Hiding Public Debt

Hadi Salehi Esfahani
HoeJeong Kim
Department of Economics, University of Illinois, Urbana-Champaign

April 2002

Abstract

This paper examines the determinants of hidden public debt—that is, government financial commitments and contingent liabilities that do not receive official recognition and explicit budgetary allocations, but are later on assumed by the government as additional debt outside the normal budget. Hidden debts are large in many countries and can cause fiscal and macroeconomic instability. We propose a measure of hidden debt and develop a model that explains its regularities. We show that the forces that raise the demand for public expenditure, such as fractionalization and division in the government, also motivate the politicians to resort to disguised expenditure and debt as a means of alleviating constraints on explicit borrowing. The tightness of such constraints also adds to the incentive to hide debt, as do factors that reduce the costs of arranging off-budget debts. We find that these costs decline with the extent of government intervention in the economy, especially when the economy is sufficiently developed to have resources that interventionist governments can direct toward hidden expenditures. We also examine the role of IMF standby programs, which impose limits on explicit spending and borrowing while intensifying the monitoring of fiscal operations to curb disguised liability creations. We find that the latter function is strong enough to ensure that hidden debts decline towards the end of standby programs. Finally, the proposed measure of hidden debt is likely to have other important applications, especially in the studies of fiscal policy that in the past have relied on budgetary deficit as a complete measure of government deficit.

Key words: Hidden public debt, fiscal policy, borrowing constraint, IMF standby programs.
JEL Classification: H63, H62, H11

Please address all correspondence concerning this paper to:

Hadi Salehi Esfahani
Department of Economics
University of Illinois
Urbana, IL 61801, USA
Phone: (217) 333-2681; Fax (217) 333-1398; E-mail: Esfahani@uiuc.edu

---

* We are thankful to Soyoung Kim, Roger Koenker, and Larry Neal for their valuable comments.

1. Introduction

Governments often have financial commitments and contingent liabilities that do not receive explicit budgetary allocations or even official recognition. Such "hidden" liabilities can be a cause of concern for fiscal and macroeconomic stability (Polackova, 1998). Less transparent fiscal systems tend to produce more "surprise" liabilities of significant magnitude with destabilizing effects, as the recent economic crises in Latin America and elsewhere have amply shown (Alesina et. al., 1999). Yet, governments seem to have an appetite for shifting liabilities off budget, especially as a means of avoiding badly needed fiscal adjustments (Easterly, 1999). Despite the importance of the issue, there are very few studies of the forces at work and of why some governments tend to generate disguised liabilities much more than others do. This paper is an attempt to fill that gap by developing a simple model of hidden public debt and putting it to empirical test.

The main view of hidden public debt examined so far in the literature is that restrictions on public expenditure and deficit induce governments to resort to off-budget activities. This idea is important because constraints on spending and deficit exist in all countries in one form or another. Externally imposed constraints aimed at fiscal discipline are also common in international pacts and multilateral arrangements, as in the European Union's Maastricht Treaty and IMF conditionality. If such arrangements merely cause governments to shift their spending off-budget, then fiscal adjustment may be an illusion (Easterly, 1999). Empirical investigation of this hypothesis in the case of U.S. states and IMF/World Bank adjustment programs seem to be supportive (Joulfaian and Marlow, 1991; Easterly, 1999). However, the evidence is still quite limited and in part sketchy. In particular, it is not clear from the existing empirical work whether restrictions are ineffective irrespective of their design and circumstances, or they may work in some situations but not in others. This is important because the institutional environments of countries differ in terms of the opportunities and pressures that arise for debt hiding. For example, governments with higher exposed debts may have greater incentive to keep their expenditures out of sight and, if their intervention in markets is already extensive, they may find more instruments at their disposal to do so. Another issue is that the existing studies do not take into account the dynamic effects of deficit and debt restrictions. This matters because disguised expenditures are eventually exposed and even if a restriction drives expenditures off-budget in the short run, it may still prove effective in discouraging excess spending in the longer run. Thus, to identify the role of restrictions, one needs to distinguish between the short-run efforts to delay fiscal adjustment and the systematic evasion of fiscal constraints in the long run.

The model developed in this paper provides a framework for the systematic analysis of the above issues and offers a number of new insights and hypotheses. We also specify a methodology for empirical investigation of these issues and hypotheses. An important part of this methodology is the measurement

of hidden debt, which is carried out in an indirect way because direct measures are nearly impossible to find. In fact, absence of direct measures seems to have been the main impediment for the study of the phenomenon in the past. The indicator that we propose consists of the amount of net hidden public liabilities that become exposed each year. This variable can be measured by the change in public debt, adjusted for the declared budget deficit and reserve money expansion. We refer to this indicator as the net extra-budgetary debt assumption by the government (NEBDA). Using NEBDA may seem to have a drawback because it reflects the underlying net hidden debt as well as the rate at which such debt is exposed. But, the combination is an important variable in itself because a critical concern is the destabilizing effects of sharp movements in the government's explicit debt exposure. While our study focuses on factors that influence the stock of hidden debt, carrying out the analysis through NEBDA reflects the extent to which those factors ultimately affect changes in explicit debt exposure outside the normal budget process. It should be pointed out that NEBDA is likely to have other important applications, especially in the study of fiscal policy. Past research in that area has treated deficit figures based on budgetary data as the direct measure of public deficit and has equated it with changes in the net amount of debt and money issued by the government. That equation needs to be reexamined in light of the sizable values that NEBDA seems to take.

In the rest of this paper, we first briefly review the existing literature on hidden public debt in section 2. The model that guides our work is developed in section 3. Section 4 discusses the empirical methodology and section 5 presents the econometric results. Section 6 concludes.

2. Hidden Fiscal Spending and Borrowing: A Review of Issues and Hypotheses

There is a large literature, produced nowadays mostly by the International Monetary Fund (IMF) and the World Bank, that describes the variety of ways in which governments incur hidden liabilities.[1] This literature also argues for fiscal transparency and calls for the inclusion of all government activities and liabilities in official budget accounts. Complete fiscal transparency, however, is largely an ideal. In reality, all governments have some sorts of off-budget accounts and omit some of their liabilities and assets from official statistics, by design or by default. Parts of a government's *de facto* fiscal liabilities, which do not show up as its official debt, can be hidden in the accounts of lower level governments, special funds, public enterprises, or implicit or explicit commitments to the private sector. As a result, a key question is what factors can enable and motivate governments to make their budgets more comprehensive and transparent.

[1] For a recent survey, see Polackova (1998). IMF's website, www.imf.org, provides detailed discussions on fiscal transparency and a comprehensive list of references.

As pointed out above, external and domestic pressures to keep public debt low may give rise to the incentive to conceal expenditures and liabilities. However, it is natural to expect the effects to depend on the characteristics of those pressures and the conditions under which they are applied. Some pressures are political and electoral, while others are explicit rules that must be enforced through domestic checks and balances (such as balanced budget laws), and still others are external constraints imposed by financial markets or arranged by multilateral entities. When such constraints are not vigilantly enforced or when they focus on narrow fiscal measures, the government is more likely to find opportunities to undermine them through hidden debt techniques. But, when the constraints are more comprehensive and there are influential agents inside and outside the government that are keen to enforce them, then there is less chance that the restrictions may be evaded. Especially when the constraints are long term, eventually they may become consequential as the government comes to deal with the expenditures that it manages to hide in the short-run.

To understand the conditions under which fiscal constraints may breed hidden debt, it is useful to start with the motives for "overspending" against which the constraints are supposed to guard. A straightforward motive, well-known from the political economy literature, is that the politicians may value government expenditure more than the public because it provides them with greater political or economic advantages. The resources can be used for buying off key voters or satisfying influential constituencies and special interests. This motive is stronger when policymaking is uncoordinated and common pool problems arise over public resources (Alesina and Perroti, 1999). The reason is that in such situations each interest group represented in the policymaking process bears a small part of the cost of its preferred programs when they are funded out of public purse. As a result, there may be a divergence between the private and social costs of programs for each interest group, inducing overexploitation of fiscal resources, especially in the form of public debt that falls on the shoulders of future generations (Velasco, 1999).

