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## The Discipline-Enhancing Role of Fiscal Institutions: Theory and Empirical Evidence

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**Abstract**

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This paper discusses the role of fiscal institutions, including budget rules and non-partisan agencies, in enhancing fiscal discipline. A dynamic model of fiscal policy shows that optimal institutions lack credibility unless the costs to bypass them are sufficiently high. In our model, a combination of complete budgetary transparency and strong democratic accountability suffice to establish credibility. Under incomplete budgetary transparency, accountable governments may also use institutions as a signal of competence to increase their reelection chances, which in turn erodes the penchant for excessive deficits. In light of the theory, empirical tests of the effectiveness of institutions are undertaken. The results further emphasize that analysis should pay due attention to simultaneity bias (because disciplined governments may be more likely to adopt strict institutions). Also, interactions among different fiscal institutions, and between the latter and key features of the political system need to be explored further.

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## I. INTRODUCTION

Persistent and widespread evidence of fiscal indiscipline has prompted a debate on the likely distortions causing such behavior, and on effective ways to improve policymakers' incentives. Among them, institutional arrangements—ranging from legally binding fiscal rules to formal commitments supported by strong accountability mechanisms and procedural arrangements—have received considerable attention. The underlying idea is that well-designed institutions effectively discourage deviations from desirable policies. Yet the significance of the role of institutions in improving policy outcomes has been the subject of debate on both theoretical and empirical grounds (see Schick, 2004, for an informal discussion). The issue revolves around the extent to which institutions themselves can alter the motivations of policymakers. In this context, the paper provides a formal assessment of the role of fiscal institutions in improving fiscal discipline, and explores some empirical implications of that analysis.

The paper comprises two parts. In the first, a stylized model of fiscal policy illustrates the theoretical underpinnings of fiscal institutions. As in Tabellini and Alesina (1990), electoral uncertainty shortens the time horizon of partisan policymakers, creating a deficit bias. In principle, institutions—such as a constitutional amendment banning excessive deficits—can alleviate such bias. In line with McCallum (1995) and Jensen (1997), we explore the credibility of that fiscal rule and show that it depends on the existence of sufficiently high costs of ignoring or bypassing the rule. The model emphasizes the role of democratic accountability as one natural mechanism through which deviations from the rule can be made costly. However, the power of voters to influence policymakers' behavior is limited by the lack of budgetary transparency and by the possibility that the deficit bias be rooted in political institutions themselves rather than electoral incentives. Although third-party enforcement and market sanctions could also play a role and be investigated in the context of the model, the former is generally limited to subnational fiscal rules whereas market mechanisms are arguably weak and discontinuous in advanced economies (Bayoumi, Goldstein, and Woglom, 1995).

Beyond the credibility issue, the contribution of institutions over and above the influence of other factors, particularly that of specific political constituencies, has been questioned in the literature. It has been argued for instance that institutions only reflect preferences of dominant constituencies for a certain course of action, and what matters therefore are not the institutions per se, but rather the power of these constituencies (Posen, 1995). We examine the extent to which this argument overlooks a key role institutions can play to reduce the consequences of asymmetric information between voters and policymakers.

The second part of the paper explores some of the empirical implications of the theory, looking specifically at fiscal behavior in a panel EU-15 countries. We first document broad correlations among various elements of the fiscal framework in these countries, including features that can raise the costs of bypassing institutions (specifically the transparency- and accountability-enhancing dimensions of the fiscal framework). We then turn to quantifying econometrically the relationship between institutions and fiscal outcomes. We explicitly test

for the null hypothesis that the relationship between institutions and outcomes is causal. Indeed, our theoretical analysis suggests that intrinsically well-behaved governments may adopt strict institutions merely to signal competence, pointing to reverse causality (from good outcomes to good institutions) in standard least-squares regressions.

Although our findings are only preliminary, there is some evidence that reverse causality may entail a serious bias in the estimated effect of institutions on outcomes. Incidentally, the instrumental variable approach used to alleviate the endogeneity problem allows us to explore the possibility that various features of the political system that may have no strong direct impact on outcomes might actually influence fiscal performance through the design of institutions only.

Our empirical analysis also explores non-linearities in the relationship between outcomes and institutions. The results suggest that the effectiveness of the latter may vary according to various features of the political landscape, including political stability, government fragmentation, country size, and growth volatility.

The rest of the paper is organized as follows. Section II discusses the effectiveness of institutions in light of the existing literature, while Section III develops a simple theoretical model and draw the implications for the theoretical analysis. In Section IV, we undertake the empirical analysis, while policy implications and conclusions are discussed in Section V.

## **II. INSTITUTIONS, DEMOCRATIC ACCOUNTABILITY, AND COST OF EVASION**

### **A. Institutions and Policy Outcomes**

Many potential sources of deficit bias have been identified in the literature, and in dealing with it, the debate has so far largely focused on the design of fiscal rules, in particular, their coverage, nature, degree of state contingency, and the specific targets (see e.g. Calmfors, 2005, and Morris, Ongena, and Schuknecht, 2006). As noted by Wyplosz (2005), there is a striking parallel between the current debate and the vast literature that blossomed in the 1980s and the 1990s to analyze the merits of monetary institutions, including rules-based monetary policy frameworks and central bank independence. In both cases, the very same question dominates discussions: how can a Society effectively encourage policymakers to avoid systematic deviations from an optimal policy stance? Wyplosz (2005) observes that after the demise of monetary rules, institutional reforms (in that case, granting political independence to the central bank in day-to-day policy decisions) became the dominant idea in the monetary policy literature, and he argues that independent institutions could play a role in the fiscal realm as well (see Debrun, Hauner, and Kumar, 2005 for a survey).

One strand of the monetary policy literature adopted a more skeptical view on the role of institutions in shaping policy outcomes, and the arguments developed there might apply with even greater strength to the current fiscal policy debate. A key element in the skeptics' thinking is that establishing rules (or institutions) does not change the underlying motivations

or preferences of the policymakers. As such they potentially suffer from the same problems as policies themselves, and in particular, optimal institutions may lack credibility (McCallum, 1995).<sup>4</sup> Proponents of institutions invariably reply that institutions are essentially defined by the very high costs of changing them so that they are intrinsically more credible than discretionary policies.

In the model below, we explicitly address McCallum's point and consider the policymaker as an optimizing agent that decides on both policies *and* the institutions. This leads us to investigate the costs of changing institutions, showing that they must indeed be sufficiently high to deter systematic deviation from optimal policies. To the extent that the fiscal rule is considered as a reasonably good proxy for the optimal policy, a combination of complete budgetary transparency and strong democratic accountability suffice to establish credibility. Even assuming non-transparent budgets, accountable governments may still find it useful to use institutions as a signal of competence.<sup>5</sup> In both cases, the impact of institutions on the deficit does not come from the "stick" of sanctions (either from markets or some third-party enforcer) but from the "carrot" of higher re-election chances, which in turn reduces the temptation for excessive deficits.

Another related critique of the role of institutions is due to Posen (1995) who argues that in a democracy, institutions can only be sustained if they reflect deeper social preferences or permanent features of the political set-up. That argument again implies that institutions *per se* do not change underlying incentives. In the context of central bank independence, Posen (1995) concludes that "*both central bank independence and a coalition in society committed to protecting that independence are necessary to achieve the low inflation heretofore ascribed to central bank independence; either alone is insufficient* (p. 271)." While institutions may well be merely decorative under complete information (i.e. the public knows the true motivation and competence of the government), their signaling role under incomplete information may explain why governments set up formal fiscal frameworks, even though they may not *directly* affect incentives.

## B. Key Features of Our Model

In Section III, we build a simple politico-economic model of fiscal policy aimed at illustrating the issues discussed above. A deficit bias arises because uncertainty about re-election increases the discount rate of partisan policymakers, who, by definition, care about future fiscal policy only if they expect to be in charge. Unlike the standard Tabellini-Alesina (1990) model, electoral uncertainty is endogenous and rooted asymmetric information about policymakers' motivations and competence. Specifically, rational voters only re-elect the incumbent administration if the latter demonstrates sufficient ability to deliver a quantity of public goods deemed commensurate to tax revenues. In fact, policymakers themselves are uncertain as to whether their actions will be successful in delivering enough public goods.

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<sup>4</sup> In McCallum's words, institutions *per se* do not "*overcome the motivation*" for biased policies but "*merely relocate it.*"

<sup>5</sup> Cukierman (2002) discusses the relationship between accountability and transparency in central banking.



The less tolerant the voters vis-à-vis policy failures, the greater electoral uncertainty, and the larger the deficit bias.

In that context, a simple budget-balance rule can be enacted, and its enforcement should be strict enough to discourage the policymaker to deviate from the optimal policy. The problem is that the enforcement of the rule can only result from the decision of a non-partisan body because in the absence of costs for ignoring the rule, a partisan decision maker will always have an incentive to revert to the fully discretionary outcome. One natural way to rationalize such costs is to assume that voters hold policymakers accountable for sticking to the rule (because it encapsulates the optimal policy). Hence, if voters can perfectly observe budgetary outcomes (what we call transparency), compliance is rewarded by certain re-election, and in our model, the elimination of electoral uncertainty removes any incentive to deviate from the rule. That said, the combination of transparency and accountability is not a magic bullet in the case where the fiscal bias comes from elsewhere, including primarily in fiscal illusion (i.e. voters themselves would have a preference for short-term deficits) or in common pool problems (see Krostrup and Wyplosz, 2006, for a discussion of possible solutions to common pool problems).

The lack of budgetary transparency is another obvious obstacle to the effectiveness of fiscal rules and institutions because voters cannot disentangle the deficit from policy failures, and can only observe their sum. In that conjecture, high deficits may be used opportunistically by policymakers to mask policy failures whereas good policy surprises may hide an excessive deficit. However, the adverse electoral consequence of flouting the rules will be stronger if voters do not pay much attention to policy failures and are correspondingly more concerned by evidence of excessive deficits. This implies that under opacity, fiscal rules are more likely to be effective precisely when electoral uncertainty and the discretionary deficit bias are low to start with.

To summarize, and in contrast to existing studies,<sup>6</sup> the model illustrates the importance of the electorate, both as a determinant of the bias itself (through the tolerance for policy failures), and as the key player in rule's enforcement. The institutional set-up is simple and comprises two components: a numerical deficit rule that can be interpreted as a benchmark characterizing the optimal policy, and, most importantly, an enforcement mechanism that imposes a cost on deviations from the benchmark in terms of utility losses for policymakers. In line with McCallum's critique, we show that the credibility of fiscal institutions rests on sufficiently high costs to bypass them, and we characterize such costs.<sup>7</sup>

These theoretical issues raise a number of concerns regarding empirical tests of the effectiveness of institutions. Two areas should receive particular attention. First, simultaneity

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<sup>6</sup> Examples include Tabellini and Alesina (1990), Beetsma and Bovenberg (1997), Peletier, Dur, and Swank (1999), Debrun (2000), Dixit and Lambertini (2003), Manasse (2005), Beetsma and Debrun (2007), and Krostrup and Wyplosz (2006).

<sup>7</sup> In the context of monetary policy delegation, Jensen (1997) overcomes the McCallum critique by introducing exogenous costs to reappoint a new central banker.

bias is likely to be important because governments with only moderate deficit bias are more likely than others to benefit from discipline-enhancing institutions. Second, since fiscal rules do not operate in an institutional vacuum and enforcement via democratic accountability is key, the effectiveness of rules is likely to depend on various features of the political landscape. The relationship between fiscal rules and outcomes may therefore be nonlinear.

### III. EFFECTIVENESS OF FISCAL INSTITUTIONS: A POSITIVE ANALYSIS

This section elaborates on the key issues noted above in the debate on the effectiveness of fiscal institutions. To illustrate the main points in a consistent theoretical framework, we use a simple politico-economic model of fiscal policy in the spirit of Tabellini and Alesina (1990). Our model draws on Beetsma and Debrun (2007) but differs in two important dimensions. Firstly, we introduce voters' behavior to allow for an explicit analysis of institutions' credibility. Secondly, we ignore possible bias in the composition of expenditure, and only look at the overall deficit.

#### A. The Model

Consider a small endowment economy with a large number of atomistic individuals deriving utility from the consumption of both private and public goods. Individuals are identical and the world ends after two periods. The typical individual's preferences are represented by a utility function  $U$  that is separable over time and types of good:

$$U = E_0 \left[ \sum_{t=1}^2 u(c_t) + v(q_t) \right], \quad (1)$$

where  $c_t$  represents consumption of the private good in period  $t$ , while  $q_t$  denotes the provision of a public good. The functions  $u(\cdot)$  and  $v(\cdot)$  are concave, strictly increasing and twice continuously differentiable, that is  $u' > 0$ ,  $v' > 0$ ,  $u'' < 0$ , and  $v'' < 0$ . Moreover, we also assume that  $v(0) = 0$ .  $E_0$  is the expectation operator based on information available at the beginning of period 1. To simplify notation, and without loss of generality, we assume that the real interest rate and the social discount rate are both equal to zero.

All agents in the economy can borrow freely on domestic and international capital markets so that the consumer's intertemporal budget constraint can be written as:

$$c_1 = (1 - \tau)y_1 + l, \quad (2a)$$

$$c_2 = (1 - \tau)y_2 - l, \quad (2b)$$

where  $\tau$  is a constant and exogenous income tax rate (essentially parametrizing the size of the government sector),  $l$  is the stock of net private liabilities at the end of period 1, and  $y_t$  is the endowment at time  $t$ . In addition, we assume that  $c_t \geq 0$ ,  $t = 1, 2$ , which implies

$-(1-\tau)y_1 \leq l \leq (1-\tau)y_2$ . Period 1 income is subject to a zero-mean multiplicative random shock  $\varepsilon \in [-\bar{\varepsilon}; \bar{\varepsilon}]$  with  $\bar{\varepsilon} < 1$ , while period 2 income is assumed to be deterministic:<sup>8</sup>  
 $y_1 = \bar{y}(1+\varepsilon)$ , and  $y_2 = \bar{y}$ .

