and Moody's ratings of the state's general obligation debt, which might contain independent information.

Table 1 contains the results of regression equations summarizing the findings. The first three equations present results estimated by generalized least squares with panel-corrected standard errors (Beck and Katz 1996) using a lagged dependent variable, a dummy variable for NOCA laws, and fixed state effects variables, respectively. The last equation shows the results for a Heckit model to correct for possible selection bias (Heckman 1979). Lagged dependent variables and Moody's ratings are not available for states that do not issue GO bonds, so the second-stage Heckit equation has fixed state effects and the unemployment rate to control for business cycle effects. All equations also include intercept shifts for each year to capture shifts in overall market conditions and other factors affecting risk relative to New Jersey.

Table 1. *Regression Results*
Dependent variable: Yield spread vs. NJ on 20-year GO debt.

Explanatory Variable	GLS Models			Heckit Model
	1974-95	1973-95	1973-95	1973-95
Constant	-0.04 (1.64)	3.36 (2.92)	-23.99 (4.58)	-15.22 (13.05)
Fixed year effects	Yes	Yes	Yes	Yes
Lagged yield spread	.850 (.018)	----	----	----
No Carryover Law fixed effect	----	-1.31 (1,52)	----	----
Fixed state effects	----	----	Yes	Yes
State personal Income	-.001 (.0002)	-.0005 (.0004)	-.0088 (.0008)	-.0067 (.0015)
Total debt Outstanding	.0007 (.0006)	.0083 (.0011)	.0040 (.0020)	.0067 (.0027)
Change in debt/income, last 4 years	35.37 (16.00)	55.94 (30.17)	70.65 (26.60)	-0.68 (33.86)
Moody's Rating "plus 1"	-3.51 (1.60)	-22.03 (2.98)	-5.38 (2.56)	----
Moody's Rating "minus 1"	1.01 (0.79)	7.54 (1.45)	2.78 (1.45)	----
Moody's rating "minus 2 or 3"	3.99 (1.88)	44.36 (3.12)	24.99 (2.83)	----
Unemployment Rate	----	----	----	3.97 (0.61)
Lagged Surplus	-.0039 (.0033)	-.0182 (.0064)	-.0164 (.0064)	-.0072 (.0107)
Lagged Deficit	.0211 (.0219)	.0154 (.0405)	.0217 (.0322)	.0305 (.0348)
No carryover law *lagged deficit	-.1278 (.0285)	-.1791 (.0531)	-.1374 (.0421)	-.1371 (.0465)
Consecutive deficits dummy variable	-4.46 (2.56)	-8.10 (4.49)	-13.53 (3.59)	-15.89 (3.89)
No Carryover law* Consecutive deficits	5.58 (4.69)	16.94 (6.19)	17.04 (4.85)	16.42 (7.55)
Unified Democrats* Lagged Deficit	.1473 (.0221)	.1847 (.0404)	.1580 (.0325)	.1551 (.0360)
Split legislature* Lagged Deficit	.0079 (.0524)	-.0700 (.0963)	.0426 (.0747)	.0095 (.0826)
Mills' ratio	----	----	----	7.83 (7.39)
Number of cases	835	872	872	872
Regression SE	9.56	18.29	14.30	----
Corrected R^2	.842	.401	.634	----
Rho	----	----	----	.5398

Standard errors are in parentheses. Data are for 38 states, except for Georgia in 1973 and 1974 .
Regressions were estimated with Stata 5.0 using generalized least squares with panel corrected standard errors (Beck and Katz 1996).
All explanatory variables except fixed year effects are measured relative to New Jersey.

- *Effects of control variables*

The effects of lagged yield spreads, income, total debt outstanding, unemployment rates, and Moody's bond ratings are all in the expected directions, though magnitude and significance vary by specification. The effect of the trend in debt/income is in the expected direction for the GLS models and essentially zero for the Heckit model. Interest rates tend to be sticky. The coefficient of lagged yield spread equals .85 and the t-ratio exceeds 40. The effects of the other economic variables are smaller and less statistically significant when we control for lagged yield spreads than when we use a dummy variable for NOCA laws or fixed state effects. Regression standard errors are smallest when the lagged dependent variable is included and largest when both the lagged dependent variable and state fixed effects are omitted.

Tracing out the estimated "long run" effects of variables (multiplying their coefficients by the reciprocal of one minus the coefficient of lagged yield spread), the first specification has qualitatively similar implications to other specifications. For example, the long run effect of real debt outstanding in the first equation is .0008/(1-.850) = .0053, which compares to the coefficient of .0083 in the second column (substituting the NOCA law dummy variable for lagged yield spread), .0040 in the third column (with fixed state effects), and .0067 for the Heckit model. Thus, an increase in real debt of $1,000 per capita translates into an increase of about four to eight basis points, depending on the exact specification.

A state persistently receiving a Moody's rating one category below New Jersey should pay interest rates that are 2.8 to 7.5 basis points higher than New Jersey. A state persistently rated two categories lower apparently pays an extra 25-44 basis points. Of course, these calculations examine only the independent effects of different variables. A change in real debt outstanding, for example, can affect the trend in debt/income, and affect the Moody's rating as well. Finally, not only are the results for the Heckit model qualitatively similar to the other regressions, but the Mills' ratio coefficient is also not significant, consistent with the null hypothesis that selection bias is unlikely to be a problem.