To avoid inefficient fiscal outcomes, interest groups need to coordinate their actions and ensure that there are mechanisms in place that help everyone internalize the common pool externalities. But, coordination possibilities depend on the structure of the polity. In particular, more fractionalized and more polarized polities face greater difficulties in coordinating action over fiscal policy (Roubini and Sachs 1989). Such polities are more likely to resort to hidden debt.[2]

[2] Aside from the macro political institutions, the details of budgetary procedures should also matter for the extent of liabilities acquired off budget. *Ex ante* agreements on budget aggregates or their delegation to a central budget authority have been found to help increase fiscal discipline as far as explicit government accounts are concerned (Poterba and von Hagen, 1999). Thus, one might expects such mechanisms to reduce the demand for hidden debt as

The incentive for manipulating explicit public accounts may change with the timing of elections. The extensive political business cycles literature has debated whether politicians use tax cuts and expenditure increases to buy voter support at election times. Evidence from OECD and developing countries generally support such effects, but reconciling them with the theory of rational voter behavior has been challenging.[3] Theoretical studies of the phenomenon generally point to imperfect information on the part of voters as a key ingredient for a plausible explanation (Persson and Tabellini, 2000: 419). If this is the case, then the election effect should be particularly strong in case of non-transparent forms of borrowing and spending. In other words, one should observe surfacing of larger than average hidden liabilities in the aftermath of elections.

Fiscal decentralization is another institutional feature that has been identified in the literature as a determinant of public expenditure and borrowing, but its role has proven more controversial. Some have argued that decentralized fiscal systems offer a greater potential for improved macroeconomic governance because they require greater clarity in the roles of various players and transparency in rules that govern their interactions to ensure fair play (Shah, 1998). Others have held that as long as there is a chance that the national government will come to the rescue, sub-national governments have an incentive to generate excess liabilities (Prud'homme, 1995; Tanzi, 1996). The national government itself may find it attractive to make its fiscal condition look better by delegating tasks to local governments. Even though it may provide funding for the tasks, local governments are likely to demand more and use indebtedness as a way of keeping pressure on the central government. When local governments occasionally find it difficult to service such debts, the central government may be pressed to bail them out and assume the liabilities. In this sense, decentralization can lead to higher hidden as well as exposed public debts.

A crucial factor that is likely to facilitate the evasion of spending and deficit restrictions is extensive government intervention in markets. When the government uses market controls to reallocate and redistribute resources, it often puts pressure on some economic agents to give up their resources in exchange for promises of future compensation. Indeed, many government interventions, such as wage and price controls, implicitly create an obligation for the government to rescue the affected parties in case of adverse shocks. For example, between 1997 and 1999, the government of Korea had to commit large amounts of public funds to save the country's banking system devastated by the foreign currency crisis. Though the banks and financial institutions were private firms, the government had to bail them out because it had intervened in the financial system for a long time and had used it for channeling credit to selected industries and enterprises. The incident made the government's debt jump even though the

---

well. We do not examine this issue in this paper because there is little data on such factors for the countries and the time span of our sample.

history of its low budget deficits seemed to indicate dutiful discipline. Examples of this kind abound in other countries. More extensive interventions make it easier for the government to use the private economy as a means of accomplishing its policy objectives, but they also entail potential financial liabilities outside the normal budgetary channels.

One form of intervention that is often identified as a source of hidden liability is government ownership of firms. The common view is that when a government owns enterprises, it can direct the managers to use the resources and the borrowing capacity of those firms to pay for tasks that are essentially fiscal functions. For example, the United States government created FICO (The Financing Corporation) in 1987 and authorized it to borrow $10.8 billion to be used for deposit insurance purposes, without appropriating any funds to deal with the contingent liabilities of such an operation (Joulfaian and Marlow, 1991). Another example is the French government's takeover of the pension liabilities of France Telecom in 1997 in exchange for a budgetary receipt from the company amounting to about 0.5 percent of GDP (Easterly, 1999). All such activities create commitments that can impose large burdens on the government at later dates in a contingent or more predictable fashion. A prominent example of realization of large contingencies is the 1982 Brazilian debt crisis in which large sums borrowed by public enterprises had to be assumed by the federal government, with major adverse effects on the economy (Coes, 1995: 62-65). Of course, public enterprises also have assets that may produce occasional capital gains in the form of privatization proceeds or enhanced financial returns. Public enterprises may not be operating efficiently, but their net assets are not necessarily negative and the liabilities that they pass on to the government do not always exceed the capital gains that they offer. Indeed, some observers have criticized privatization in countries under fiscal stress as short-term palliatives that may cause more long-term problems due to asset depletion (Easterly, 1999).

Public enterprises can be seen as a special form of extra-budgetary funds that governments use to make their fiscal conditions look sounder. Another major example is pension funds. Many countries have pay-as-you-go pension systems that accumulate surpluses in their early stages. Commonly, governments borrow the surplus of pension funds in these stages at low interest rates or keep their own contributions low, thus maintaining their explicit budget deficits low for a while. However, this practice eventually leads to shortages of funds needed for pension payments in later periods. It is not difficult to find pension funds whose present values are negative, with the government ultimately being forced to cover the shortage, which is in fact its own hidden debt.

Other economic characteristics of the country such as openness and vulnerability to internal and external volatility are also likely to be relevant for the calculus of hidden liabilities. Greater openness is likely to increase the demand for expenditures on social insurance of the households exposed to risk

[3] For a comprehensive survey of theory and evidence on political business cycles, see (Alesina et al., 1997).

(Rodrik, 1998). In particular, this tends to raise the contingent liabilities of the government, which are typically off budget. It also indirectly encourages policymakers to resort to more hidden borrowing to keep the official accounts look healthy despite the increased fiscal burden.

The above discussion suggests a variety of variables to be considered in the empirical analysis of hidden debt. In the next section, we develop a model that places these variables in a unified framework, takes account of the key effects involved in the process, and yields a set of testable hypotheses.

3. A Simple Model of Hidden Debt

Consider a two-period economy where in the first period the government incurs expenditure x and finances it either by current taxes or by debt, which is raised against taxes in the second period. Taxes are distortionary and cause the economy's total income to decline at an increasing rate. That is, if t_i is tax revenue in period i, $i = 1,2$, the economy's maximum output in that period given t_i can be denoted as $y(t_i)$, where $y' < 0$ and $y'' < 0$.[4] Taxes are always less than their corresponding total output—i.e., $t_i < y(t_i)$—and have an upper limit, $\bar{t} > 0$, where $y'(t_i) \to -\infty$ as $t_i \to \bar{t}$.[5] We also assume $y'(t_i) \to 0$ as $t_i \to 0$. This assumption helps rule out corner solutions that complicate the analysis without changing the main insights of the model.

The output is produced by a population (the public) that values both income and government expenditure. For simplicity, let the public's welfare function from a given fiscal plan, (x, t_1, t_2), be linear in expenditure and output net of taxes:

$$(3.1) \qquad w(x, t_1, t_2) = \alpha x + y(t_1) - t_1 + \delta y(t_2) - \delta t_2,$$

where δ is the discount factor for period 2 output and α is the marginal social value of government expenditure measured in terms of output units. We assume $\alpha > 1$ to ensure that the public wants a positive amount of expenditure, x. Government decisions are made by a group of politicians who take account of the public's welfare to maintain support for their rule, but place more weight on government expenditure than the public does. If the politicians' objective function is denoted by $u(x, t_1, t_2)$, we have:

$$(3.2) \qquad u(x, t_1, t_2) = \gamma\alpha x + y(t_1) - t_1 + \delta y(t_2) - \delta t_2,$$

---

[4] One can allow the output function to be different across the two periods. But, that has no impact on the results.