There are two political parties indexed by  $Q = C, L$ . Both parties share individuals' preferences only to the extent that they are in power to deliver the public good. The latter is identical irrespective of the party. Fiscal policy is also subject to a mechanism discouraging policymakers to accumulate public debt  $b$  beyond a certain threshold  $\bar{b}$ . The utility cost of breaching the threshold is denoted by  $S(b)$ , with  $S(b) = 0$  if  $b \leq \bar{b}$ , and  $S(b) = k(b - \bar{b})$  with  $k \geq 0$  if  $b > \bar{b}$ . One can think of  $b - \bar{b}$  as a numerical fiscal rule and of  $k$ , as the enforcement mechanism through which violations of the rule turn into utility losses for policymakers. The objective function of the policymaker (expressed in per-capita terms) therefore writes as follows:

$$V_Q = E_0 \left[ \sum_{t=1}^2 u(c_t) + v(q_{Q,t}) - S(b) \right], \quad Q = C, L. \quad (3)$$

with  $q_{C,t} = 0$  if  $Q = L$ ,  $q_{L,t} = 0$  if  $Q = C$ . In the absence of borrowing restrictions, fiscal policy decisions are subject to the intertemporal budget constraint:

$$q_{Q,1} = \tau y_1 + b - \delta_1, \quad (4a)$$

$$q_{Q,2} = \tau y_2 - b - \delta_2, \quad (4b)$$

where  $\delta_t$  is a random failure in public good delivery attributable to unforeseeable policy mistakes, administrative capacity problems, or the action of corrupt bureaucrats siphoning off government resources (as in Debrun, Masson, and Pattillo, 2005). To simplify the formal analysis, we consider that  $\delta_t$  is uniformly distributed over the interval  $[0; \bar{\delta}]$ . As in the case of consumers' decisions, we impose nonnegativity constraints on public good provision:  $q_t \geq 0$ ,  $t = 1, 2$ , implying  $-\tau y_1 + \bar{\delta} \leq b \leq \tau y_2 - \bar{\delta}$ . Notice that the distribution of policy failures is the same for both parties so that there is no actual difference in "type" (e.g. a more competent versus a less competent) between the two political parties.

The only source of inefficiency in our model is the absence of public information on policymakers' ability to efficiently deliver public goods.<sup>9</sup> As a result, voters can only infer

<sup>8</sup> Randomizing period 2 income only complicates the notation without bringing additional insight to the analysis.

<sup>9</sup> The assumption of an under-informed public is fairly common in theoretical analyses of fiscal bias. See Morris, Ongena, and Schuknecht (2006) for a survey.

such ability on the basis of actual actions. Specifically, they assign a non-zero probability to the fact that a policy failure beyond a certain threshold  $\delta^+$  signals an underlying lack of competence—in other words, some failures are deemed too big to be purely random. Voters also ignore the true ex-ante probability distribution of  $\delta$ , and whether there exists any difference in type among policymakers of different parties. However, they do observe  $b$ —which we equate with perfect budgetary transparency—which in turn allows them to assess ex-post the magnitude of policy failures, and possibly, adjust their voting decision. Formally, they assign a fixed probability  $\psi \in [0, 1/2[$  that a policy failure  $\delta_t > \delta^+$  can occur under a competent government. At the end of period 1, individuals either re-elect the incumbent (party  $C$  by assumption) or vote it out—in either case by a unanimous vote. Voters will re-elect party  $C$  if:

$$E_1[v(q_{C,2})] \geq E_1[v(q_{L,2})], \quad (5)$$

where  $E_1$  designates the expectations operator at the end of period 1.

Expression (5) indicates that if the incumbent is not believed to be less competent than the challenger in delivering public goods, it will be re-elected. While voters' beliefs about competence are the same for both parties at the beginning of period 1, they are updated following the realization of  $\delta_1$ . The incumbent's ex-ante assessment of re-election chances thus reflects the probability of occurrence of a large policy failure  $\delta_t \geq \delta^+$  (see Proposition 1). Notice that individuals assess policymakers' competence on the sole basis of their ability to deliver public goods in the most efficient way given the budget constraint. The level of the deficit at the end of period 1 therefore plays no role in the voting decision since both political parties will have to repay the debt anyway.

**Proposition 1:**

*If  $0 \leq \psi < 1/2$  and voters follow (5), then, at the beginning of period 1, the incumbent assigns a probability  $r = 1 - (\delta^+ / \bar{\delta})$  of not being re-elected.*

**Proof:** See Appendix.

Importantly, the probability  $r$  of losing the election depends on how flexibly voters assess policy failures. Flexibility (that is when  $\delta^+$  is large but below  $\bar{\delta}$ ) reduces that probability, effectively loosening the link between information asymmetry and electoral uncertainty.

Events unfold as follows. In period 0, a representative constitutional convention (or a referendum) imposes a debt (or deficit) cap  $\bar{b}$  which carries a utility cost  $S(b)$  when  $b > \bar{b}$ . At the beginning of period 1, Nature draws the governing party ( $C$  by assumption). Then, the shock  $\varepsilon$  is realized and government chooses  $b$  and  $q_{C,1}$  so as to maximize  $V_C$ . After that,  $\delta_1$  materializes, and private consumers select  $l$  and  $c_1$  maximizing their expected utility  $U$ .

Finally, elections take place. In period 2, all debts are paid off and the world ends. The equilibrium is found by backward induction to ensure time-consistency.

The last three stages of the solution are immediate. Indeed, period 2 decisions result from the budget constraints, and voters' behavior depends on the realization of  $\delta_1$ . Also, private consumption-saving decisions are independent of fiscal policy. Hence, denoting optimal values by a star superscript, we have  $c_1^* = c_2^* = 1/2[(1-\tau)(y_1 + \bar{y})]$  and  $l^* = -1/2(1-\tau)\bar{y}\varepsilon$ . Of course, fiscal policy would affect private behavior if productive expenditure was introduced in the model (as in Peletier, Dur, and Swank, 1999; or Beetsma and Debrun, 2007) or if the real interest rate depended on  $b$ , which is not the case by virtue of the small economy assumption.

### B. Optimal Fiscal Policy

Before turning to the political equilibrium, we characterize the first-best fiscal policy, assuming that a social planner is in charge. Electoral constraints and fiscal institutions are therefore irrelevant, and the planner selects a public debt level  $b^*$  defined as:

$$b^* = \arg \max_b [2u(c_1^*) + v(\bar{y}(1+\varepsilon) + b - \bar{\delta}/2) + v(\bar{y} - b - \bar{\delta}/2)] \quad (6)$$

The first order condition for (6) is:<sup>10</sup>

$$v'(\bar{y}(1+\varepsilon) + b^* - \bar{\delta}/2) = v'(\bar{y} - b^* - \bar{\delta}/2) \quad (7)$$

The socially optimal public debt  $b^*$  equates the marginal utility of additional deficit-financed public good provision in period 1 with the marginal disutility of foregone public good provision in period 2 (because additional resources are allocated to debt repayment). The optimal policy thus achieves  $q_1^* = q_2^*$ , and it follows that  $b^* = -\bar{y}\varepsilon/2$ . On average, the optimal public debt is zero, and deficits or surpluses are only used to smooth out the income shock.

### C. Political Equilibrium and the Role of Fiscal Institutions

In the political equilibrium, the policymaker is exposed to electoral uncertainty and to the possible costs of breaching the fiscal constitution  $S(b)$ . Denoting by  $b^{**}$  the deficit maximizing policymaker's expected utility, we can write:

$$b^{**} = \arg \max_b [2u(c_1^*) + v(\bar{y}(1+\varepsilon) + b - \bar{\delta}/2) + (1-r)v(\bar{y} - b - \bar{\delta}/2) - S(b)] \quad (8)$$

---

<sup>10</sup> The second-order condition is satisfied by concavity of  $v(\cdot)$ .

Equation (8) shows that uncertainty about re-election brings the policymaker's discount factor  $(1-r)$  below the social discount factor. The first order condition for (8) is:

$$v'(\bar{y}(1+\varepsilon)+b^{**}-\bar{\delta}/2)=(1-r)v'(\bar{y}-b^{**}-\bar{\delta}/2)+\Gamma(b^{**}) \quad (9)$$

with  $\Gamma(b)=0$  if  $b \leq \bar{b}$ , and  $\Gamma(b)=k > 0$  if  $b > \bar{b}$ .

Equation (9) implicitly defines  $b^{**}$  (and the corresponding  $q_1^{**}$  and  $q_2^{**}$ ) as a function of all other parameters and variables in the model. The main features of the political equilibrium are formalized in Proposition 2.

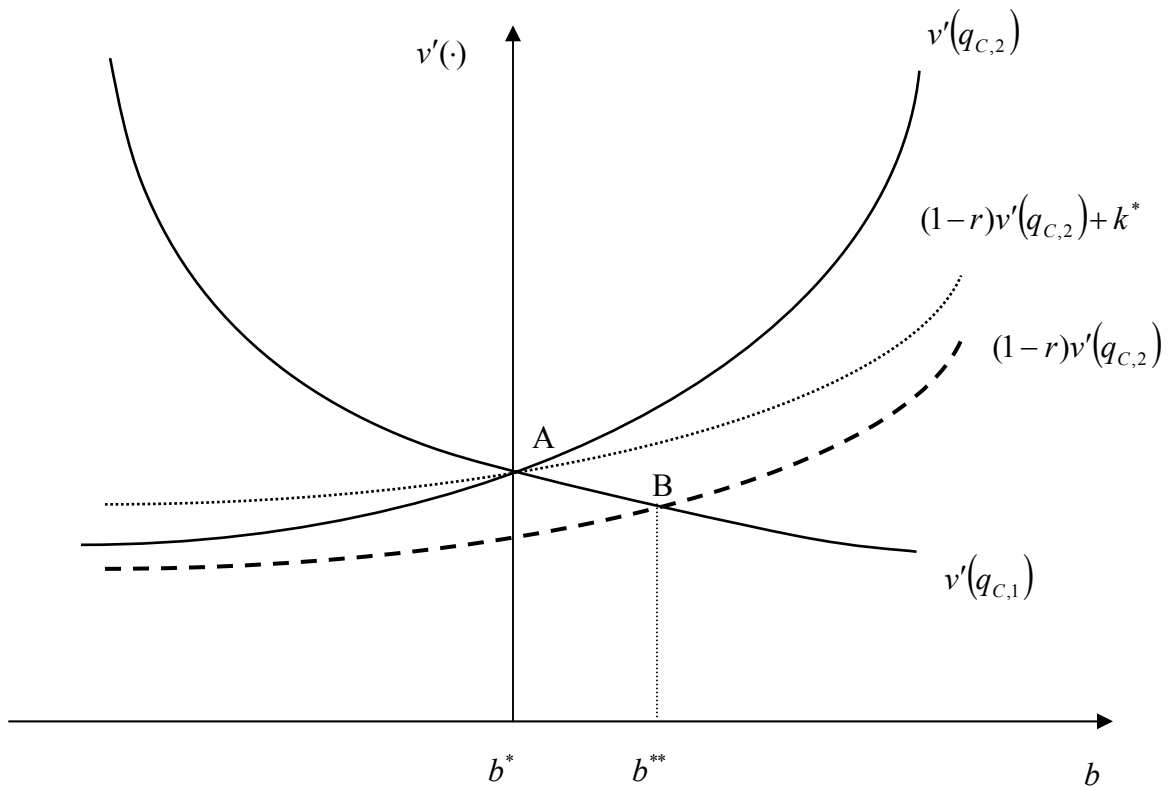
**Proposition 2:**

1. **Deficit (debt) bias:** In general, the equilibrium public debt  $b^{**}$  differs from its optimal level  $b^*$ . Specifically, if  $\bar{b} > b^*$  for all  $\varepsilon \in [-\bar{\varepsilon}; \bar{\varepsilon}]$ , the equilibrium public debt is suboptimally high for all  $0 < r \leq 1$ .
2. **Fiscal institutions:** If  $b^{**} > \bar{b}$ , a higher marginal disutility of breaching the fiscal rule ( $k$ ) reduces equilibrium public debt. Specifically, a fiscal constitution characterized by  $k^* = rv'(q_{C,1}^*) > 0$  and  $\bar{b} = b^*$  ensures that  $b^*$  is implemented in the political equilibrium (i.e.  $b^{**} = b^*$ ).

**Proof:** See the Appendix.

A geometrical illustration of Proposition 2 is useful. Figure 1 displays the graph of marginal utility functions  $v'(\cdot)$  in terms of  $b$  for  $\varepsilon = 0$ . The downward sloping curve represents the marginal utility derived from current public good provision  $v'(q_{C,1})$ , whereas upward sloping curves show the expected marginal utility of future public good provision under different conjectures: a social planner (plain line), electoral uncertainty (bold dotted line), and electoral uncertainty under an optimal fiscal rule (light dotted line). Each intersection between two curves with opposite slopes describes a solution to the optimization problem, and its projection on the horizontal axis gives the corresponding deficit.

Point A identifies the planner solution defined by (7). There, the two marginal utility curves are symmetric with respect to the vertical axis so that equilibrium debt is  $b^* = 0$ . Electoral uncertainty leads policymakers to discount the expected marginal utility of future public good provision more heavily than a social planner. The upward-sloping curve is consequently flatter (bold, dotted line), leading to a political equilibrium B, defined by (9) and characterized by a deficit  $b^{**} > b^*$ . A degree of enforcement  $k > 0$  associated with the fiscal rule  $b = b^*$  pushes up the upward-sloping curve, reducing equilibrium deficit. In particular, an enforcement level  $k^* = rv'(q_{C,2}) = rv'(q_{C,1})$  eliminates the “wedge” between the political and the socially optimal discount factors (light dotted line).

Figure 1: The Geometry of Interior Solutions (for  $\varepsilon = 0$ )

The optimal institutional setup can be interpreted as a state-contingent deficit rule whose violation entails a utility loss (or sanction) that depends upon the nature of sanction and the strictness of enforcement ( $k$ ). While the model offers no insight on the former, it suggests that the latter should increase with the incentive to deviate from  $b^*$ . It is easy to verify that such incentive increases with the extent of political uncertainty ( $r = 1 - (\delta^+ / \bar{\delta})$ ) and the related capacity constraints altering public good delivery ( $\bar{\delta} / 2$ ), and decreases with the size of the government sector ( $\tau$ ), and the level of per-capita income ( $\bar{y}$ ). The impact of  $r$  on the fiscal wedge operates directly through the policymaker's subjective discount factor (the higher  $r$ , the greater the relative importance of period-1 expenditure). The effect of the magnitude of policy failures, government size, and per-capita income all reflect induced changes in the marginal utility of public goods. Specifically, elements contributing to a low delivery of public goods increases their marginal utility, and thereby, the government's incentive to spend.

Quite intuitively, these results suggest that a fiscal bias is expected to be large in poor countries with small governments facing significant capacity constraints and political instability. These countries correspondingly need fiscal institutions providing stricter enforcement mechanisms to support their commitment to the optimal fiscal policy. By contrast, affluent countries with large government sectors, good delivery capacities, and

enjoying political stability should experience less severe deviations from the optimal policy, relaxing somewhat the need for strict enforcement mechanisms.<sup>11</sup>

### D. Are Optimal Institutions Credible?

#### Time-Consistency

While Proposition 2 establishes the joint existence of a fiscal bias and of an institutional response to it, the effectiveness of the latter is assumed. A classic argument in the literature is that of a given constitutional clause that policymakers diligently observe (Tabellini and Alesina, 1990). In our theoretical setup, it is easy to check that the fiscal arrangement  $(k^*, b^*)$  results from the maximization problem of a *representative agent* (a benevolent “founding father,” a nonpartisan constitutional convention, or the outcome of a referendum) that fully internalizes the features of the political equilibrium in periods 1 and 2.