- *Effects of surpluses, deficits and NOCA laws*

Now, on to the quantities of real interest. States with NOCA laws actually pay about 7.3 basis points less on average than states that lack these laws. The second equation in Table 1 shows that the coefficient of the NOCA law variable is negative but not statistically significant. However, the simple averages for NOCA and non-NOCA states of the state-specific intercepts from the third column are (for NOCA states) -19.95 and (for the rest) 0.21, a difference of 20 basis points in the predicted direction. Debt outstanding may itself be a function of fiscal institutions, and thus may obscure the effect of institutions on interest rates. When the second equation is re-estimated without the real debt stock, the coefficient of NOCA laws is –3.76, its standard error is 1.54, and the rest of the results are robust. So states with NOCA laws do pay lower interest rates on average, at least partly through the effect of NOCA laws in producing lower debt outstanding.

All four equations indicate that interest rates decrease slightly if the previous fiscal year ended in surplus, and the effect is statistically significant for the fixed effects GLS models. Interest rates also increase after a state that lacks a NOCA law runs a deficit, but the response of interest rates to a deficit in the previous year is significantly less in states with NOCA laws, regardless of specification. This supports the argument that investors can be more forgiving of short-term deficits in a state with NOCA laws. With their mean value of lagged deficits of about $70 per capita, states with NOCA laws can expect to pay about 8.9 to 12.5 basis points less in the year following an average deficit than other states. Whether this is a "large" effect is hard to say. Ten basis points corresponds to an extra $1,000 in interest for every million dollars financed by GO bonds. As a rule of thumb, it is also approximately the average magnitude of yield spread from New Jersey across the whole sample and the standard deviation of interstate differences in spreads in the last year of the data.

States with NOCA laws are disproportionately punished for running consecutive deficits. The coefficient of the consecutive deficits dummy variable is consistently negative, while the main quantity of interest, the coefficient on consecutive deficits interacted with a NOCA law, is always positive, and less than twice its standard error only when in the

presence of the lagged yield spread. Moreover, this result is robust to a host of specification experiments. Dropping years at the beginning or end of the sample increases the standard error of the parameter estimate, but does not alter the qualitative pattern of results. The result is also generally robust to alternative GLS-based estimation methods, including fixed and random effects regression, common and panel-specific corrections for first-order autocorrelation, and some corrections for heteroskedasticity and contemporaneous correlation in the errors.

To see the hypothetical effects of repeat deficits, consider two states, one without and one with a NOCA law. Based on the estimates for column 2, if each state runs deficits of $70 per capita (about average for both NOCA and non-NOCA states) two years in a row, the following are the predicted effects on the yield spread from each deficit. The state without a NOCA law faces interest rates 14.9 basis points higher in the first year, but the effective risk premium in the second year is only 5.9 basis points. (This effect in year 2 is for the deficit only, and omits the effect of the change in the stock of debt due to the year 1 deficit.) By contrast, the state with a NOCA law pays only 1.5 basis points more in the first year, but 10.3 basis points more in year 2. Similar patterns of results with slightly smaller magnitudes for states with NOCA laws can be derived from the estimates in columns 1, 3 and 4. This pattern is consistent with the behavior described above, in which a second deficit in a row is far more informative when there is a NOCA law around which signals and expectations of responsibility can coordinate.

V.   Conclusions

In the example just discussed, the laws are effective at least in part because the operation of bond markets gives politicians an incentive to maintain orderly fiscal policies, namely, lower operating costs of government (and thus more funds to spend on other things) in those cases where unforeseen economic circumstances compel running a deficit in the short term. If politicians do run consecutive deficits, however, then it is highly likely that

they are not conforming to the strict standard set forth in the NOCA law, and markets react accordingly. Thus, to keep the discount intact, political officials must adopt sound practices.

The effects of NOCA laws are distinct from the budget transparency that Alesina and Perotti (1999, 1996) say can result from rules on how the budget is to be prepared, organized, and executed, or the creation of a "watchdog" agency that verifies the accuracy of the estimates used and discourages creative accounting practices. In a sense, NOCA laws may be thought of as substitutes for procedures designed to increase transparency because they improve the ability of outside observers to interpret noisy signals rather than trying to remove the noise from the signals. They accomplish this by creating clear expectations about the preferred policy in certain circumstances, namely, after deficits. These expectations then allow observers to infer whether the government is following the clearly defined, preferred policy or is being opportunistic.

Nevertheless, the choice situation facing politicians, and the key role for credibility of observable action in the logic of the model of bond investor behavior, are very similar to features motivating Ferejohn's model of transparency and credibility. In this case, I have not yet linked up the formal model and the observable implications. Moreover, the particular laws analyzed have been on the books in many cases since canal company collapses in the 1830s. But the choice of budget institutions facing EMU participants and the case argued in the literature for transparency present an opportunity to apply the simultaneous choice framework that Ferejohn develops, and the analysis of interest rates and inferences from observed consecutive deficits are an example of how tests of such models can be carried out.

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