[5] To see the rationale for the condition placed on $y'(t_i)$, note that in the case of fixed tax rates, $\bar{t}$ would be the maximum of the Laffer curve. If τ is the tax rate and $q(\tau)$ represents the output as a function of τ, then total tax revenue would be $t = \tau q(\tau)$, which is maximized when $\tau q'(\tau)+q(\tau) = 0$. If we treat t as the control variable and τ as its function, $\tau(t)$, then $y(t) = q(\tau(t))$ and at the maximum revenue point, we will have $dq/dt = q'(\tau)/[\tau q'(\tau)+q(\tau)] = -\infty$.

where $\gamma > 1$ parameterizes the government's valuation of x relative to that of the public. This specification reflects the potential agency problems between the public and its representatives discussed in section 2.[6]

When the first period expenditure and tax revenue are x and t_1, the government must borrow $x - t_1$ in period 1. Assume that the government has access to a competitive world capital market with a large number of potential lenders whose opportunity cost of credit is fixed at r. If there is no risk of default and no borrowing constraint, the government can freely borrow $x - t_1$ in period 1 and pay back

(3.3) $\quad t_2 = (x - t_1)(1+ r)$

in period 2. In this situation, the government's most preferred fiscal plan, (x^*, t_1^*, t_2^*), which maximizes u subject to (3.3), solves:

(3.4) $\quad \gamma\alpha = 1 - y'(t_1) = \delta(1+r)[1 - y'(t_2)] \qquad$ and $\qquad x = t_1 + t_2/(1+r).$

This result is easy to interpret. In the absence of a borrowing constraint, the government sets its marginal benefit from expenditure, $\gamma\alpha$, equal to its marginal cost in period 1, $1-y'(t_1)$, and the marginal cost of borrowing in period one to be paid back by taxes in period 2, $\delta(1+r)[1- y'(t_2)]$. The preferred expenditure is equal to the discounted present value of taxes in the two periods. Any factor that raises the marginal value of expenditure will raise the government's preferred taxes, spending, and borrowing in period 1. A decrease in the interest rate or in the discount factor will also do the same thing for expenditure and borrowing, but in the setting of this model taxes rise only in period 2. The optimal fiscal plan from the public's point of view solves the same equations as in (3.4), but with $\gamma = 1$. As a result, the public's preferred expenditure and taxes are all lower than those of the politicians. The politicians are interested in taxing, borrowing, and spending more because they value expenditure more than the public does.

The public's interest in smaller deficits creates pressures on the government to limit the deficit. These pressures could be in the form of domestic political demands or formal constraints such as laws or constitutional clauses requiring the budget to be balanced or limiting government borrowing to capital spending (the "golden" rules). The origin of the constraints may also be external, as in the case of IMF standby agreements or the membership requirements of the European Monetary Union. Finally, financial markets may impose a credit constraint on the government if there is a possibility of default on government debt in period 2. This can happen if the principal and interest on government debt in period 2

[6] The difference between the preferences of the public and the politicians may alternatively manifest itself in the differences in their discount factors. Allowing for that effect does change the results.

is greater than the maximum tax that the government can collect and deliver to the lenders in that period. This upper limit may be the same as the maximum tax, $\bar{t}$, but may be less if the lenders cannot compel the government to render collateral more than some amount that is less than $\bar{t}$. This would be the case, for example, if the government cannot commit to pay back its debt or if it is carrying other liabilities such as a pre-existing debt. If we let q represent the part of $\bar{t}$ that cannot be used for paying back explicit debts, then the lenders can only expect a maximum payback of $\bar{t} - q$ and would be willing to lend only up $(\bar{t} - q)/(1+ r)$. Denoting the maximum debt limit that originates from all other sources of restriction by z, the government's overall borrowing limit in period 1 can be described as $\bar{d} = \min\{z, (\bar{t} - q)/(1+r)\}$. Since at least the public always wants to constrain the politicians' choice of debt, $\bar{d} < t_2^*$.[7] Thus, in maximizing u with respect to x, t_1, and t_2 given $\bar{d}$, the government faces the following constraints:

(3.5) $\quad t_2 = (1+ r)\,\bar{d} \qquad \text{and} \qquad x - t_1 \le \bar{d}$.

The first-order conditions of this problem yield:

(3.6) $\quad \gamma\alpha \;=\; 1 - y'(t_1) \;\ge \delta(1+r)[1 - y'((1+ r)\,\bar{d}\,)] \qquad \text{and} \qquad x = t_1 + \bar{d}$.

The first period tax in this case is still t_1^*, but the expenditure is less than x^* due to the borrowing limit.

When borrowing is constrained, the government has an incentive to look for other means of financing additional expenditures. In particular, the government may make an attempt to induce some agents to lend in ways that are not directly observable by those who want to enforce the deficit limit. For example, the government may be able to delay payment for some goods and services that it procures to make its budget appear compliant with the deficit limit. Also, the government may offer private guarantees to private and public enterprises or banks in exchange for tasks that it wants them to carry out. This can again hide a great deal of liability when the budgetary provisions for such guarantees are inadequate or non-existent. The enterprises involved may cooperate in these situations and may keep the information private in order to maintain their long-term relationships with the government and earn rents from it in the future. Even when the limit on the deficit is due to the financial market's concern over the risk of default, the government may be able to use its special relationships with some private or quasi-public firms to offer them stronger guarantees of payback and, thus, obtain additional credit. This

[7] This is the case because when the public wants more borrowing, there is no reason for the politicians to opt for less. But, as we have argued earlier, agency problems between the public and the politicians causes the latter to have a preference for more expenditure and borrowing than the public does.

possibility may, of course, tighten the government's constraint in the explicit credit market (by raising q) because the lenders there may suspect that the government is diluting the collaterals for their loans. But, the politicians may not be able to prevent the tightening when they are unable to credibly commit not to create hidden liabilities. As a result, the credit constraint and hidden debt may be inevitable.

Arranging hidden liabilities and ensuring that the information does not become public are likely to entail some costs for the government (or leaving them less transparent may save some expenses). Naturally, such costs depend on the characteristics of the institutions and the economy. When government intervention in the economy is extensive, the politicians' opportunities for pressing firms to extend credit are greater while observing the magnitude of such debts is more difficult for third parties. Extensive intervention, therefore, lowers the cost of creating disguised liabilities (or increases the effort needed to make public accounts transparent in credible ways). Also, the presence of enterprises with the necessary financial resources to extend credit is important because the government is likely to face difficulties in squeezing funds out of a poor economy with little surplus. On the other hand, when the existing institutions ensure greater transparency in government operations, hidden debt becomes more costly to create (or it is easier to provide credible public information about government accounts).

To formalize the above effects, let $\eta > 0$ represent the cost of arranging a dollar of disguised expenditure. As argued above, η rises with transparency and declines with the extent of intervention and the level of development. If the total hidden expenditure in period 1 is x_h, the government must incur an additional hidden cost of ηx_h in that period and must pay back a total hidden debt of $(1+\eta)x_h$ in period 2. Suppose that a share, $\varphi > 0$, of this debt is paid back out of resources that cannot be used for the repayment of explicit loans. The rest consists of obligations that raise q and reduce the funds available for amortizing explicit debt. In other words, q can be written as $\bar{q} + (1-\varphi)(1+r)(1+\eta)x_h$. In that case, if in period 1 the lenders expect the hidden public expenditure to be $\tilde{x}_h$, they will restrict explicit lending to

$$(3.7) \qquad m = \frac{\bar{t} - \bar{q}}{1+r} - (1-\varphi)(1+\eta)\tilde{x}_h .$$

The government's overall borrowing limit would then be $\bar{d} = \min\{z, m\}$. Given that the politicians have an incentive to use the explicit borrowing to the limit, the explicit expenditure in this case would be $x = t_1 + \bar{d}$ and the second period taxes must equal the sum of explicit and hidden debt obligations, $t_2 = \bar{d} + (1+\eta)x_h$. This means that the government's problem can be written as:

$$(3.8) \qquad \max_{x_h,\, t_1} \ \gamma\alpha(t_1 + \bar{d} + x_h) + y(t_1) - t_1 + \delta y[(1+r)(\bar{d} + (1+\eta)x_h)] - \delta(\bar{d} + (1+\eta)x_h).$$

As before, $\bar{d}$ is a given for the politicians' choice of x_h and t_1. The first-order conditions are:

(3.9) $\quad 1 - y'(t_1) = \gamma\alpha = (1+r)(1+\eta)\delta[1 - y'((1+r)(\bar{d} + (1+\eta)x_h))]$.

The final step is to specify the nature of lenders' expectations about hidden debt, which we assume to be rational and be equal to the x_h that emerges from the solution of (3.9). In other words, we are focusing on the subgame perfect Nash equilibrium of the game between the politicians and the lenders. Under this assumption, the second equality in (3.9) implies that in equilibrium,

(3.10) $\quad \gamma\alpha = (1+r)(1+\eta)\delta[1 - y'((1+r)(z + (1+\eta)x_h))]$ $\qquad$ when $\quad z \le m$,

$\qquad\qquad \gamma\alpha = (1+r)(1+\eta)\delta[1 - y'(\bar{t} - \bar{q} + \varphi(1+r)(1+\eta)x_h))]$ $\qquad$ when $\quad z > m$.