In practice, however, constitutions and lower-level norms can be amended or scrapped; and if they prove too hard to change, they may simply not be enforced.<sup>12</sup> Allowing policymakers to amend  $(k^*, b^*)$  or to bypass it adds one step to our solution procedure, providing a test for the time-consistency of fiscal institutions (see also Krogstrup and Wyplosz, 2006).

The eventual re-optimization of  $k$  (which we can interpret as either a change in the rule itself or in its enforcement) takes place just before fiscal policy is selected. It is easy to show that if changing  $(k^*, b^*)$  entails no cost for the policymaker, the fiscal arrangement will be scrapped or fall into abeyance, yielding  $k^{**} = 0$ . Specifically, we can write:

$$k^{**} = \arg \max_k [2u(c_1^*) + v(\bar{y}(1 + \varepsilon) + b^{**} - \bar{\delta}/2) + (1 - r)v(\bar{y} - b^{**} - \bar{\delta}/2) - S(b^{**})] \quad (10)$$

At  $b^{**} > \bar{b}$ , the first order condition for  $k^{**}$  follows:

$$[v'(\bar{y}(1 + \varepsilon) + b^{**} - \bar{\delta}/2) - (1 - r)v'(\bar{y} - b^{**} - \bar{\delta}/2) - k^{**}] \frac{\partial b^{**}}{\partial k} - (b^{**} - \bar{b}) = 0, \quad (11)$$

which simplifies to  $-(b^{**} - \bar{b}) = 0$  because (9) implies that the terms inside the square brackets sum to zero. It follows that (11) is satisfied as long as  $b^{**} = \bar{b}$ . However, the second order condition indicates that this strategy actually *minimizes*  $V_C$  because

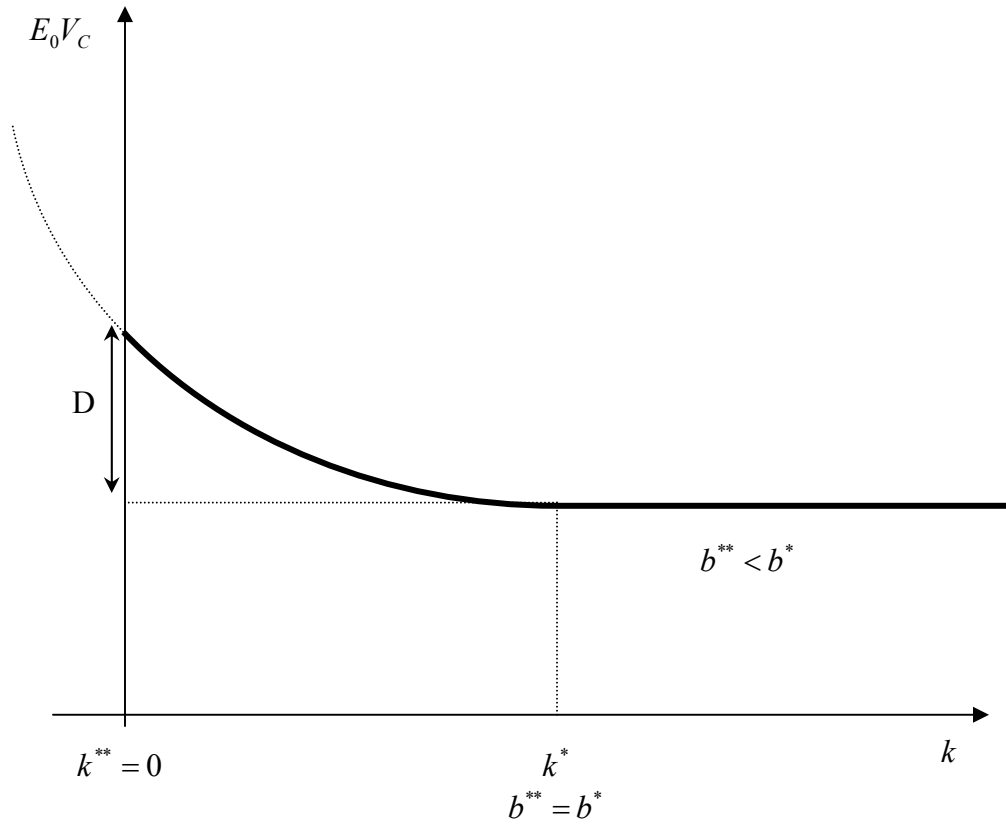
<sup>11</sup> One way to interpret this is that governments facing severe resource constraints may need strict conditionality attached to an IMF-supported program to avoid a deficit bias, while richer governments may rely on possibly less demanding domestic arrangements.

<sup>12</sup> In the monetary sphere, McCallum (1995) notes the absence of a constitutional amendment abolishing the metallic standard in the United States.



$\frac{\partial^2 E_0 V_C}{\partial k^2} = -\frac{\partial b^{**}}{\partial k} > 0$ . Given the first and second derivative functions of  $E_0 V_C$  with respect to  $k$ , and taking into account the fact that  $k = 0$  for all  $b < \bar{b}$ , we can immediately conclude that the value of  $k$  maximizing  $V_C$  is a corner solution  $k^{**} = 0$  (see Figure 2).

Figure 2: Re-optimization of  $k$  by Politicians (for  $\bar{b} = b^*$ )



## Democratic Accountability and “Ownership” of the Rule

Figure 2 suggests that optimal institutions can only be credible if changing (or ignoring) them brings about specific utility losses—which should be strictly greater than the vertical distance  $D$ . These losses can be rationalized in various ways. One possibility is to argue that the *raison d’être* of a fiscal rule is to guide underinformed voters in assessing fiscal performance. In that conjecture, the rule could reduce or even eliminate the effect of asymmetric information on voters’ behavior and thereby, on equilibrium fiscal policy. In the presence of a rule, the government’s capacity to adhere to it would thus become a reliable indication of competence in the eyes of the voters.<sup>13</sup> Given equation (5) and by analogy with Proposition 1, compliance with the fiscal rule would then ensure reelection.<sup>14</sup>

In our model, the guarantee of re-election in case of compliance readily neutralizes the effect of information asymmetry, and is therefore a *sufficient* reward to encourage politicians to stick to the fiscal rule. Formally, one can check that a compliant government derives more

utility than a cheater:  $E_0 \left[ \sum_{t=1}^2 v(q_{C,t}^*) \right] > E_0 \left[ v(q_{C,1}^{**} |_{r=1}) \right]$ . Because a cheater would be voted out

with certainty (i.e.  $r = 1$ ) and  $v' > 0$ , he would select the corner solution  $b^{**} |_{r=1} = \vartheta y_2 - \bar{\delta}$ .

Substituting  $q_{C,t}^*$  and  $q_{C,1}^{**} |_{r=1}$  with the budget constraints and using the (explicit) solutions for  $b^*$  and  $b^{**} |_{r=1}$ , the concavity of  $v(\cdot)$  guarantees that the inequality holds:

$$2v(\bar{\vartheta}(1 + \varepsilon/2) - \bar{\delta}/2) > v(\bar{\vartheta}(2 + \varepsilon) - (3/2)\bar{\delta}).$$

This result illustrates that, absent fiscal illusion, democratic accountability can play a key role in ensuring the credibility of optimal fiscal institutions. What is more, if electoral uncertainty is the only source of deficit bias, democratic accountability is sufficient to establish such credibility.<sup>15</sup> However, if the bias is rooted in other distortions, accountability may not be enough to deter unpleasant outcomes. For instance, policymakers may be intrinsically more impatient than the representative consumer (e.g., they may have a subjective discount rate  $\rho > 0$ ), in which case the inequality discussed above may not hold:

$(2 - \rho)v(\bar{\vartheta}(1 + \varepsilon/2) - \bar{\delta}/2) > v(\bar{\vartheta}(2 + \varepsilon) - (3/2)\bar{\delta})$ . The effectiveness of the rules thus also depends upon the specific nature of the fiscal bias.

<sup>13</sup> This of course requires that voters do not suffer from a myopic appetite for fiscal deficits—or “fiscal illusion.” Calmfors (2005) and Morris, Ongena, and Schuknecht (2006) discuss fiscal illusion in detail.

<sup>14</sup> In a model of monetary policy delegation, Jensen (1997) argues that renegeing on central bank independence causes reputation losses, which can help sustain near-optimal institutions in a repeated game. In our three-period setup, however, repeated games become quite cumbersome and it is more convenient to think in terms of political costs associated with either a change in institutions or an attempt to bypass them. Another well-known shortcoming of repeated games is the multiplicity of reputational equilibria, reflecting the arbitrary definition of the “trigger strategies.”

<sup>15</sup> Observe also that in this instance, rewarding compliance with the fiscal rule is a socially optimal voting strategy for voters.

Another critical assumption underlying the above result is that voters perfectly observe all the components of the budget identities (4-a/b); in short, the budget is transparent.<sup>16</sup> Mounting evidence of creative accounting and outright manipulation of budget numbers undermines the assumption that formal adherence to the rule is perceived as a sufficient indication of competence. To study budgetary opacity in our model, we assume that fiscal outturns are revealed to individuals *after* the elections.

### The Implications of Budgetary Opacity

Opacity implies that voters can only observe  $q_{C,1}$  (what they get from government),  $\tau_1$  (what they pay to government), and the aggregate  $\Lambda = b - \delta_1$ . Although the deficit and the policy failure cannot be observed separately, a low  $\Lambda$  may indicate a large policy failure while a high  $\Lambda$  may reflect a deviation from the rule, two events that individuals would interpret as a sign of incompetence. Hence, opacity prevents the detection of combinations of large policy failure and a high deficit.<sup>17</sup>

By analogy with Proposition 1, we assume that voters revise upward their belief that the incumbent is incompetent—and elect the challenger—if  $\Lambda$  lies outside some interval around  $b^*$ . We define that interval as  $[b^* - \delta^+; b^* - \delta^-]$ , with  $\delta^- \leq 0$ , indicating that voters intend to punish deviations from  $b^*$  that they could not plausibly explain by random shocks on public good delivery.<sup>18</sup>

Budgetary opacity modifies policymakers' perception of re-election chances. Specifically, the probability  $r_0$  of being voted out is now:

$$r_0 \equiv \Pr(\delta_1 > \delta^+ + (b - b^*)) + \Pr(\delta_1 < (b - b^*) + \delta^-) \quad (12)$$

Equation (12) highlights the link between fiscal policy choices, voters' behavior, and the extent of political uncertainty. The first term indicates that higher deficits help offset the impact of policy failures on  $\Lambda$ , lowering the probability that voters perceive such failures. This points to circumstances under which opacity provides policymakers with an opportunity to increase re-election chances by boosting current borrowing. Opacity may thus lead to an

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<sup>16</sup> See Castellani (2002) for a formal analysis of accountability and transparency along similar lines in a model of monetary policy delegation.

<sup>17</sup> Recall that competence is only an issue for the under-informed voters. In reality, neither high deficits nor large policy failures originate in a lack of competence.

<sup>18</sup> A negative value for the delivery shock is possible from the voters' perspective because they do not know the true distribution. Of course,  $\delta^-$  could be strictly positive if individuals had a profound distrust of policymakers' capacity to efficiently deliver public goods. For the sake of brevity, we do not explicitly analyze this issue here.

opportunistic deficit bias.<sup>19</sup> The second term captures the effect of opacity on democratic accountability: random policy failures hamper the detection of breaches of the fiscal rule, especially if voters' tolerance for  $\Lambda > b^*$  is large (i.e.  $\delta^-$  is large in absolute value).

Because the actual distribution of  $\delta$  is bounded between 0 and  $\bar{\delta}$ , there are limits to the effect of fiscal policy on electoral outcomes. In particular, higher deficits reduce the risk of detection of policy failures only if  $b - b^* \leq \bar{\delta} - \delta^+$ . Beyond that, the first term in (12) remains equal to zero as  $b$  increases because the deficit is already large enough to prevent the detection of policy failures through low realizations of  $\Lambda$ . Likewise, any change in  $b$  leaves the second term in (12) equal to zero as long as  $b < b^* - \delta^-$  because the deviation of  $b$  from  $b^*$  would be too small to be attributed to cheating. The implication for the formal analysis is that the marginal utility of future public good provision exhibits discontinuities at  $b^* - \delta^-$  and  $b^* + \bar{\delta} - \delta^+$ . In the remainder of this section, we focus on selected solutions with interesting policy implications.

***Case # 1: Voters have a low tolerance for signs of excessive deficits (i.e.  $\delta^-$  is small in absolute value)***

If voters revise their assessment of incumbent's incompetence for only small positive deviations of  $\Lambda$  from  $b^*$ , then the policymaker's marginal utility function (for  $k = 0$ ) writes as follows:

$$\frac{\partial V_C}{\partial b} = \begin{cases} v'(q_{C,1}) - \frac{\delta^+ + (b - b^*)}{\bar{\delta}} v'(q_{C,2}) + \frac{v(q_{C,2})}{\bar{\delta}}, & \text{if } b \leq b^* - \delta^- \\ v'(q_{C,1}) - (1 - r)v'(q_{C,2}), & \text{if } b^* - \delta^- < b \leq b^* + \bar{\delta} - \delta^+ \\ v'(q_{C,1}) - \left(1 - \frac{(b - b^*) + \delta^-}{\bar{\delta}}\right) v'(q_{C,2}) - \frac{v(q_{C,2})}{\bar{\delta}}, & \text{if } b^* + \bar{\delta} - \delta^+ < b \end{cases} \quad (13)$$

If the deficit is such that  $b \leq b^* - \delta^-$ , then it is too small for voters to detect cheating on the rule. In that interval, the probability of re-election only depends on their capacity to detect policy failures. As higher deficits lessens that capacity, opportunistic policymakers have an additional motive to deviate from  $b^*$  (raising  $b$  lowers  $r_0$ ). Clearly, if  $\delta^-$  is small enough and  $v(q_{C,2})/\bar{\delta}$ , large enough, the first order condition for maximum utility is unlikely to be satisfied in that interval (see however Case #2 below)