The assumptions about the shape of $y(.)$ guarantee that (3.10) has a unique solution, x_h^{**}, for each given set of parameters. Note that the equilibrium t_1 is determined by (3.9) and is again equal to t_1^*. However, the total expenditure (exposed as well as disguised, $t_1^{**} + \bar{d} + x_h^{**}$) is less than x^* because of restrictions on explicit borrowing and the expenses of arranging the hidden debt, which add to the marginal cost of government expenditures.

Condition (3.10) is the main result of our model. It characterizes the equilibrium hidden debt creation when government borrowing is constrained for any reason and the politicians have the option to disguise part of public expenditures at some cost. We use this result to derive hypotheses for empirical testing. As we show in the Appendix, the comparative statics with respect to the parameters of the model imply:

(3.11) $\quad \frac{\partial x_h^{**}}{\partial \bar{q}} \ge 0, \ \frac{\partial x_h^{**}}{\partial z} \le 0, \ \frac{\partial x_h^{**}}{\partial \eta} < 0, \ \frac{\partial x_h^{**}}{\partial \alpha} > 0, \ \frac{\partial x_h^{**}}{\partial \gamma} > 0$, and $\frac{\partial x_h^{**}}{\partial r} < 0$.

Hidden debt, which is proportional to x_h^{**}, rises as the ceiling on explicit debt (z) goes down or the ability to ensure repayment of explicit debt declines ($\bar{q}$ rises). It also rises when the costs of borrowing (r) and hiding debt (η) decline or when the value of government expenditure rises for the public (α) or for the politicians (γ).

In following section, we develop an empirical methodology for testing these hypotheses. We describe our measure of hidden debt and specify variables that shape the parameters of the model. The tests of the hypotheses will be based on the relationships of those variables with the hidden debt indicator.

4. Empirical Methodology

For empirical assessment of the issues related to hidden debt, we build and analyze a panel dataset, with each unit of observation being a country-year. Data limitations restrict our sample to 43 countries during 1970 and 1997. (The names of these countries are listed below Table 2.) The panel is unbalanced and, after taking account of all the necessary lags, observations per country range between seven and twenty three. The total number of observations in the sample used for regressions is 716. This section describes the variables and the details of the empirical methodology. Table 1 provides summary statistics for all the variables included in our analysis.

The Measure of Hidden Borrowing

The nature of hidden public debt makes its direct measurement very difficult. Our approach is to focus instead on NEBDA, which is the net amount of debt revealed each year from the stock of hidden government liabilities and can be calculated based on available data. For country i in year t, we have:

$$\text{(4.1)} \qquad \text{NEBDA}_{ti} = \Delta B_{ti} + M_{ti} - D_{ti},$$

where B_{ti} is the country's exposed debt at the end of year t, M_{ti} is the reserve money growth, and D_{ti} is the gross deficit (primary deficit plus interest payments) during year t. In other words, NEBDA_{ti} is the increase in the government's total explicit obligations (in form of money and debt) that are not used for deficit financing. Many past studies of fiscal policy have assumed that NEBDA is always equal to zero. But, as we will see below, this is not the case. The excess debt issue measured by NEBDA must be going towards the government's assumption of liabilities that are outside official accounts. To some extent, such liabilities are natural because it is difficult to predict all contingencies in the budget process, and once they occur, it may be easier to just add them to the stock of debt rather than integrating them into the budget. The interesting issue is whether the politicians' incentives also play systematic roles in creating or curbing the situations that lead to off-budget debt creation.

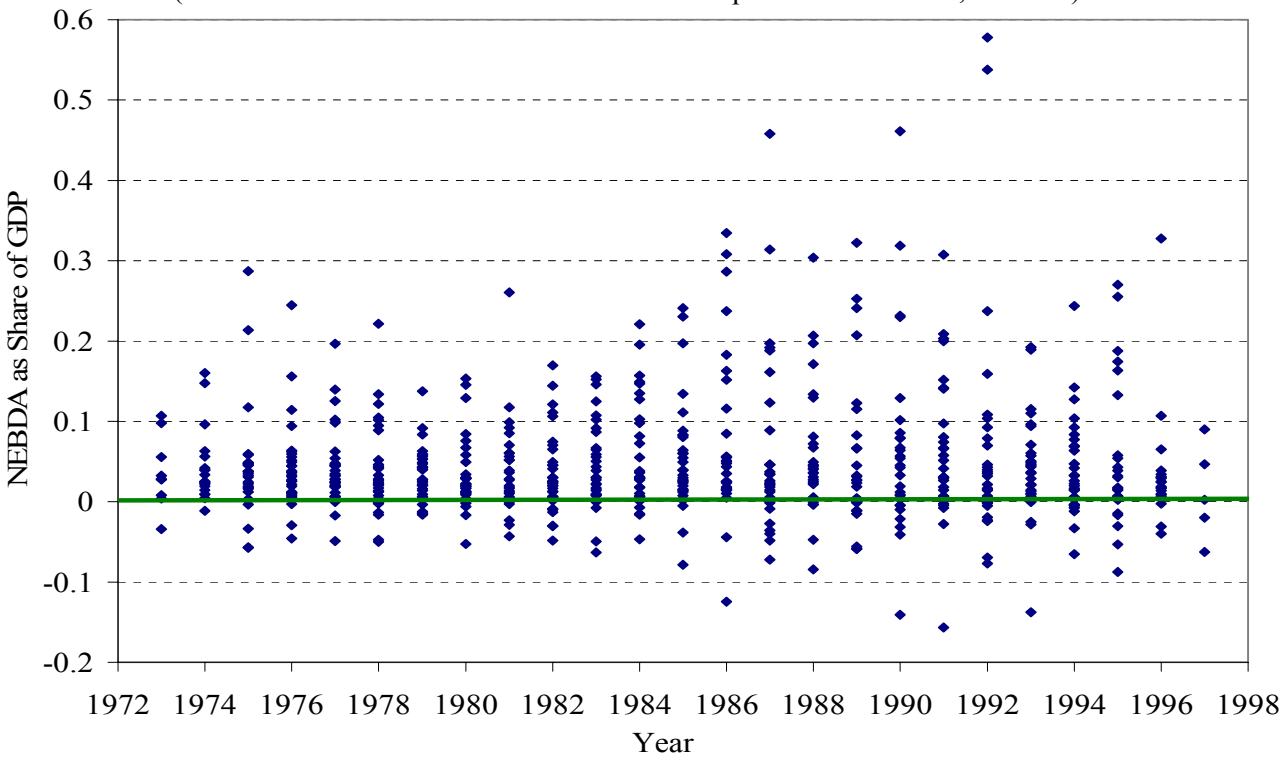
The sources of data for all the indicators that go into the calculation of NEBDA_{ti} are IMF's *Government Financial Statistics* and *International Financial Statistics* and the World Bank's *World Development Indicator 2000 (WDI) CD-Rom*.[8] Figure 1 presents the distribution NEBDA over time for our (panel) sample. Note that NEBDA can be negative because governments have assets as well as debts that are not reflected in their accounts. Such assets can generate revenues or sales proceeds that help retire explicit debt without entering the budget process. Figure 1 shows that while the average NEBDA has not

[8] We treated the IMF sources as primary and supplemented them with data from WDI whenever the latter could fill in information missing from the former. Since the definitions of budget deficits and public debt in these sources are almost the same, combining their data does not cause any compatibility problem.

changed much over the years, its variance has clearly increased since the mid-1980s. This seems to reflect the increased uncertainty in the world economic environment associated with globalization. [We take account of this factor in our empirical work by addressing the implied heteroskedasticity.] It should be pointed out that the data shown in Figure 1 excludes several observations, mostly from Guyana after 1980, which were in the order of 1.0-1.5 times GDP and seemed to be clear outliers. We exclude those observations from our analysis because their presence strengthens our results in a tangible way and may create the impression that those outliers are driving the results. Some of the observations included in the sample may also seem to be outliers, but their exclusion or inclusion has no discernible effect on the outcome and we retain them.

Figure 1. Net Extra-Budgetary Debt Assumption by the Government Over Time

(716 Observations from Unbalanced Panel Sample of 43 Countries, 1973-97)

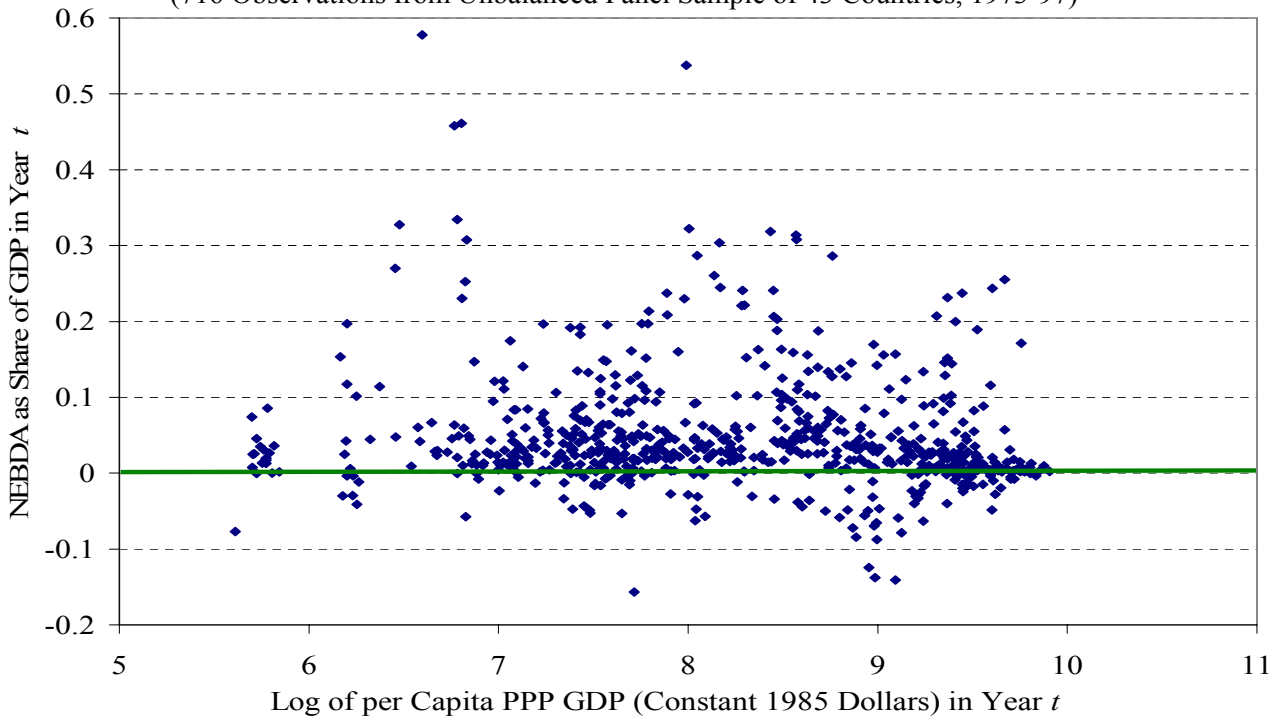


Source: Calculated based on IMF and World Bank data.

To further examine the properties of NEBDA, in Figures 2 and 3 we present its scatter diagrams against the logs of per capita GDP and 1+debt/GDP. Figure 2 shows that there is some tendency for lower income countries to have larger NEBDAs. However, the tendency is weak and, in fact, econometrically undetectable once we control for the factors identified by the theoretical model. Figure 3 shows that there is a more discernible positive association between NEBDA and debt-GDP ratio. This relationship is confirmed in our econometric work and provides support for the theoretical results derived above.

Figure 2. Net Extra-Budgetary Debt Assumption by the Government vs. Real Per Capita GDP

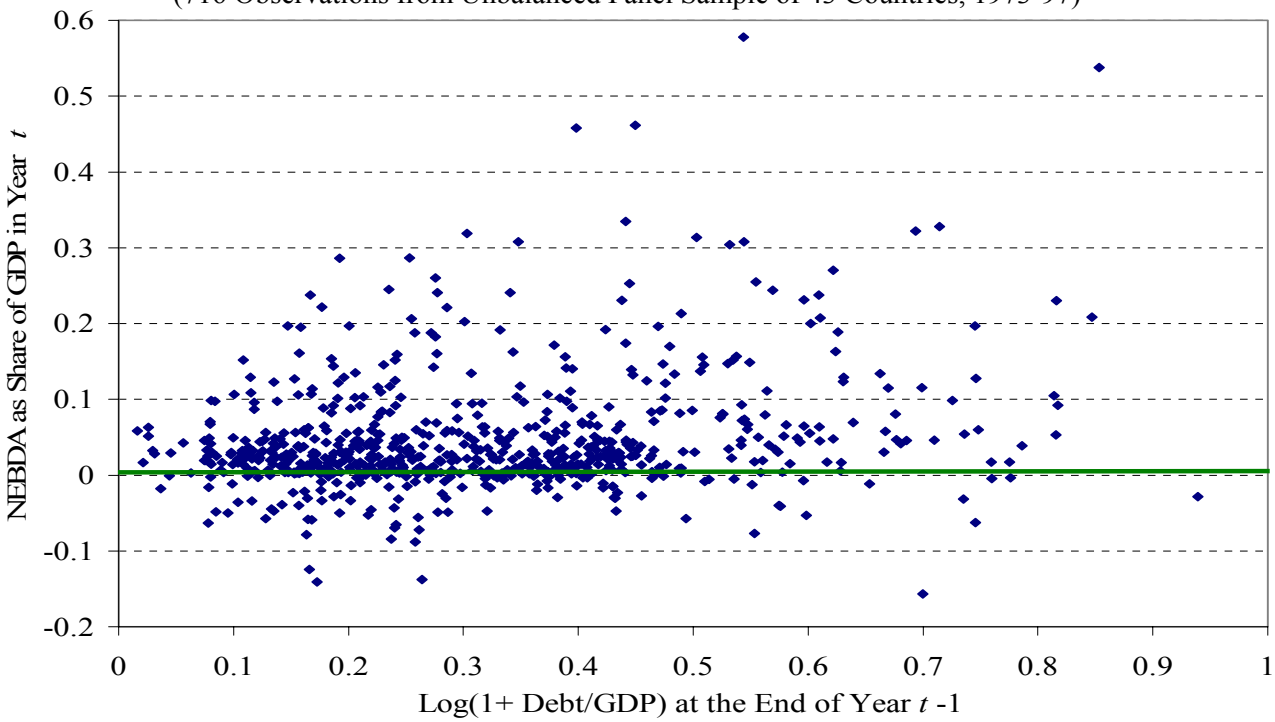
(716 Observations from Unbalanced Panel Sample of 43 Countries, 1973-97)



Source: Calculated based on IMF and World Bank data.

Figure 3. Net Extra-Budgetary Debt Assumption by the Government vs. Log of Debt-GDP Ratio

(716 Observations from Unbalanced Panel Sample of 43 Countries, 1973-97)



Source: Calculated based on IMF and World Bank data.

To be able to use the model of section 3 for analyzing NEBDA, we need to make some assumptions about the rate at which hidden debt becomes exposed. If the rate of revelation were independent of the determinants of the stock of hidden debt, then we could ignore that factor altogether. However, this is unlikely to be the case. In fact, it is likely that the factors that raise hidden debt tend to slow down its revelation as well. To overcome the consequences of this problem, we assume that the effects of the determinants of the stock of hidden debt on the revelation rate of the debt do not completely counteract the effects of those determinants on the stock itself. In other words, we assume that the net effects of those factors on NEBDA are in the same direction as the ones on the stock of debt. This allows us to proceed with the examination of the determinants of NEBDA based on the theoretical insights of section 3. Since the variations in the rate of revelation are likely to dampen the effects on the stock, if empirical results from the study of NEBDA agree with our hypotheses concerning the stock of hidden debt, we can interpret them as strongly favorable evidence. In the rest of this section, we lay out our empirical methodology for testing the model of section 3 based on this approach. To ensure that NEBDA is comparable across countries, we scale it by its corresponding GDP. We denote this new variable as c_{ti}.