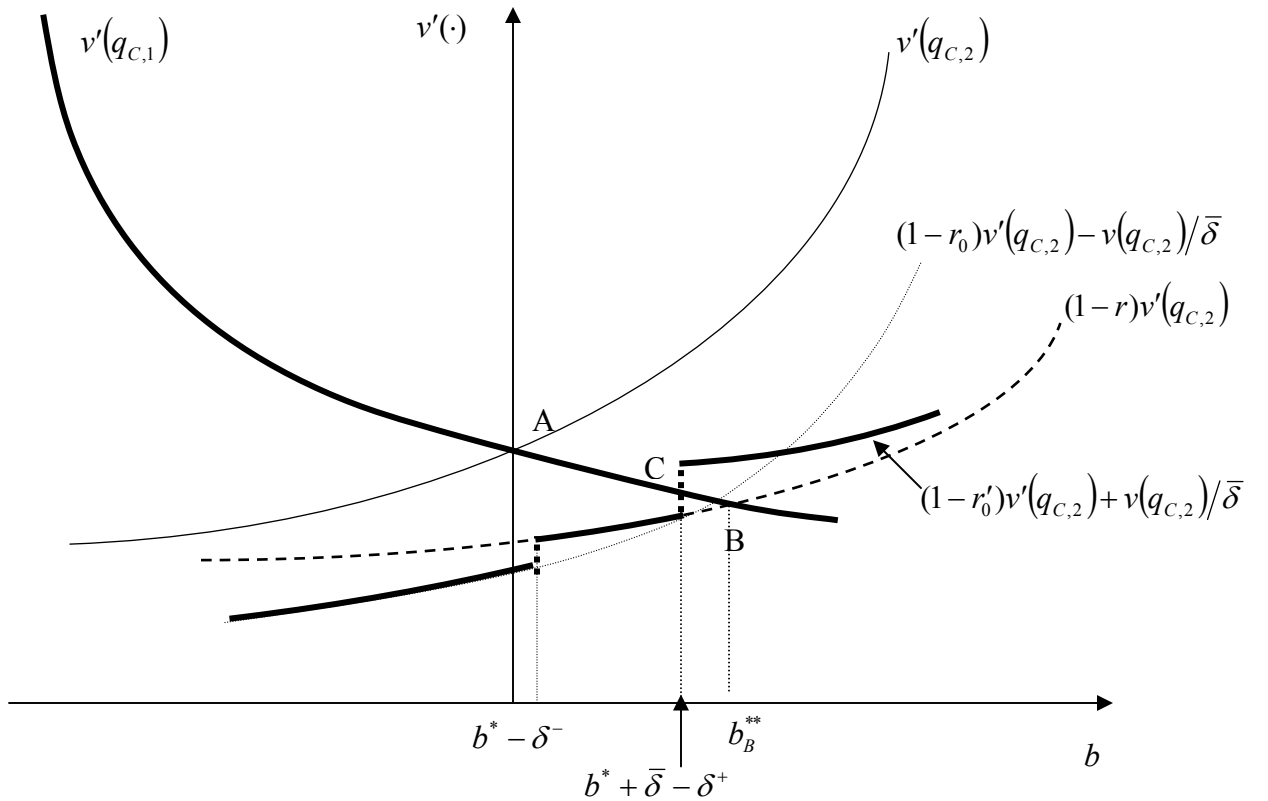
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<sup>19</sup> See Rogoff (1990) although here the argument is related specifically to a lack of transparency, rather than information asymmetry per se.

When  $b \in [b^* - \delta^-; b^* + \bar{\delta} - \delta^+]$ , the link between ex-ante fiscal policy and electoral outcomes breaks down because the electoral benefits from higher deficits (i.e. making the detection of policy failures less likely) are completely offset by a higher probability of being found cheating on the fiscal rule. An interior solution for equilibrium fiscal policy located in that interval would thus satisfy a first-order condition identical to (9) with  $k = 0$ .

Finally, if  $b > b^* + \bar{\delta} - \delta^+$ , policymakers know that the deficit is too high for voters to detect any policy failure, and  $r_0 = \Pr(\delta_1 < (b - b^*) + \delta^-) = [b - b^* + \delta^-] / \bar{\delta}$ . Opportunistic policymakers are now encouraged to show *restraint* because increasing the deficit entails a higher risk of being voted out for violating the rule. If the latter effect is sufficiently strong, a corner solution where  $b^{**} = b^* + \bar{\delta} - \delta^+$  may be observed (see Figure 3). The resulting deficit would be lower than in the case of an interior solution.

Figure 3: Example of Equilibrium Deficit Under Budgetary Opacity (for  $\varepsilon_1 = 0$ )



A number of interesting equilibria are therefore possible:

- If information asymmetry seriously distorts voters' behavior (leading to a large deficit bias under full discretion), budgetary opacity renders democratic accountability (and fiscal institutions) completely ineffective: the equilibrium deficit remains  $b_B^{**}$ . Indeed, If voters are prone to sanction the incumbent with only limited evidence of policy failure (i.e.  $\delta^+$  is low), equation (9) is satisfied for  $k = 0$  and  $b^{**} \in [b^* - \delta^-; b^* + \bar{\delta} - \delta^+]$ . This is the interior solution depicted by point B in Figure 3.
- By contrast, if voters show substantial flexibility in the face of signs of policy failure (i.e.,  $\delta^+$  is large), the equilibrium deficit is more likely to be lower than in B. Indeed, voters are unable to detect policy failures even at fairly low deficit levels so that the only impact of higher deficits on re-election chances operate through a greater risk of being caught cheating on the rule. In Figure 3, the corresponding equilibrium could be a corner solution C or an interior solution if the last segment of the upward-sloping curve crosses the downward sloping bold curve to the left of B.

Overall, governments faced with less electoral uncertainty arising from information asymmetry—and correspondingly lower deficit bias—are also more likely to extract benefits discipline-enhancing fiscal institutions, making them more likely to adopt such mechanisms.

**Case #2: Voters treat evidence of excessive deficit “flexibly” (i.e.  $\delta^-$  is large in absolute value)**

The policymaker's marginal utility function (for  $k = 0$ ) now writes:

$$\frac{\partial V_C}{\partial b} = \begin{cases} v'(q_{C,1}) - \frac{\delta^+ + (b - b^*)}{\bar{\delta}} v'(q_{C,2}) + \frac{v(q_{C,2})}{\bar{\delta}}, & \text{if } b \leq b^* + \bar{\delta} - \delta^+ \\ v'(q_{C,1}) - v'(q_{C,2}), & \text{if } b^* + \bar{\delta} - \delta^+ < b \leq b^* - \delta^- \\ v'(q_{C,1}) - \left(1 - \frac{(b - b^*) + \delta^-}{\bar{\delta}}\right) v'(q_{C,2}) - \frac{v(q_{C,2})}{\bar{\delta}}, & \text{if } b^* - \delta^- < b \end{cases} \quad (14)$$

Because the second term in (12) drops off for all deficits  $b < b^* - \delta^-$ , the incumbent can increase re-election chances by raising the public debt (opportunistic deficit bias). If  $\delta^-$  is large enough in absolute value and voters are sufficiently strict in sanctioning policy failures, then an interior solution exists.

In that case, the impact of opacity on the resulting equilibrium deficit is ambiguous. On the one hand, higher deficits reduce voters' ability to detect large policy mistakes, and correspondingly increase the likelihood of re-election. On the other hand, the greater probability of re-election associated with higher deficits reduces the bias stemming from

electoral uncertainty. The tension between these two effects determines whether the equilibrium deficit is larger or smaller than under transparency and full discretion (Figure 4).

Figure 4: Interior Solutions Under Budgetary Opacity (for  $\varepsilon_1 = 0$  and  $b < b^* - \delta^-$ )

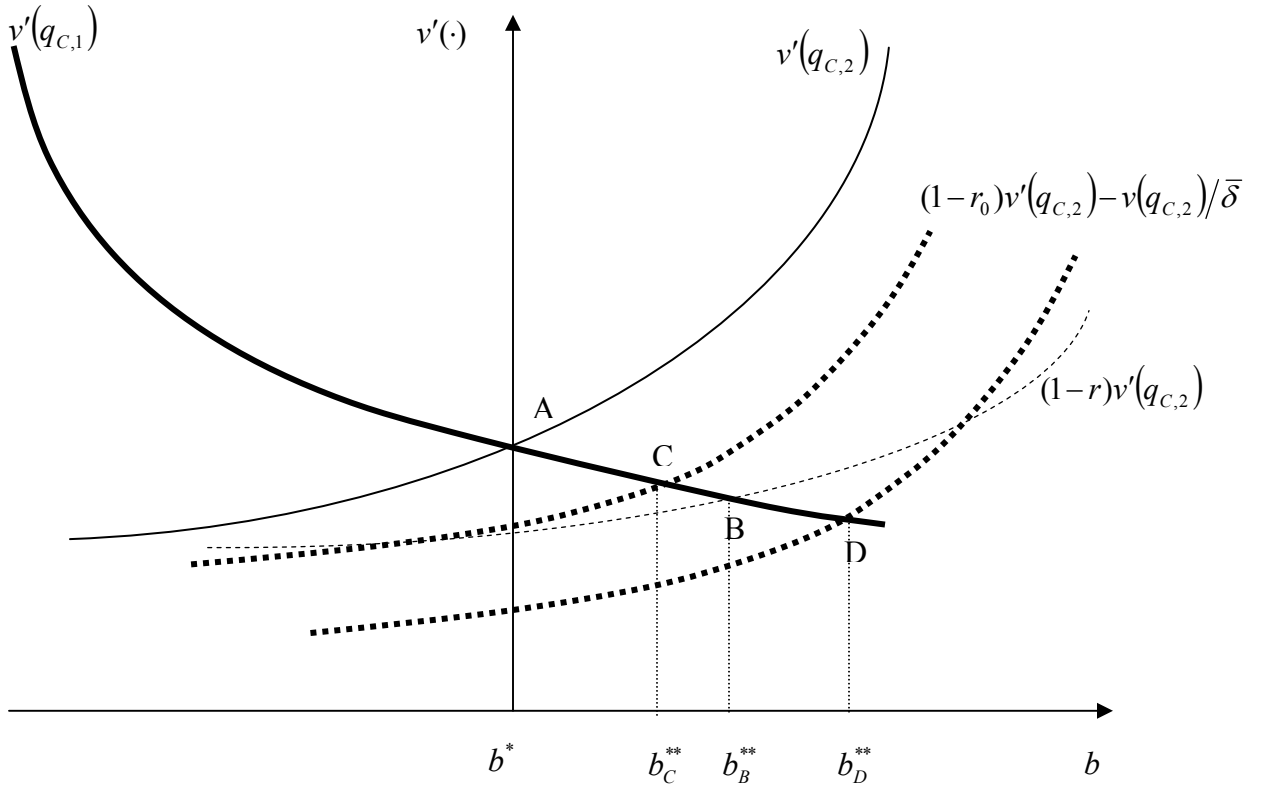
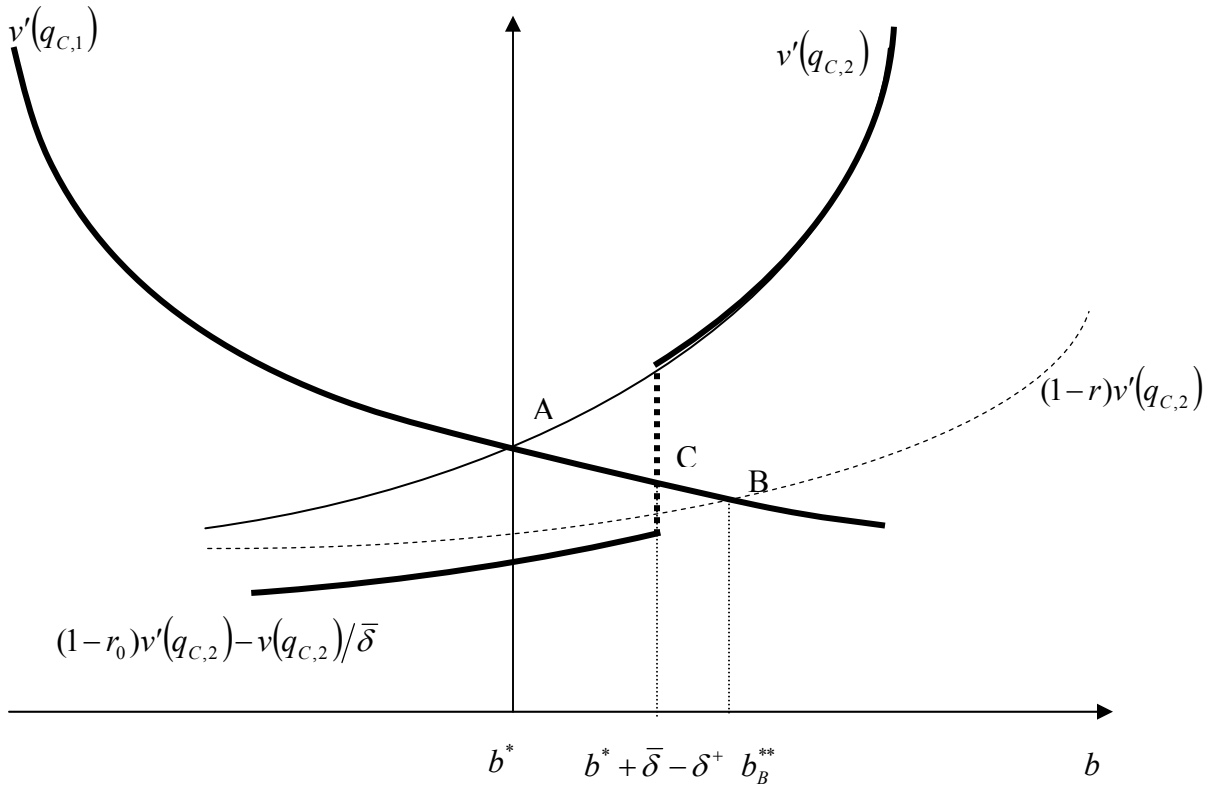


Figure 4 shows that if the “opportunistic wedge”  $v(q_{C,2})/\bar{\delta}$  is sufficiently small with respect to  $v'(q_{C,2})$ , the impact of higher deficits on electoral uncertainty can be strong enough to deliver a lower debt level ( $b_C^{**}$ ) than in the absence of the rule but full budget transparency ( $b_B^{**}$ ). By contrast, strongly opportunistic policymakers ( $v(q_{C,2})/\bar{\delta}$  is large) could be lured into a high deficit equilibrium  $b_D^{**} > b_B^{**}$ . Hence, to the extent that it creates an opportunistic deficit bias, a rule operating under budgetary opacity could be counterproductive.

For the same reason as in Case #1, a corner solution  $b^* + \bar{\delta} - \delta^+$  may emerge if voters consider that only large policy failures warrant an adjustment of their beliefs regarding policymaker’s competence (Figure 5). Indeed, for all  $b \in [b^* + \bar{\delta} - \delta^+; b^* - \delta^-]$ , the deficit is too high for voters to perceive any policy failure, and too low to raise concerns about possible violations of the rule, resulting in the absence of electoral uncertainty (i.e.  $r_0 = 0$ ).