The Explanatory Variables and Operational Hypotheses

To test the results obtained in section 3, we need to specify the actual variables that can proxy for the parameters of the model and, then, examine their relationships with c_{ti}, which represents x_h^{**}. Let's start with the proxies for $\overline{q}$. The first variable that we consider for this purpose is the "contract repudiation" index available from the *International Country Risk Guide* (ICRG) dataset (see Knack and Keefer, 1995).[9] This index ranges between 0 and 10, with higher scores indicating lower risks of modification in government contracts in the form of repudiation, postponement, and the like, which translate into lower levels of $\overline{q}$. To reflect the improvement in institutional quality associated with higher values of this index, we will refer to it as *contract reliability*. Our hypothesis is that the *contract reliability* is *negatively* related to c_{ti}. It is possible that lacking credibility in contracting may also raise the cost of arranging hidden debt and result in the opposite effect. However, the *contract reliability* index reflects situations concerning formal and explicit contracts, while disguised debt deals are often arranged through informal relationships, which seem to be more readily available in environments where formal contracts are less reliable. For this reason, we expect the stated hypothesis to hold. In any event, if the impact of *contract reliability* on the cost of hidden loans is in fact large and the data still shows a negative

[9] ICRG dataset is available from the early 1980s. To take advantage of a longer time span, we extrapolated this data to the early 1970s with the help another data set, BERI, which offers similar indicators, though for a more limited number of countries.

relationship between that variable and c_{ti}, the result should be taken as even a stronger support for the hypothesis concerning the role of factors that tighten the explicit borrowing constraint by lowering $\overline{q}$.

Another variable that should affect the tightness of the constraint on explicit borrowing is the initial level of exposed public debt as a share of GDP. Other things equal, a more indebted government is likely to have less to offer by way of debt repayment in the future (i.e., have a higher $\overline{q}$) and, thus, face a tighter debt limit in the formal credit markets. This should increase the politicians' incentive to seek hidden debt. Therefore, c_{ti} is expected to be *positively* related the *debt-GDP ratio* in years prior to *t*.

Finding data for the variables that form *z*—i.e., the borrowing constraint originating from outside the financial market—is difficult. The main factor that we consider in this category is the IMF standby programs.[10] Based on the information available from IMF's *Annual Reports*, we create six dummies for these agreements to identify the stage of the program in each country during each year. One dummy indicates whether a given country has initiated a standby program during a given year or not. The second dummy points to the last year of the program. [When the length of a program is one year to less, that year is counted as both the first year and the last year of the program. When there are consecutive programs in a country without interruption, we treat them as a single program.] The third dummy takes the value of 1 if the country is under the middle years of a program (not the first or the last), otherwise the dummy is 0. The other three dummies indicate the year before and the first and the second years after the end of each program. If IMF programs act as simple constraints on budget deficit and total spending without closing off disguised borrowing channels (that is, they only lower *z*), we should observe c_{ti} to rise after the first year of the program, peak in the first year after the end the program, and decline afterwards.

The reason for this pattern is as follows. Most hidden liabilities, especially the kinds that are supposed to evade IMF monitoring, should take at least a year to become exposed. This causes a delay in the rise of c_{ti} in response to the standby program. Once standby constraints are over, the government can enjoy more explicit borrowing and spending, so it does not need to resort to hidden debt mechanisms. It may also come to acknowledge some of the hidden debts accumulated under the program. These effects account for the peak and later decline of c_{ti} after the program ends. If, on the other hand, standby programs have strong safeguards against hidden debt and raise the cost of arranging them is sufficiently high to ensure fiscal discipline (that is, if they raise η), one may observe a rise in c_{ti} early in the program or even before that as the IMF gets the government to clean up its accounts. But, after that initial stage, c_{ti}

[10] IMF has other programs that are complementary to the standby agreements. We experimented with dummies for those programs as well, finding little difference in the outcome. In the empirical results that we present here we focus standby agreements because they seem to be the most important aspect of IMF involvement in countries.

should decline as opportunities for hidden debt creation are curtailed. This process should bottom out in the year after the end the program when IMF supervision is removed and the government regains its earlier flexibility to raise hidden debt.

Among the factors that shape the cost of arranging hidden debt, η, beside the effects of standby programs, the most important seems to be the extent of government intrusion in markets. We use the *black market premium on the foreign exchange rate* to represent this factor and expect it to be *positively* related to c_{ti}. The premium, which is available from a database compiled by the Global Development Network, is calculated by dividing the difference between the black market exchange rate and its official counterpart by the official exchange rate. If there is no black market, this variable equals zero. Extensive foreign exchange market interventions are typically accompanied by (and are, therefore, indicative of) deep interventions elsewhere in the economy. Such interventions, of course, are likely to matter more when the economy is more industrialized because there are few resources for funding hidden debts in a traditional and mostly self-sufficient economy. For this reason, we experiment with the interaction of the black market premium with the *share of agriculture in GDP* (available from the WDI) and expect this interaction to have a *negative* effect on c_{ti}. However, the overall effect of the black market premium, after taking account of this interactive term, should still be positive.

Another indicator of intervention is the share of state-owned enterprises (SOEs) in the economy. Unfortunately, there are very limited data on this variable. We experiment with the share of state-owned enterprises in GDP, available from WDI. Using the share of those enterprises in the economy-wide investment yields similar results. It should be kept in mind that these indicators also reflect the government's implicit assets and may not necessarily be associated with higher net hidden debt.

Parameter α represents the value of public expenditure, which is not easy to measure across countries. However, the degree of *openness* that affects the demand for public expenditure as a source of social insurance can be used as a proxy (Rodrik, 1998). If this is indeed the case, *openness* should be *positively* related to c_{ti}.[11] We measure *openness* by the share of imports plus exports in GDP from WDI database.

For the excess valuation of public expenditure by the government, γ, the discussions in sections 2 and 3 suggest a host of determinants. These include indicators of *legislative fractionalization* and *political*

[11] It is possible that the greater access to international capital markets in more open economies may lead to less need for hidden debt. This effect would tend to dampen the positive impact of *openness* on c_{ti} through increased demand for public expenditure. Thus, if we observe a significant positive coefficient for *openness*, it would confirm the strength of the latter effect.

division in the government, which are expected to be positively related to NEBDA. To measure *fractionalization*, we use an index available from the *Database of Political Institutions* or DBPI (Beck et al., 1999) that consists of the probability that two randomly selected deputies in the legislature belong to two different parties.[12] The *political division* index, also available from DBPI under the name "political cohesion," is based on the criteria proposed by Roubini and Sachs (1989). In presidential systems, the *political division* index equals 0 when the same party controls the executive and legislature and equals 1 otherwise. In parliamentary systems, the index equals 0 when there is a one-party majority government, equals 1 when the government is a coalition with two parties, equals 2 if coalition government with three or more parties, and equals 3 if there is a minority government.[13]

As discussed in section 2, the politicians' preference for government spending (γ) may rise before elections. Because increases in explicit deficit or taxation may have negative effects on the voters' support for the incumbent politicians, the incentive for hidden debt creation is likely to strengthen during election times. If this is the case, one should observe a rise in c_{ti} at the end of an election year and its aftermath. To test this hypothesis, we employ DBPI's *executive election* dummy and its lagged values.

Decentralization may also be viewed as another determinant of γ, with effects similar to fractionalization. However, as the literature review in section 2 suggests, the impact of decentralization on fiscal policy is more mixed and may depend on factors that are not yet very well understood. The impact on disguised debt is also theoretically unclear. We examine this issue in our empirical work to see if some regularity can be observed. For this purpose, we employ a *decentralization* index available from DBPI. It takes a value of 2 for countries where there are both executive and legislative elections at sub-national levels of government and a value of 1 for countries where there is only one of those two types of elections. It is equal to 0 for all other countries.

Finally, the comparative statics in (3.11) suggest that hidden debt should decrease as the interest rate rises and makes borrowing generally more costly. We proxy this variable with two possible candidates: the real domestic lending interest rate and the real international interest rate (LIBOR), both from WDI. The former is obviously closer to the kind of measure one wants for this purpose, but it is

---

[12] DBPI data starts with year 1975. For a limited number of countries that have data for all other variables, we extrapolated DBPI variables backward to the early 1970s, largely based on information available from Arthur Banks' *Cross-National Time Series Data Archive*. In a few cases we used other country sources for this purpose.