Figure 5: Corner Solution Under Budgetary Opacity (for  $\varepsilon_1 = 0$ )

### E. Summary and Implications for the Empirical Analysis

The model points to a number of important determinants of fiscal outcomes and institutions that are interesting in their own right, and which an empirical analysis should consider. It also suggests that OLS estimates of the quantitative relationship between institutions and fiscal performance may be biased.<sup>20</sup>

First, the model assumes that electoral uncertainty is a key source of deficit bias. The reason is that the perceived risk of not being re-elected drives policymakers' discount rate below the social discount rate. That risk originates in voters' incomplete information about the true motivations of elected officials. The model thus suggests that, other things equal, countries with higher political instability (and a correspondingly higher risk of officials being voted out) should experience higher deficits on average. In what follows, we examine whether this is indeed the case in our sample of industrial and EU countries because the validity of some

<sup>20</sup> The possible endogeneity of institutions is a general concern in empirical analyses of the link between the latter and economic performance. The main problem is that a similar set of "deep" determinants may simultaneously affect institutions and performance (see for instance Acemoglu, Johnson and Robinson, 2001, or Funk and Gathmann, 2005).



key conclusions of the above analysis, including those related to the effectiveness of institutions, is sensitive to that assumption

The second insight of the model is that enforcement is key. Hence, to be useful, quantitative indicators of fiscal restraints need to properly capture the enforcement dimension. We have seen that the key parameter in the fiscal framework is not the numerical deficit rule—which simply provides voters with a benchmark characterizing the optimal policy—but the strength of the enforcement mechanism, whose role is to turn deviations from the rule into actual utility losses for policymakers. There are of course a number of ways, including through an outside enforcer, that this can occur.

The third insight is the possibility of reverse causality that may bias quantitative estimates of the impact of institutions on outcomes. A first reason for reverse causality is that institutions may be time-inconsistent because fiscal arrangements are self-enforced. This means that intrinsically less stable governments are likely to be more prone to weaken the disciplinary aspect of fiscal institutions (or not to adopt them in the first place), and that such weakening is more likely to occur in bad times than in good times (when even noncredible institutions are unlikely to be binding). A second reason for reverse causality relates to the fact that budgetary opacity may create an incentive for policymakers to opportunistically increase the deficit in order to secure electoral gains. Indeed, an analysis of the possible equilibria under opacity showed that if voters are sufficiently strict when holding the government accountable for suspected deviations from the rule, institutions are more likely to reduce equilibrium deficits if the deficit bias is low to start with. This implies that countries with relatively minor fiscal problems may be more likely to effectively implement discipline-enhancing fiscal rules than countries with serious fiscal issues.

The final insight is that the effectiveness of fiscal institutions is likely to be country-specific. This suggests that panel analyses—which are now common in quantitative approaches of fiscal behavior<sup>21</sup>—should pay particular attention to cross-sectional heterogeneity. Specifically, the model illustrates the important role of transparency and democratic accountability (and by extension, of the broader political context). Indeed, to the extent that a fiscal rule crystallizes social consensus on what constitutes “optimal” policy, it will be used by voters to assess fiscal performance, possibly leading them to hold the incumbent accountable for complying with the rule. Democratic accountability can be a sufficient enforcement mechanism and make the rule credible. Of course, accountability works best if budgets are transparent—in the sense that its components are perfectly observable by voters.

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<sup>21</sup> See Méhitz (1997), Ballabriga and Martínez-Mongay (2002), Galí and Perotti (2003), Debrun and Faruqee (2004), or Annett (2006), among others.

#### IV. EMPIRICAL ANALYSIS

This section undertakes empirical analysis drawing on the above insights provided by our model. We focus on 14 European Union Member States (the EU-15 excluding Luxembourg) over the period 1990–2004, using the European Commission’s (2006) database on fiscal institutions. The latter, based on a recent survey among member states, comprises quantitative, time-varying indices of fiscal rule restrictiveness and coverage, as well as qualitative data on nonpartisan fiscal agencies.<sup>22</sup> We first provide a brief description of some stylized facts on the link between fiscal institutions and budgetary performance, and on the main characteristics of institutional arrangements. We then undertake more systematic econometric analysis regarding fiscal behavior with a view to test the robustness of the apparent relationship between institutions and outcomes.

##### A. Fiscal Institutions and Budgetary Performance: Some Stylized Facts

As the detailed European Commission (2006) study notes, the restrictiveness and coverage of national fiscal rules have increased in EU countries over the past two decades. This immediately raises two questions. The first is whether these developments have been associated with an improvement in fiscal performance. The second question relates to the role of underlying policy preferences—what should ultimately matter according to our model. We look at the way different features of institutional arrangements tend to be associated across countries.

##### Institutional Reforms and Fiscal Performance

Under the null hypothesis that fiscal institutions effectively influence policymakers’ behavior, institutional changes—a tightening of the rules or an expansion of their coverage—should *lead* to improvements in fiscal performance. Figures 6a to 6c below display the time path of a median fiscal indicator before and after a meaningful “tightening” in institutional indicators (i.e., increased restrictiveness and or expanded coverage).<sup>23</sup>

The first of these figures shows that in the three-year prior to the institutional change, there was a steady but quite pronounced improvement in the primary balance.<sup>24</sup> In other words, institutional reforms do appear to *lag* improvements in fiscal performance. In fact, in the three years following the change ( $T$  to  $T+3$ ), there was no further improvement (and even some deterioration) in the balance<sup>25</sup>. This suggests that at the time of the reform at least, institutional changes sought to consolidate a prior change in policy preferences or priorities

<sup>22</sup> A full description of the data can be found in European Commission (2006).

<sup>23</sup> The “change” or the “event” is predetermined as an increase in the index of fiscal restrictiveness of at least 10 percent. Alternative larger cut offs reduced the sample size somewhat but did not lead to an appreciable change in the conclusions.

<sup>24</sup> Similar results were obtained for the cyclically-adjusted primary balance.

<sup>25</sup> Using mean rather than median provides similar results.

rather than to effectively constrain policymakers' to adopt policies they would not have opted for in the absence of reform.

Figure 6A. Overall Fiscal Rules Index and Primary Balances

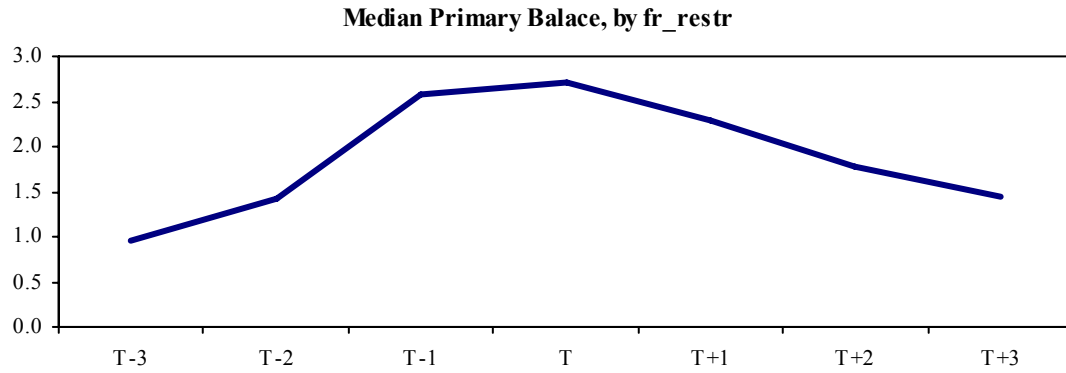


Figure 6B. Fiscal Rules Coverage and Primary Balances

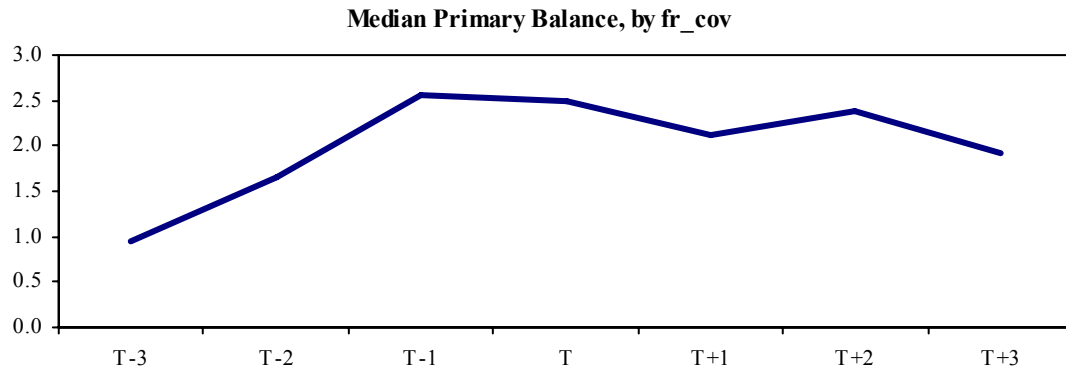
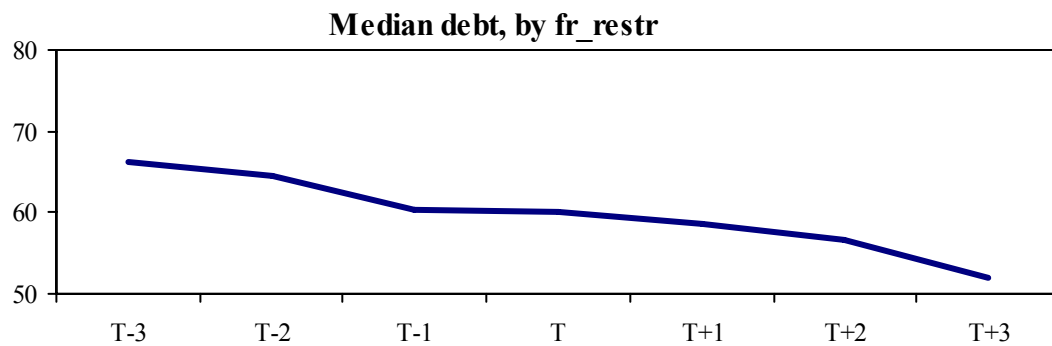


Figure 6C. Overall Fiscal Rules Index and Debt



Sources: Author's calculations using data from the OECD and the European Commission (2006).

The above interpretation is corroborated when we examine the change in the coverage of fiscal rules. In the three years prior to the increase in the coverage, there appeared to have been quite a noticeable increase in the average primary balance of the sample countries. However, after the broadening of the rules, the primary balance stabilized with little change in the three subsequent years.

Using the public debt as a fiscal indicator (Figure 6C), we see that a noticeable decline in the debt to GDP ratio had begun in the three year period to the reform, and that the decline continued albeit at a slightly weaker pace in the subsequent period. The stabilization in the primary balance after that period may thus reflect a lesser need to run high primary surpluses, probably reflecting a decline interest rates in many countries over the period covered by our analysis. Yet the conclusion remains: reforms do not appear to affect underlying policy trends.

### **Institutions and “Revealed Preferences”**

To check whether consistent stylized facts also emerge over a longer period of time, we looked at the correlation between countries’ “revealed preference” for fiscal prudence—measured by the change in the public debt-to-GDP ratio over the 1980s—and the level of the Commission’s institutional indices in 2004. In line with the above, one would expect countries that tended to have relatively disciplined fiscal policy end up having opted for more restrictive rules in the last 15 years. Of course, it could be that the countries with restrictive rules in 2004, already had some form of rules-based fiscal policy. We therefore did the same exercise using the change in the rule restrictiveness index over 1990–2004, instead of the level in 2004.<sup>26</sup>

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<sup>26</sup> Given that there has been relatively much less change in the role played by fiscal agencies, the above analysis was confined to the restrictiveness and coverage of fiscal rules.

Figure 7A. Fiscal rule index in 2004 (Overall)

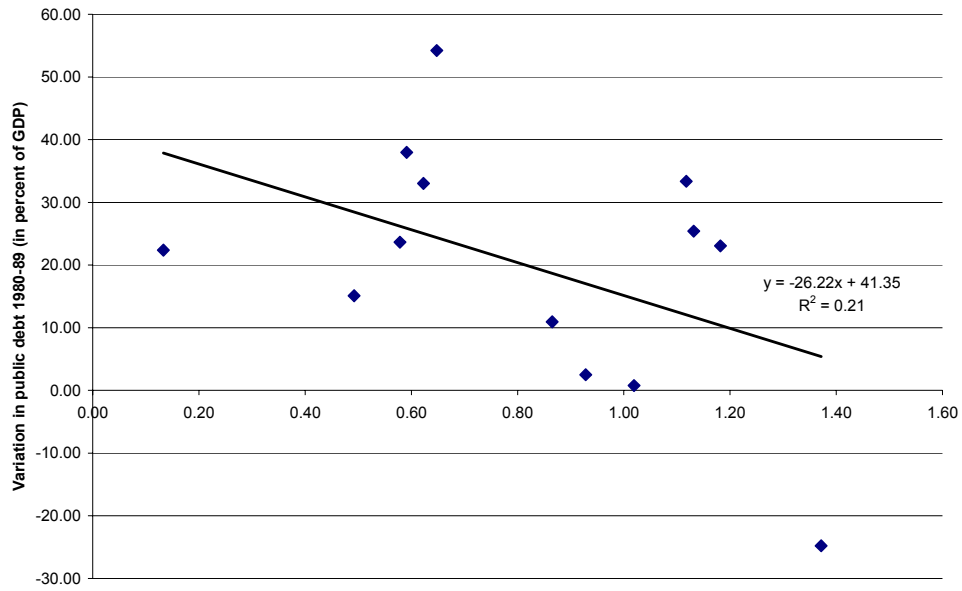


Figure 7B. Index of fiscal rule coverage in 2004

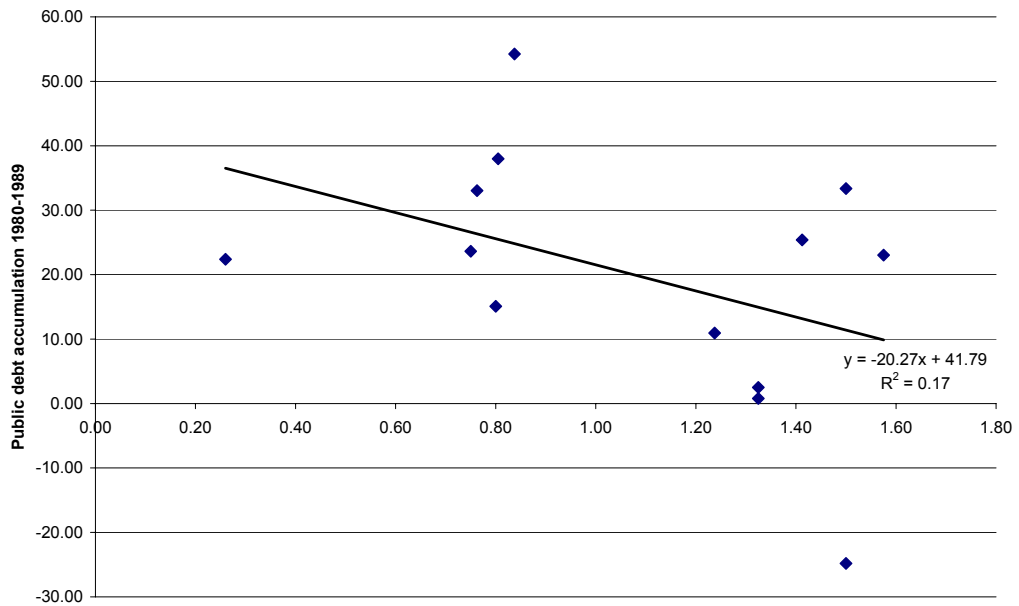
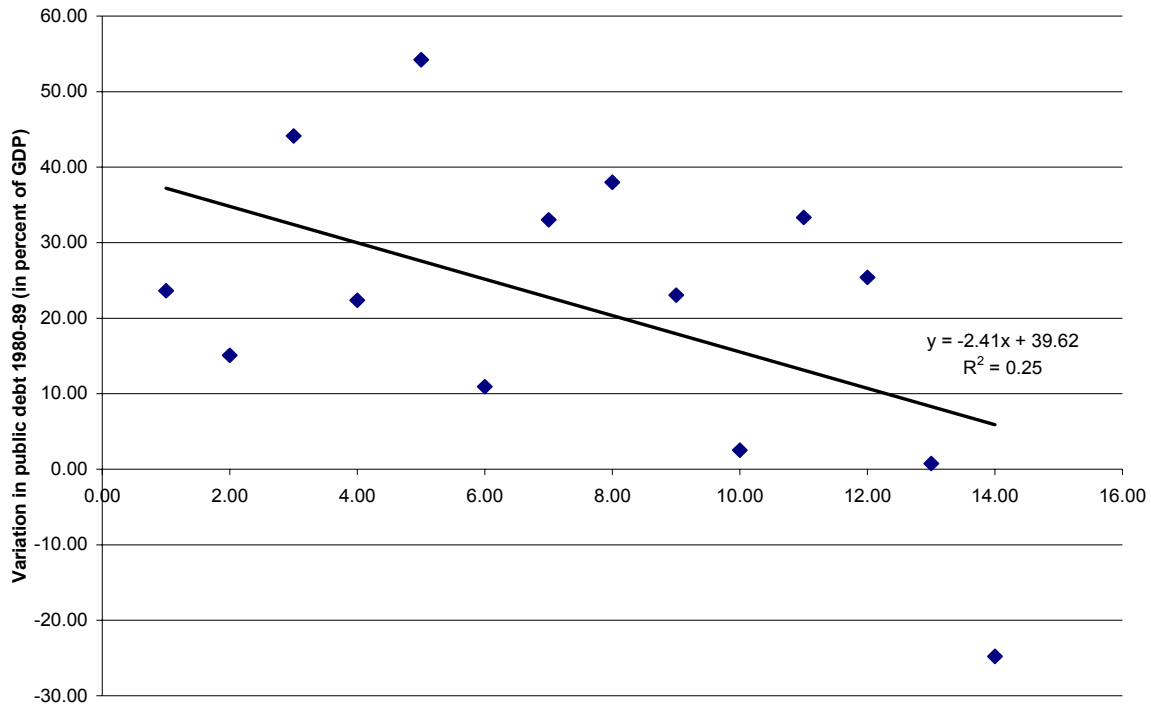


Figure 7C. Change in overall fiscal rule index (1990-2004)



Sources: Author's calculations using data from the OECD and the European Commission (2006).

The results given in Figures 7a to 7c again suggest that countries that had large increases in public debt during the 1980s also ended up being the countries that had the least restrictive fiscal rules in 2004. Similarly, the countries that had the largest increase in debt were the ones that had the narrower coverage of fiscal rules. The same holds true—with an even greater correlation—if we take the change in the overall index. Of course, the unconditional correlations are not spectacularly high, the dispersion around regression lines is substantial, and the fact that outliers may be shaping the overall picture cannot be dismissed. However, one cannot reject a priori the possibility that a revealed preference for fiscal conservatism could drive countries' attitudes vis-à-vis fiscal rules.

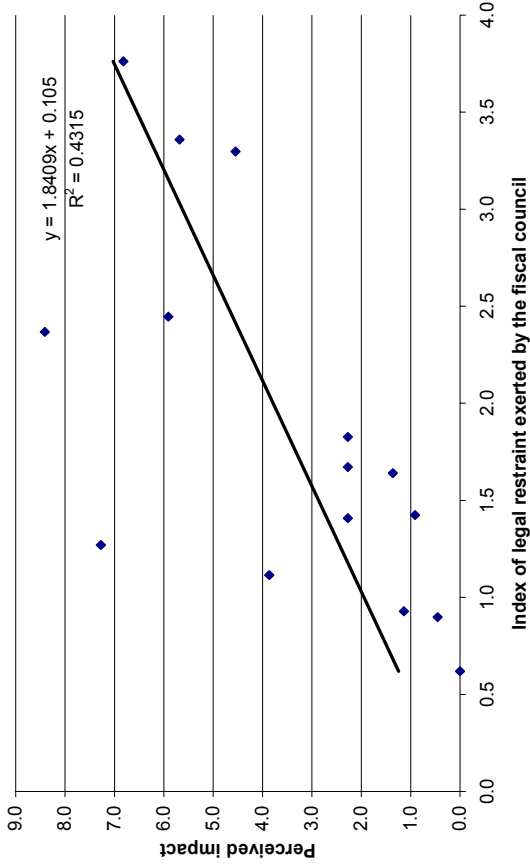
### **Fiscal Councils: Main features and Interaction with Rules**

In addition to rules, many countries set up, some of them a long-time ago, nonpartisan agencies expected to provide an independent input to the budget process, with a view to limit the scope for politicization of fiscal decisions (see Debrun, Hauner, and Kumar, 2005 for a discussion of the issues and country experiences). The Commission's survey covered many relevant dimensions of these institutions, including the legal guarantees on their independence, their potential impact on the policymaking process (including through the provision of independent forecasts, and their perceived influence on the public debate. We calculated summary indices for these dimensions.

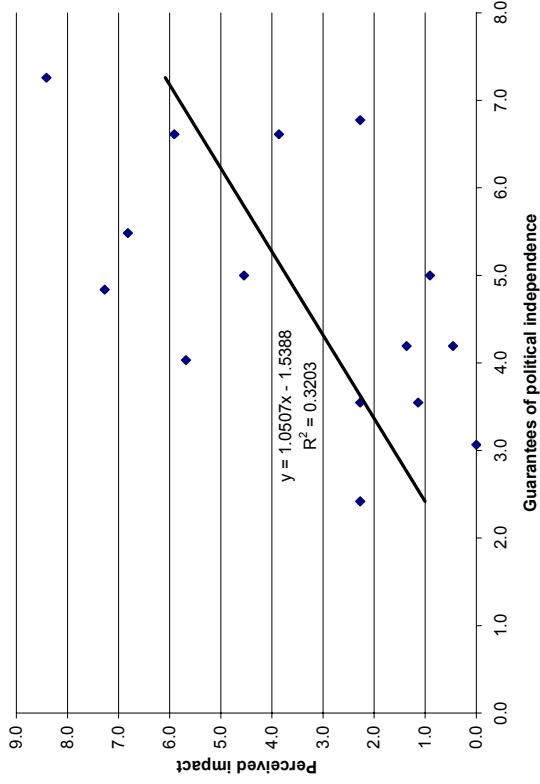
Unlike the above two exercises that focused on the relationship between rules and performance, here we examine more closely the channels through which the fiscal councils might be able to have an impact, and also the relationship between the fiscal council and fiscal rules. One premise is that the greater the degree of restraint exercised by the fiscal council, or the greater the guarantee of independence from political interference, the greater the likelihood of perceived or actual impact. There may also be a presumption of some complementarity between fiscal rules and fiscal councils, with the latter contributing to a more effective enforcement of the former.

Figure 8. Fiscal Councils

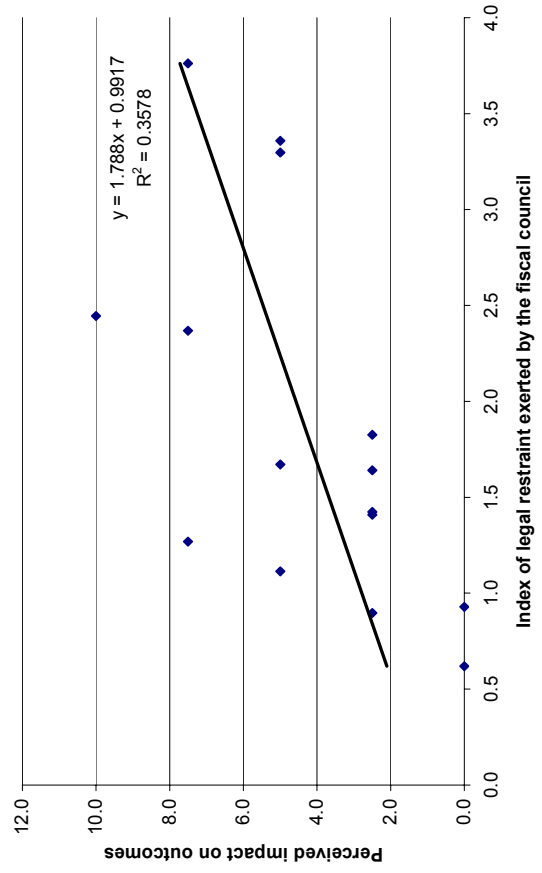
8a



8b



8c



8d

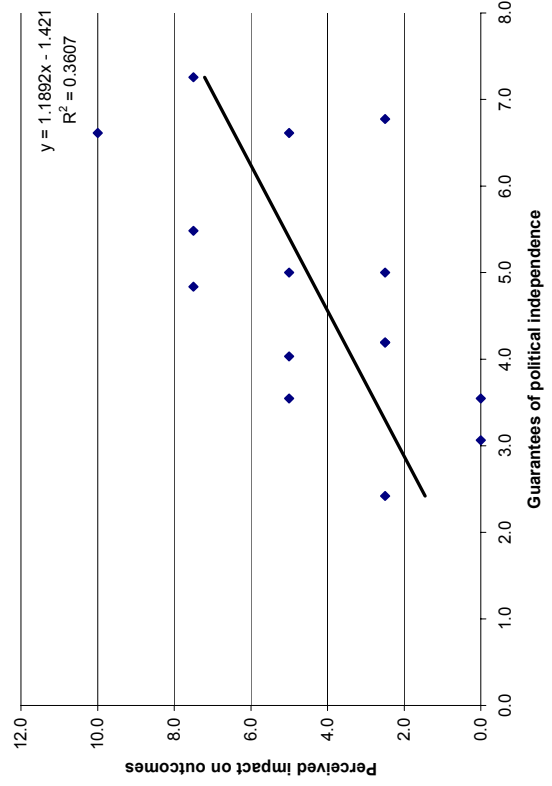
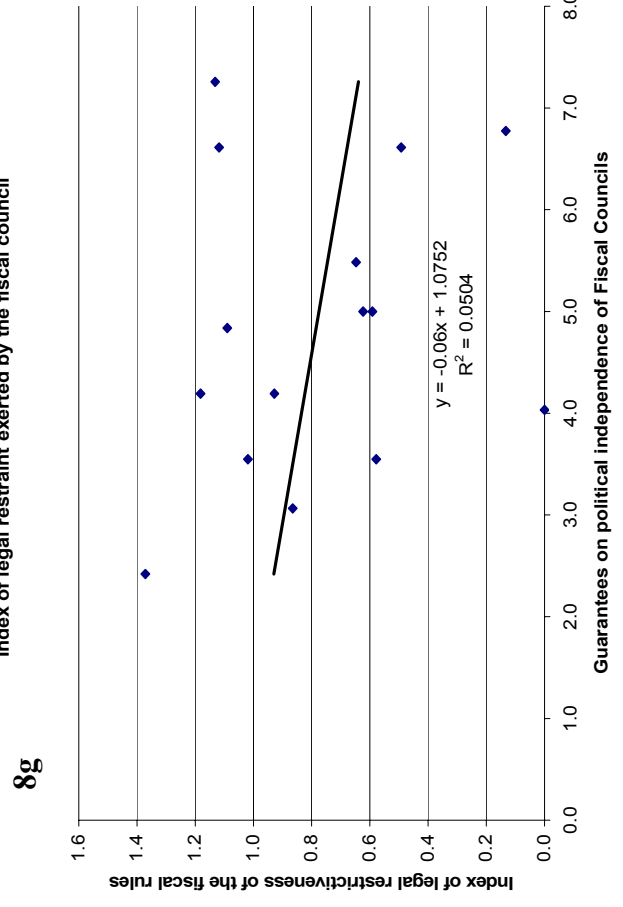
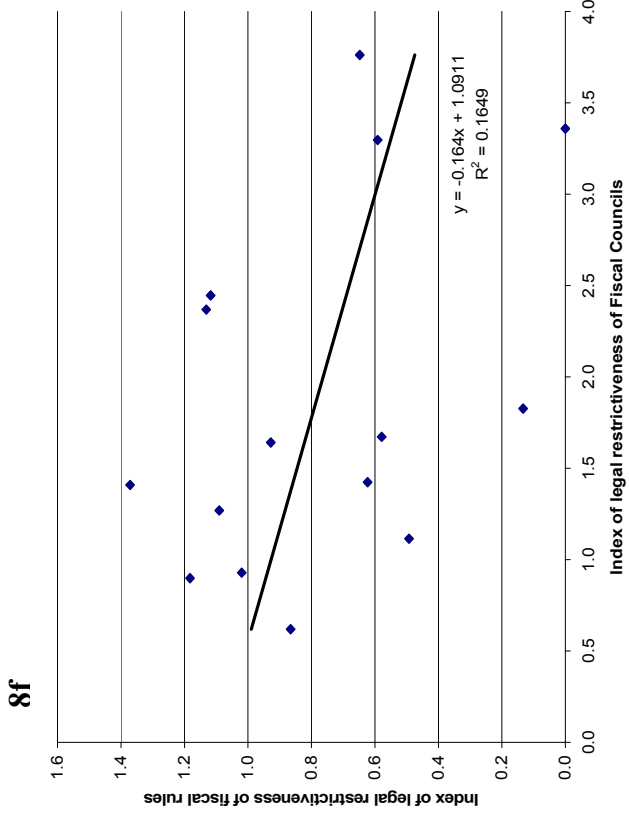
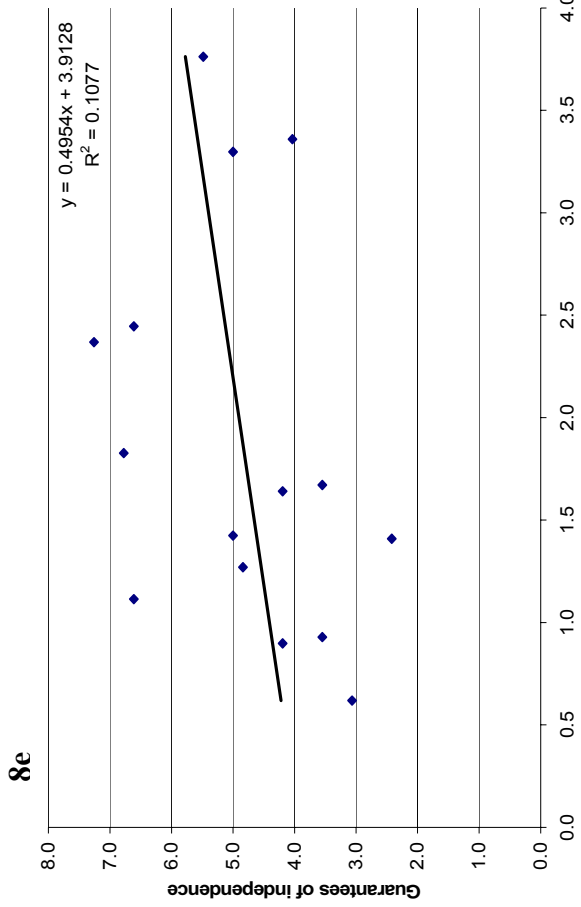




Figure 8. Fiscal Councils (continued)



The results are shown in Figures 8a to 8g. The first of these shows that there is a strong positive relationship between the extent of legal restraint exerted by the fiscal council and its perceived impact on fiscal performance. This is complemented by a positive relationship between formal guarantees of political independence and the perceived impact of the fiscal council. It is also interesting to note that, as shown in Figure 8e, there appears to have been some positive relationship between the index of legal restraint and the guarantee of independence, suggesting that countries instituting such agencies seemed serious in their willingness to establish the council's effectiveness.