[13] We also experimented with a measure of *polarization* from the same dataset. This index is largest absolute distance between two veto players in the policymaking process when all veto players are assigned scores of 1 if they are left-leaning, +1 if they are right-wing, and 0 if they are centrist. This index did not produce any significant result.

available for only a limited group of countries. Therefore, for the most part, we will rely on real LIBOR, which, as we will see, turns out to be a reasonable proxy.

The Econometric Model

To test empirically the above hypotheses, we need to examine the dynamic evolution of c_{ti}. For this purpose, we set up an error-correction model with the following basic structure:

$$(4.2) \quad \Delta c_{ti} = \lambda \Delta c_{t-1,i} - \alpha_{ti}(c_{t-1,i} - c^*_{t-1,i}) + \phi' \Delta c^*_{t-1,i} + s_{ti} + \varepsilon_{ti},$$

where Δ is the first difference operator, c^*_{ti} is the steady state value of c_{ti} in year t for the set of conditions prevailing in country i in that year, α_{ti} is the speed of adjustment of c_{ti}, again given country conditions at the time, s_{ti} is the effect of observable transitory determinants of c_{ti}, and λ and ϕ are coefficients. ε_{ti} is a random variable, which may not be *i.i.d*. The terms on the right-hand side with lagged first-differences of c_{ti} and c^*_{ti} reflect the transitory effects of changes in these variables. Equation (4.2) specifies only one lag for these transitory effects. One can add additional lags to take account of possible longer lasting effects. In our empirical work, additional lags did not show much significance and led us to focus on the one-lag equation described in (4.2).

We specify the relationship of c^*_{ti} with the vector of institutional and economic characteristics of country i in year t, Z_{ti}, that shape it as a linear expression:

$$(4.3) \quad c^*_{ti} = \beta' Z_{ti},$$

where β is a coefficient vector. For testing our hypotheses, we take Z_{ti} to consist of the determinants of hidden debt (discussed in the previous subsection) that have a long-term nature. This essentially leaves out the dummies for elections and the IMF programs, which are transitory and must be included in the expression for s_{ti}. We also include country fixed effects in Z_{ti} to reduce possible biases due to the omission of potentially relevant variables.

We treat α_{ti} as another linear function of country characteristics, but the choice of the variables in this case is not guided by theory. Our main reason for allowing α_{ti} to vary with country conditions is to avoid bias in the estimates of β in case the variables in Z_{ti} play a role in the intensity of short-run dynamics and their effects can show up in the estimate of β if those roles are ignored. For this reason, we experiment with all the variables included in Z_{ti}, but for parsimony purposes we keep only the ones that prove statistically significant. We do not include fixed effects in the expression for α_{ti} because this causes identification problems and does not matter for the main results. The parameters λ and ϕ can be treated as functions of country characteristics as well. We experimented with such specifications, but did not find any of the characteristics considered for the analysis to have much significance in those functions.

The formulation of equation (4.2) allows for country heterogeneity both in steady state and in response to the deviations from the steady state. The importance of such heterogeneity has been well recognized for economic growth (Lee, Pesaran, and Smith, 1997 and 1998; Canning and Pedroni, 1999). However, the approach in growth studies has been to estimate country-specific convergence rates based on panel data, assuming that there are no steady-state fixed effects. Due to the relatively short time span of country data, that method essentially generates information about the distribution of the convergence rate and helps deal with the biases that may arise if heterogeneity is ignored. But, it does not allow one to identify the factors that cause variations in α_{ti}.[14] Moreover, the framework requires one to assume that the α_{ti} is time-invariant for each country, even though there are changes in country conditions over time. Our approach specifies both the convergence rate and the steady state as functions of country characteristics, taking only the parameters of such functions as constant. This allows for the direct estimation of the impact of various factors on the convergence rate and the steady state.

The econometric method that we use for estimating (4.2) is non-linear least squares, with standard errors calculated based on the Newey-West heteroskedasticity and autocorrelation robust (HAC) technique. The latter feature deals with heteroskedasticity and autocorrelation problems that cannot be ruled out for ε_{ti}. We also use an instrumental variables method to deal with simultaneity and measurement error problems for some of the right-hand side variables. Because of the nonlinearity of the model, we create an instrument list that includes all the right-hand side variables as well as the interactions of those in α_{ti} and Z_{ti}, with instruments replacing the original variables when one is needed.

The right-hand side variables that need instruments are all those that are related to Δc_{ti} by calculation and all the six standby program dummies. The former group includes $c_{t-1,i}$, $\Delta c_{t-1,i}$, and the beginning of the year debt-GDP ratio, which we instrument by their lagged values. The indicators of the standby program cycle need instruments because IMF programs come about as a result of unsustainable fiscal situations, which may include excessive hidden debt creation. To come up with instruments in this case, we use the findings of Przeworski and Vreeland (2000), who show that lagged legislative elections and smaller number of concurrent standby program around world increase the probability of a standby agreement for each given country in given year. The role of legislative elections seems to be due to the fact that "governments are more likely to enter into agreements with the IMF early in their electoral terms, hoping that the stigma of signing an agreement will be forgiven or forgotten [by the electorate] before the next elections" (Przeworski and Vreeland, 2000: 394). The number of standby agreements around the world affect the chances of initiating one in a particular country due to the IMF's budget limitations and its

[14] One could regress the estimated country-specific convergence rates on country characteristics, but such a method

internal incentives that encourage signing on more countries when the number of on-going programs are low. We use these two variables and their one-year and two-year lag values as instruments for the standby program dummies.[15]

Another econometric issue is the potential non-stationarity of the variables in the equation. If some of the variables are non-stationary, our estimation may encounter the problem of spurious regression. Because some of the variables included in the error correction term, $c_{ti} - \beta' Z_{ti}$, seem to be non-stationary, we followed Davidson and MacKinnon (1993) and Pedroni (1999) and used the *t*-values from the augmented Dickey-Fuller test to examine the cointegration among those variables. The test showed that the cointegration hypothesis could be maintained, justifying our estimation procedure.

5. Empirical Results

Table 2 reports our main results. Column 1 in this table shows the outcome of a basic OLS estimation of equation (4.2). Column 2 applies instruments to the variables that need one according to the above discussion. Column 3 introduces country fixed effects to take account of factors that are left out or are unobservable. The only variable that consistently showed significance in the convergence rate expression was the debt-GDP ratio, which we include in all regressions. A quick comparison of the three columns shows that addressing simultaneity and measurement matters for the size of the estimated coefficients and their significance levels. Taking account of fixed effects also matters, particularly for the convergence rate and the debt-GDP ratio in the steady state expression.

Focusing on column 3 of Table 2, which offers the most reliable estimate, first note that the convergence rate is always positive and significant. Its magnitude is also quite large, ranging from 0.35 to 1.13, which shows that deviations from the steady state die out quickly, especially when the debt-GDP ratio is large. These high rates are consistent with the fact that the transitory effects of changes in c_{ti} and c^*_{ti} have no significance beyond the lag of one-year. The rapid convergence shows that most hidden debt arrangements are not very long term. The positive association of the rate with the debt-GDP ratio may indicate that governments tend to face a more critical fiscal situation when exposed debt is high, hence finding it necessary to be more responsive to excessive revelation of hidden liabilities as well as opportunities for disguising debt.

---

would be noisier than the method of direct inclusion of country conditions in convergence rates employed here.

[15] Note that these instruments are aided by the cross-product terms in the instrument list that arise due to the nonlinear nature of the model. We also used these cross-products to check whether the current elections dummy introduced as part of s_{ti} has an endogeneity problem, which turned out not to be the case.

The estimated coefficients for the steady-state expression in column 3 show that the exposed *debt-GDP ratio* has another significant impact beyond its role in the convergence rate as well. The positive coefficient of this variable in the steady-state expression shows that governments respond to higher exposed debt by hiding more liabilities. This conforms to our claim that, other things equal, a larger debt burden implies a tighter constraint on explicit borrowing and a greater pressure to resort to disguised expenditures. The *contract reliability* index also has its predicted negative effect, showing that the flexibility to borrow more in explicit markets reduces the need for arranging off-budget expenditures.