Finally, consider the relationship between the legal restrictiveness of fiscal councils and the restrictiveness of fiscal rules. Contrary to what might be expected on an a priori basis, the unconditional correlation points to the possibility of substitution between the two, although the relationship is certainly not strong. This may suggest that countries that feel the need for relatively restrictive fiscal rules, may be reluctant to allow for additional external influence on the policymaking process, possibly because they value discretion per se. The same correlation holds, although in an even weaker form, when one consider the guarantees on political independence of fiscal councils and the legal restrictiveness of fiscal rules.

Unconditional correlations need of course to be complemented with a systematic assessment of fiscal rules and institutions in the context of a more comprehensive, multivariate model of fiscal behavior. In line with our theoretical analysis, we focus on the role of political variables, and explore the issue of reverse causality and possible interactions between the effectiveness of institutions and other economic and political variables.

## B. Econometric Analysis

Fiscal behavior can be assessed by estimating fiscal policy "reaction functions" similar to Bohn (1998). Because of the relatively short time-series available for most fiscal variables, panel data techniques have increasingly been used despite the likely heterogeneity among individual countries' behavior. In line with the literature, the general specification is given by:

$$p_{i,t} = \alpha_0 + \rho d_{i,t-1} + \gamma Institutions_{i,t} + x'_{i,t} \beta + \eta_i + \varepsilon_{i,t}, \quad t = 1, \dots, T, \quad i = 1, \dots, N, \quad (1)$$

where  $p_{i,t}$  is the ratio of the primary balance to GDP in country  $i$  and time  $t$ ,  $d_{i,t-1}$  is the public debt to GDP ratio at the end of period  $t-1$ ,  $Institutions_{i,t}$  is a time- and country-specific measure of fiscal institutions,  $x_{i,t}$  is a vector of control variables,  $\eta_i$  are unobserved country effects, and  $\varepsilon_{i,t}$  is a time- and country-specific disturbance. To better capture fiscal behavior, it is common to filter out the impact of automatic stabilizers on the primary balance, using the cyclically-adjusted primary balance (CAPB) as the dependent variable.

We proceed in three steps. First, we estimate standard reaction functions for a broader panel of 18 industrial countries, ignoring fiscal institutions. The idea is to identify features of the

political system that may cause a deficit bias in industrial countries.<sup>27</sup> In a second step, we build on the European Commission's (2006) work to evaluate the potential for reverse causality and the possible role of non-partisan fiscal agencies. Finally, we explore country-specific factors that may systematically influence the effectiveness of fiscal rules by introducing interaction terms in our basic specification.

### **Fiscal Behavior Omitting Fiscal Institutions**

The results reported in Table 1 confirm earlier findings in similar studies. First, fiscal behavior tends to exhibit a fairly high persistence, with an AR(1) term estimated to be around 0.7. Second, the negative sign on the output gap variable suggests that on average, the countries in our panel have a tendency to react in a destabilizing fashion to output fluctuations (procyclicality). Thirdly, the response of the CAPB to the public debt is significant, robust, and positive, which is consistent with long-term solvency (Bohn, 1998). Those results are generally robust to the use of alternative estimators, including pooled OLS, LSDV (country fixed-effects), IV (instrumenting the output gap only), and GMM (Arellano and Bond's dynamic panel estimator, which accounts for the possible small sample bias associated with fixed-effects estimation of an AR(1) panel data model).

One interesting finding is that the introduction of political variables—a measure of government fragmentation, an ideology variable that increases with the degree of conservatism, and an index of government stability—eliminates most of the unexplained cross-sectional heterogeneity captured by country fixed effects (see the F-test of the null hypothesis that country effects are jointly redundant, and that fixed-effect and GMM estimators are correspondingly suffering from a specification bias). In particular, the significant and positive impact of government stability on fiscal outcomes is interesting.<sup>28</sup> To the extent that government stability is likely to be inversely correlated with electoral uncertainty (i.e., the government stability variable is a plausible proxy of the risk faced by an incumbent to be voted out), our result is consistent with the key assumption of the theoretical model, and namely that electoral uncertainty is an important source of deficit bias. Our estimates suggest that a reduction in government stability by one standard-deviation would reduce the CAPB by about 0.25 percent of GDP on average. Similarly, the sample range of the index (between 3 and 11) corresponds to a difference of about 1 percent of GDP between the CAPB of a country with a very unstable government, and that of a very stable one.

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<sup>27</sup> The EU-15 minus Luxembourg, plus Australia, Canada, Switzerland, and the U.S.

<sup>28</sup> The government stability variable is an index ranging from 0 to 12, with the highest figure indicating perfect stability. The index is taken from the International Country Risk Guide (ICRG), compiled by the PRS Group, a consultancy. Other political variables have been constructed using the World Bank's Database on Political Institutions.

**Table 1. Fiscal Behavior in a Panel of Industrial Countries**  
(Dependent variable: cyclically-adjusted primary balance)

Estimator:	OLS	IV-DV	GMM	IV-DV	IV	GMM	IV-DV	IV	GMM
	(Robust t- or z-statistics in parentheses)								
Lagged dependent variable	0.73 *** (28.79)	0.73 *** (28.53)	0.72 *** (47.65)	0.68 *** (16.14)	0.76 *** (20.57)	0.68 *** (25.30)	0.67 *** (13.12)	0.72 *** (15.86)	0.63 *** (14.83)
Output gap	-0.02 (-0.99)	-0.01 (-0.45)	-0.02 (-0.54)	-0.05 (-1.04)	-0.10 *** (-2.64)	-0.04 (-0.70)	-0.06 (-1.14)	-0.10 ** (-2.25)	-0.07 ** (-1.72)
Lagged public debt	0.03 *** (8.21)	0.03 *** (8.19)	0.03 *** (5.93)	0.03 *** (4.35)	0.02 *** (4.70)	0.03 *** (4.09)	0.03 *** (3.64)	0.02 *** (4.28)	0.04 *** (5.44)
Government fragmentation	...	...	...	-0.10 (-0.17)	0.34 (1.22)	-0.10 (-0.09)	-0.63 (0.93)	-0.19 (-0.47)	-0.83 (-1.44)
Ideology (conservative)	...	...	...	-0.03 (-1.10)	-0.03 (-1.15)	-0.03 (0.75)	0.03 (0.78)	0.02 (0.62)	0.00 (-0.11)
Government stability	...	...	...	0.12 *** (2.31)	0.10 ** (2.18)	0.11 * (1.61)	0.14 ** (2.22)	0.11 ** (2.06)	0.14 *** (2.31)
Delegation (dummy)	...	...	...	...	...	...	-0.37 (-0.79)	-0.01 (-0.03)	-0.15 *** (-2.51)
Commitment (dummy)	...	...	...	...	...	...	0.50 (1.35)	0.51 (1.44)	0.06 (1.13)
Constant	-1.60 *** (-7.52)	-1.61 *** (-7.54)	...	-2.49 *** (-3.87)	-1.51 *** (-3.21)	0.01 (0.46)	-2.56 *** (-3.41)	-1.99 *** (-3.33)	0.02 (0.46)
R-squared (overall)	0.75	0.75	...	0.73	0.76	...	0.75	0.77	...
F-test (country effects)	2.75 ***	2.77 ***	...	1.10	...	...	0.71	...	...
Sargan test (p-value)	...	...	0.98	...	...	0.98	...	...	1.00
Arellano-Bond test (p-value)	...	...	0.11	...	...	0.66	...	...	0.70
Fixed effects (country)	Yes	Yes	...	Yes	No	...	Yes	No	...
Number of observations	490	490	490	279	279	261	234	234	234
Number of cross-sections	18	18	18	18	18	18	15	15	15

With regard to the other explanatory variables, we see that government fragmentation and ideology do not appear to have any *direct* effect on the fiscal balance. Finally, it is worth noting that country specific dummies characterizing the type of fiscal governance in place to alleviate common pool problems (the so-called delegation and commitment models) have no robust impact on the average balance, which is in line with the findings of Annett (2006) for the post-1992 period, but also indicative of a potential collinearity problem between the two.

### The Role of Fiscal Institutions

The availability of time-varying indices of restrictiveness and coverage of fiscal rules allows for a direct statistical test of their impact on fiscal behavior. In that regard, the Commission's indices of fiscal rules are particularly useful as they encompass the strictness of enforcement, which is key according to our theoretical model. In addition to focusing on political control variables, one original aspect of our analysis is to examine the role of fiscal councils. As noted earlier, there is little to guide the construction of meaningful quantitative indices summarizing features of nonpartisan agencies likely to affect fiscal policy choices. Nonetheless, using the analytical framework proposed in Debrun, Hauner, and Kumar (2005), we compiled indices of different features of fiscal councils (FCs) that might be regarded as likely to be related to fiscal performance. Extensive robustness checks clearly remain to be performed on those indices, and the results should therefore be taken with care.

As noted earlier, there are good theoretical reasons and some *prima facie* evidence that the relationship between budgetary balances and fiscal rules may not be causal. First, it can be argued—and the theoretical analysis suggests—that intrinsically profligate governments would be reluctant to adopt or maintain constraining fiscal arrangements, while fiscally conservative governments are more prone to do so. Second, beyond the obvious possibility of reverse causality, omitted determinants of fiscal behavior could be correlated with institutions, also causing a bias in OLS estimates.

Whereas instrumenting the fiscal rule indices emerges as a natural technical response to this potential issue, there is a scarcity of quality instruments (which have to be orthogonal to the error term but highly correlated with the explanatory variable to instrument) for institutional variables. One way to alleviate this problem is to rely on standard specification tests to exclude exogenous political variables that appear to play no direct role in fiscal behavior, and use them as instruments. In our model, good candidates are government fragmentation and ideology. We also introduce other excluded instruments to capture exogenous factors that may have affected the decision to introduce national fiscal rules. The European Commission's analysis points to the role played by the run-up to EMU, which may have encouraged countries to adopt stricter national rules to accompany the fiscal adjustment process, and by the introduction of the Stability and Growth Pact. Dummy variables capturing these events are therefore used as excluded instruments as well.<sup>29</sup> Estimates reported in Table 2 below also consider a dummy variable identifying election years in the EU countries.

Another problem is that other explanatory variables may suffer from an endogeneity problem and could also be candidates for instrumentation. In particular, the fiscal council index, the output gap, the lagged primary balance, and the lagged public debt may all be correlated with the error term of the primary surplus equation, making them debatable instruments.<sup>30</sup> However, instrumenting more than one variable raises a number of difficulties, including potential problems in the overall quality of the set of instruments (e.g. a good instrument for the output gap may prove to be very weak for fiscal institutions). This is why Table 2 reports results where we have instrumented only one variable at a time, namely the output gap and fiscal rule indices. In the absence of obvious instruments for the lagged public debt and the lagged CAPB, we rely on standard specification tests to check whether they are orthogonal to the error term. (The same tests are used to check for the exogeneity of the fiscal council index.) Of course, the power of these tests is still a matter of debate, and for all practical purposes, one should treat these results with caution.

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<sup>29</sup> These dummies proved highly insignificant when included in the model.

<sup>30</sup> One reason for such correlation is the possibility of time-invariant factors affecting the capacity or willingness to generate high primary surpluses in each country. Another reason is the possible persistence in the idiosyncratic shocks to primary surplus behavior. See Celasun, Debrun, and Ostry (2006) for a detailed discussion of the statistical biases related to the estimation of fiscal reaction functions, and Celasun and Kang (2006) for a technical discussion of alternative estimators.

**Table 2. Fiscal Reaction Functions: Exploring Reverse Causality**  
(Dependent variable: cyclically-adjusted primary balance)

	Instrumenting the output gap			Instrumenting fiscal rules		
	(Robust t- or z-statistics in parentheses)					
Lagged CAPB	0.63 *** (12.46)	0.63 *** (12.51)	0.63 *** (12.34)	0.66 ** (10.42)	0.69 *** (12.20)	0.68 ** (12.43)
Output gap	-0.05 (-1.02)	-0.05 (-1.04)	-0.05 (-1.05)	-0.07 (-1.48)	-0.08 * (-1.77)	-0.08 * (-1.77)
Lagged public debt	0.03 *** (5.84)	0.03 *** (5.74)	0.02 *** (6.31)	0.02 *** (4.51)	0.02 *** (5.12)	0.02 *** (5.16)
Government stability	0.07 (1.53)	0.07 (1.60)	0.07 (1.59)	0.10 ** (2.00)	0.12 ** (2.31)	0.12 ** (2.36)
Fiscal governance ("Commitment" dummy)	0.65 *** (2.71)	0.66 *** (2.71)	0.57 *** (3.07)	0.56 *** (2.91)	0.56 *** (2.86)	0.56 *** (2.87)
Government fragmentation	-0.24 (-0.51)	-0.31 (-0.63)	...	...	...	...
Ideology	0.02 (0.58)	0.02 (0.55)	...	...	...	...
Election year (dummy)	-0.32 ** (-1.93)	-0.32 * (-1.89)	-0.33 ** (-2.02)	-0.33 ** (-2.00)	-0.33 ** (-1.99)	-0.33 ** (-1.98)
Fiscal council index	-0.13 ** (-2.10)	-0.13 ** (-2.10)	-0.12 ** (-2.04)	-0.07 (-0.90)	...	...
Fiscal rule overall index	0.72 *** (2.96)	...	0.68 *** (2.88)	0.23 (0.43)	-0.06 (-0.15)	...
Fiscal rule coverage index	...	0.54 *** (2.85)	...	...	...	-0.06 (-0.23)
Constant	-1.98 *** (-3.99)	-1.96 *** (-3.73)	-1.93 *** (3.76)	-2.00 *** (-3.89)	-2.02 *** (3.79)	-2.01 *** (-3.74)
R-squared (overall)	0.79	0.79	0.79	0.78	0.78	0.77
F-test (country effects)	1.53	1.43	1.29	1.02	0.61	0.85
Hansen J statistic (p-value)	0.98	0.99	0.84	0.98	0.93	0.94
Durbin-Wu-Hausman Chi-squared (p-value)	0.36	0.35	0.44	0.31	0.06	0.05
Cragg-Donald statistic (weak instrument)	...	...	...	9.64	14.3	16.11
Exogeneity of suspect instrument (C statistic, p-value)						
- fiscal council index	...	...	...	0.66	0.40	0.45
- lagged debt	...	...	...	...	0.37	0.40
- lagged CAPB	...	...	...	...	0.58	0.58
- all of the above (joint test)	...	...	...	...	0.80	0.83

Notes: All estimates are obtained by two-stage least squares. Excluded instruments for the output gap are the lagged output gap and the average output gap in the US, France and Germany, except for France (Germany, US, and UK), and Germany (US, UK, and France). Instruments for the fiscal rule indices include government fragmentation, ideology, and dummies for SGP, the runup to EMU, and the delegation form of fiscal governance. In the last two columns, the fiscal council index was also used as an excluded instrument.

Table 2 confirms the broad patterns observed in Table 1. The first 3 columns only instrument the output gap, assuming that fiscal institutions (both rules and the fiscal council index) are exogenous. While stricter and broader fiscal rules are associated with higher CAPBs (supporting the European Commission's findings), elections also seem to play a role, with lower CAPBs being observed in election years. By contrast, the impact of government stability is less precisely estimated, and its coefficient is lower, reflecting possible collinearity with rules and elections. Our fiscal council index enters with a negative and significant sign, which corroborates the (unconditional) correlation reported earlier. It is also worth noting that the Durbin-Hu-Hausman test does not reject the null hypothesis that the output gap is exogenous, despite the usual assumption of the contrary in most related empirical studies (e.g. Gali and Perotti, 2003). However, that result may also reflect a relatively low power of the test in the context of our panel.

Instrumenting the rules deeply affects estimates of fiscal behavior (Table 2). It now appears that both the restrictiveness of the rules and their coverage have no meaningful effect on the CAPB. The Durbin-Hu-Hausman tests indicate that the potential endogeneity problem is at least as large as for the output gap. Exogeneity is even unambiguously rejected at standard levels of significance if the fiscal council variable (which loses significance when the rule index is instrumented) is used as an excluded instrument. Although there remain many caveats and that extensive robustness checks are still needed, these results thus suggest that one should not dismiss a priori the possibility of a serious endogeneity problem when estimating the impact of fiscal rules on fiscal behavior.

For the sake of completeness, Table 3 confirms the impression conveyed by specification tests that first-stage regressions for rules are of good quality. The significant role of excluded exogenous variables is particularly noteworthy. These regressions support the stylized fact that more disciplined governments (i.e. low public debt and high CAPB) tend to have more restrictive (or a broader coverage of) fiscal rules. Also, government stability—which is associated with better fiscal performance—is significantly positively correlated with the restrictiveness of the rules: the more stable the government, the more it will be willing to forgo discretion and implement rules. Rather strikingly, when controlling for all other determinants of the rules, delegation countries tend to have tightened fiscal rules by more than commitment countries over the sample period, perhaps reflecting a “catching up” effect as the former were generally less prone than the latter to have rules-based fiscal frameworks.

Government fragmentation and ideology also appear to have a significant effect on the preference for tighter and more encompassing fiscal rules. Specifically, more fragmented governments seem to find it more convenient to enact binding rules committing all parties to the same aggregate objective than to rely on endless and paralyzing bargaining sessions among coalition partners. Also, right-leaning governments seem to have an intrinsic appetite for less constraining arrangements than left-leaning governments. Finally, the fiscal council index enters with a positive, quantitatively large, and statistically significant coefficient. Once one appropriately controls for other determinants of rules, the presence of fiscal councils would thus appear to contribute positively to either the emergence of fiscal rules or their more effective enforcement.

**Table 3. First-stage Regressions for the Fiscal Rules Indices**  
(Dependent variable: fiscal rule index)

	Fourth column in Table 2	Sixth column in Table 2
Lagged public debt	-0.00 *** (-3.36)	-0.01 *** (-3.70)
Lagged CAPB	0.06 *** (4.97)	0.08 *** (4.95)
Government stability	0.05 *** (2.18)	0.04 (1.52)
Delegation (dummy)	0.44 *** (6.64)	0.58 *** (7.22)
Commitment (dummy)	0.20 *** (3.03)	0.28 *** (3.24)
Government fragmentation	0.29 *** (3.15)	0.48 *** (4.10)
Ideology (conservative)	-0.03 *** (-3.08)	-0.04 *** (3.33)
Output gap	-0.01 (-1.12)	-0.01 (-0.82)
SGP (dummy)	-0.09 (-1.36)	-0.04 (-0.42)
Runup to EMU (dummy)	-0.10 * (-1.79)	-0.08 (1.08)
Elections	0.03 (0.48)	0.02 (0.32)
Fiscal council index	0.11 *** (6.90)	0.14 *** (7.07)
Constant	-0.12 (-0.66)	-0.03 (-0.15)
R-squared (overall)	0.47	0.48
Partial R-squared of excluded instruments	0.21	0.35
F test of excluded instruments	11.82 ***	19.24 ***

In Table 4, we document the existence of suggestive nonlinearities, indicating that, as suggested by our theoretical analysis, the effectiveness of rules depends upon the broader economic and political context.



**Table 4. Interactions between Fiscal Institutions and other Country-Specific Features**  
(Dependent variable: cyclically-adjusted primary balance)

Estimator:	LSDV				
	(Robust t-statistics in parentheses)				
Lagged dependent variable	0.60 *** (8.84)	0.60 *** (8.91)	0.64 *** (13.53)	0.68 *** (15.13)	0.68 *** (15.67)
Output gap	-0.04 (-0.72)	-0.05 (-0.89)	-0.09 (-1.04)	-0.09 (-1.05)	-0.09 (-1.06)
Lagged public debt	0.03 *** (2.58)	0.03 *** (2.46)	0.02 *** (5.03)	0.02 *** (4.57)	0.02 *** (4.42)
Fiscal rule restrictiveness	-0.47 (-0.51)	0.22 (0.78)	1.52 *** (3.13)	0.30 (1.17)	0.80 *** (3.12)
<i>interacted with:</i>					
Government stability	0.16 * (1.88)	...	...	...	...
Growth volatility	...	0.50 *** (4.62)	...	...	...
Country size	...	...	-0.26 ** (-1.92)	...	...
Commitment	...	...	...	0.51 ** (2.24)	...
Delegation	...	...	...	...	-0.52 ** (-2.18)
Country size (population)	...	...	-0.13 * (-1.69)	...	...
Constant	-1.81 *** (-2.50)	-1.86 *** (-2.59)	-0.83 *** (-2.76)	-1.07 *** (-3.88)	-1.05 *** (-3.74)
R-squared (overall)	0.79	0.80	0.80	0.79	0.79
F-test (country effects)	1.46 *	1.92 **	1.63 *	1.50	1.50
Fixed effects (country)	Yes	Yes	Yes	Yes	Yes
Number of observations	195	195	195	195	195
Number of cross-sections	13	13	13	13	13

The results show the following. First, there is a positive and highly significant interaction between volatility of growth and fiscal rule restrictiveness, suggesting that the uncertainty engendered by output volatility, and the need to have some “anchor” likely impels authorities to opt for more restrictive rules. This complements the results for the interaction between fiscal rule restrictiveness and government stability, which indicates that a given rule is more likely to have an impact in a stable political context than in less stable one. Rules also appear to be less effective in large countries, perhaps capturing the fact that part of those rules are somehow connected to the implementation of the Stability and Growth Pact (we think of the adoption of internal SGPs in some countries). However, the strength of the effect is probably not unrelated to the fact large countries also tend to adopt a delegation mode of fiscal governance, which also appears to undermine the effectiveness of rules (last column of Table 4)

## V. CONCLUSIONS

This paper has developed a stylized model of fiscal policy to illustrate the theoretical underpinnings of fiscal institutions. Two sets of issues were addressed: the credibility of optimal institutions; and the contribution of institutions over and above the influence of other factors, particularly that of specific political constituencies.

The results highlight a number of important issues relating to fiscal outcomes and institutions. First, they suggest that electoral uncertainty is a key source of deficit bias, and therefore, a central determinant of fiscal institutions. The reason is that the perceived risk of not being re-elected drives policymakers' discount rate below the social discount rate. That risk originates in voters' incomplete information about the true motivations or competence of elected officials. The model thus suggests that, other things equal, countries with higher political instability (and a correspondingly higher risk of officials being voted out) should experience higher deficits on average. Such countries should correspondingly adopt stricter enforcement mechanisms of fiscal rules to ensure that deviations from the rule entail significant costs for the policymakers.

Second, the model highlighted the possibility of reverse causality between institutions and outcomes. One reason for reverse causality is that institutions may be time-inconsistent because fiscal arrangements are self-enforced. This means that intrinsically less stable governments will be more prone to weaken the disciplinary aspect of fiscal institutions (or not to adopt them in the first place), and that such weakening is more likely to occur in bad times than in good times (when even noncredible institutions are unlikely to be binding). Another reason for reverse causality is that, under certain circumstances, fiscal institutions are more likely to be effective if the deficit bias is low to start with. Hence, low-deficit countries may be more likely to set up such institutions.

The second part of the paper explored some of the empirical implications of the theory. We first documented broad correlations among various elements of the fiscal framework in EU countries, and then turned to quantifying the relationship between institutions and fiscal outcomes, focusing on three key dimensions: (i) the potential sources of fiscal bias; (ii) the relationship between the restrictiveness and coverage of fiscal rules and fiscal outcomes; and (iii) the interactions between our institutional variables and various country specific features, as the effectiveness of fiscal institutions may vary according to the political landscape and commitment to fiscal discipline.

The results do not reject the role of political instability as a source of bias. Instability was also found to be associated with less restrictive and narrower rules. Finally, we found suggestive evidence that it interacts with the effectiveness of fiscal rules, with more stable political environments being conducive to a greater effectiveness of the rule, as suggested in our theoretical analysis. We found evidence that the greater the restraint exerted by the fiscal council, or the greater its political independence, the greater the perceived impact on outcomes. Our econometric results indicate that this perception may be related to a more pronounced tendency of countries with fiscal councils to adopt rules and/or to better enforce them. As to the relationship between rules and outcomes, we found evidence that simultaneity issues could be at least as meaningful as in the case of the output gap, which is generally assumed to be endogenous in most empirical studies. Accounting for that potential endogeneity bias contributes

to a severe weakening of the estimated impact of rules under the null hypothesis of exogeneity. Overall, our analysis suggests that further research is needed to check the robustness of these findings to alternative specifications of the fiscal reaction functions, and to capture in a more systematic and robust way, the non-linearities that appear to matter.

A broad policy conclusion emerging from our findings is that rules can provide an important signaling mechanism that can help crystallize underlying preferences for good fiscal behavior, and thereby strengthen the reward for being well-behaved (e.g. through greater re-election chances, but also lower borrowing costs). To put it simply, rules and institutions work best when they are not meant to be binding. However, when they become truly binding, rules may well work effectively only to the extent that there is enough political capital to support their enforcement, or that there are high costs to bypass them, including the action of external enforcer or a strong response from capital markets.

## APPENDIX

**A. Proof of Proposition 1**

At the beginning of period 1, voters assign a probability  $z_{Q,0}$  of  $\delta_1 \geq \delta^+$  equal to  $p - \psi(2p - 1)$ ,  $Q = C, L$ , where  $p$  is a probability symbolizing voters' prior about politicians' incompetence.<sup>31</sup> With  $0 \leq \psi < 1/2$ , voters update their beliefs using Bayes' rule: if they observe  $\delta_1 \geq \delta^+$ , the probability that party  $C$  is incompetent is revised to  $p^+ = \frac{(1-\psi)p}{(1-\psi)p + \psi(1-p)}$ , and  $p < p^+ \leq 1$ .

As a result, the probability of  $\delta_2 \geq \delta^+$  under Party  $C$ 's rule is increased to  $z_{C,1} = p^+ - \psi(2p^+ - 1)$ . At the same time,  $z_{L,1} = z_{L,0} < z_{C,1}$  so that  $E_1[v(q_{C,2})] < E_1[v(q_{L,2})]$ , and party  $L$  wins the election. If  $\delta_1 < \delta^+$ , the probability that party  $C$  is incompetent is revised downward to  $p^- = \frac{\psi p}{\psi p + (1-\psi)(1-p)}$ , which guarantees  $E_1[v(q_{C,2})] > E_1[v(q_{L,2})]$ , and the re-election of party  $C$ . This establishes that, from the perspective of the incumbent, the probability of being re-elected is simply equal to the *true* probability of  $\delta_1 < \delta^+$ , that is  $\delta^+ / \bar{\delta}$ .

**B. Proof of Proposition 2**

The first part of the proposition follows from the fact that no rationally chosen debt threshold  $\bar{b}$  should discourage the selection of the optimal debt  $b^*$  for any income shock  $\varepsilon \in [-\bar{\varepsilon}; \bar{\varepsilon}]$ , so that  $\bar{b} \geq b^*$ . In the case of a strict inequality ( $\bar{b} > b^*$ ),  $b^*$  is never an equilibrium strategy because for  $k = 0$ ,  $v'(q_{C,1}^*) > (1-r)v'(q_{C,2}^*)$ . Restoring equality between these two terms (while keeping  $k = 0$ ) requires more spending on public goods in period 1 than in period 2:  $q_{C,1}^{**} > q_{C,2}^{**}$ , or equivalently  $b^{**} > b^*$  (see Figure 1). The second part of the Proposition is established by applying the implicit function theorem to (9), which yields:  $\partial b^{**} / \partial k = [v''(q_{C,1}^{**}) + (1-r)v''(q_{C,2}^{**})]^{-1} < 0$ . Then it is clear from (9) that  $k^* = v'(q_{C,1}^*) - (1-r)v'(q_{C,2}^*) = rv'(q_{C,1}^*) > 0$  makes any deviation from  $b^*$  sufficiently costly to deter a deficit bias.<sup>32</sup>

<sup>31</sup> If  $\psi = 1/2$ , then  $\delta_1$  is not a signal of competence, and  $z_{Q,0} = z_{Q,1}$ ,  $Q = C, L$  irrespective of  $\delta_1$ . In that case, the incumbent government is assured to be re-elected, and the analysis of the political equilibrium loses any interest.

<sup>32</sup> See Beetsma and Debrun (2007) for a similar characterization of optimal fiscal institutions.

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