The *black market premium* and its interaction with the *share of agriculture in GDP* are both significant and carry their expected signs. These two terms show that hidden liability creation depends on the ease with which the government can arrange disguised expenditure and debt. More interventionist governments generate more hidden debt, especially when the economy has more developed markets and resources. The expression that multiplies the black market premium—that is, 0.0882 –0.1559×(share of agriculture)—is positive for the entire sample except for three observations with share of agriculture above 0.57 where it is practically zero. Moreover, this coefficient is significantly different from zero at the 5 percent level for 95 percent of the sample, where the share of agriculture is less than 0.45.

Openness of the economy in terms of share of exports and imports in GDP also has a positive effect on NEBDA. Our explanation for this effect is that openness raises the demand for public expenditure as a means of social insurance.

The estimates for the last two terms in the steady-state expression in column 3 of Table 2 show that *fractionalization* and *political divisions* in the government both tend to raise NEBDA, though the statistical significance of the latter variable is marginal. The signs of the two coefficients are in line with the results of earlier studies of fiscal policy, which find that fractionalization and political divisions tend to raise government expenditure and the extent of indebtedness. Our theoretical and empirical analysis show that, controlling for other factors, the higher demand for spending translates into larger hidden public debt.

Elections also have a positive effect on c_{ti}, though their impact may be of shorter duration. As the estimates for the transitory factors indicate, the rate at which hidden debt is revealed rises in election years and possibly in the year immediately following. This suggests that incumbent politicians tend to incur hidden expenditures during election years, which they turn into extra-budgetary debt at the end of those years or soon after.

The role of IMF standby programs is an interesting aspect of the estimation outcome. The coefficients of the dummies for various parts of the program cycle show a clear pattern: NEBDA rises on

average by about 7%-8% of GDP before or during the early years of a typical standby program, becomes steady during the last year, and declines by about 6% of GDP after the program is over. As we have argued in the previous section, this must be interpreted as a temporary cleaning up effect during standby programs in which the IMF obliges the government under a program to make its accounts more explicit, leaving less hidden debt to be revealed in the end. These effects, however, do not seem to be permanent because when we added the end of the program dummy with more lags, it showed no significance. Indicators of the past history of dealings with the IMF (e.g., the total years spent under standby programs and the number of past programs or agreements signed) are also insignificant.

Returning to the steady state expression, the coefficient of the real LIBOR is negative as predicted, but its significance level is low. When we replaced this variable with the real domestic lending rate, the coefficient became highly significant, as the first column of Table 3 shows. Interestingly, the magnitudes of the coefficients of the two interest rates are remarkably similar (about –0.004). Since the sample size is much larger when we use the real LIBOR (43 countries as opposed to 34), we decided to rely on that variable for most of our regressions. However, we note that despite the change in the sample size, the coefficient estimates are similar in the two regressions (in column 1 of Table 3 and column 3 of Table 2). This is also largely true when column 3 of Table 2 is compared with column 3 of Table 3, where the sample size is even smaller due to the introduction of the SOE variable. The levels of significance are, of course, lower for many of the estimates based on the smaller samples. But, the general stability of coefficient estimates adds credence to the robustness of the results.

The second and third columns of Table 3 show the results of for the role of decentralization and SOE size. Decentralization has a positive coefficient and SOE size a negative one, but neither variable shows any significance.[16] This may reflects the conflicting effects that these variables have on hidden debt creation, as discussed above. Using the share of SOEs in total investment rather than GDP yields a similar result with a negative, but insignificant coefficient. But, the size of the coefficient is much larger, suggesting that the investment share may indicate the role of SOE assets in NEBDA more closely.

Finally, we examined whether GDP growth might help reduce the share of hidden debt in GDP, either in the steady state or as a concurrent temporary shock. For this purpose, we added the growth rate of per capita constant-price GDP to both $Z_{t-1,i}$ and s_{ti} expressions with appropriate lagging in the former. Because GDP growth enters the calculation of c_{ti}, we instrumented these terms with two and three year

[16] We also used an alternative index for decentralization, available from the Polity III dataset (Jaggers and Gurr, 1996), which equals 0 for unitary systems, 2 for federal systems, and 1 for those that have mixed features. This index had a negative sign, but it was again insignificant.

lagged values of GDP growth. The concurrent GDP growth in s_{ti} always had a negative coefficient, which indicated possible beneficial effects of favorable macroeconomic shocks. However, the coefficient did not reach much statistical significance. In the steady-state expression, GDP growth had no significance or consistency. These results emerged even when no instruments were used for GDP growth.

6. Conclusion

Government budgets are highly complex and difficult to track. Politicians are also often reluctant to make government accounts transparent, either because it is difficult for them to do so or because they prefer to shield part of their activities from public scrutiny. These factors give rise to hidden liabilities that sometimes come to undermine fiscal and macroeconomic performance. Understanding the factors that increase or decrease off-budget liabilities or their exposure rates is important for designing preventive measures and for enhancing transparency and predictability in government finances around the world. The theoretical and empirical analysis of this paper offers important insights in this regard.

Our results show that the forces that tend to raise the demand for public spending—such as fractionalization and political divisions in the government, election concerns of incumbent politicians, and increased needs for social insurance—also motivate the politicians to resort to disguised expenditure and debt as a way of alleviating constraints on explicit borrowing. We also find that hidden debt rises with the tightness of such constraints resulting from a large pre-existing public debt or from lack of government credibility. The factors that lower the cost of arranging off-budget debts such as extensive market interventions further contribute to the creation of larger stocks of hidden liabilities. These findings suggest that the hidden public debt phenomenon is indeed driven by the efforts of politicians to evade fiscal constraints imposed on the government by public pressure, institutional requirements, financial markets, etc. This implies that reaching fiscal discipline requires institutional arrangements that curb the politicians' use of hidden debt mechanisms. An important insight of our analysis in this respect is that the form and extent of government intervention in markets matter for the politicians' ability to incur disguised expenditures and liabilities. This aspect of interventions requires more attention in policy assessments and is a subject worth studying in more detail.

An interesting outcome of our study is evidence on the performance of IMF standby programs from a crucial, yet understudied, point of view. Although the main aim of IMF programs is to bring about fiscal sustainability, most hard evidence generated by their critiques has pointed to their negative effects in other respects (Przeworski and Vreeland, 2000; Bird, 2001). Our analysis in this paper concerns the fiscal discipline issue: Do standby programs ensure that their limits on explicit spending and borrowing are not undermined by off-budget government activities? Do they entail sufficient monitoring of fiscal operations to curb disguised liability creation? Our empirical results suggest that the monitoring function

of standby programs is strong and the costs that it imposes on off-budget spending ensure that the stock of hidden debt tends to decline towards the end of the program. In this sense, standby programs are successful in bringing about fiscal discipline as long as they last. IMF programs may have adverse effects in the form of slow growth or increased inequality, but they do seem to discourage opaque government expenditures. However, our evidence does not show that the measures applied by the IMF lead to fiscal adjustment on a more permanent basis.

Lastly, it is worth noting that the conformity of the various effects derived from our theoretical framework with the estimation results offers support for the usefulness of NEBDA as a proxy for hidden public debt. The regressions show that this indicator is capable of generating meaningful results that help disentangle a variety of effects on hidden debt. The concept can also be useful for improving research on fiscal policy by highlighting the difference between budgetary deficit and the actual deficit that a government runs. However, more work needs to be done to separate the role of stock of hidden debt from its revelation rate. There is also a clear need to collect information about the specifics of budget procedures that influence the costs and benefits of hidden debt. Identifying such factors and documenting their roles can play an important role in offering lessons for practical policy steps that help improve budget discipline.

Appendix: Derivation of Comparative Statics Results

In this appendix we derive the results given in equation (3.11) from equation (3.10). Let us start with $\partial x_h^{**}/\partial z \le 0$. This result follows from the observation that when $z > m$, then this derivative is equal to zero and when $z \le m$, it is equal to $-1/(1+\eta) < 0$. A similar observation proves $\partial x_h^{**}/\partial \overline{q} \ge 0$. In this case, the derivative is zero when $z \le m$, and equals $1/[\varphi(1+r)(1+\eta)] > 0$ when $z > m$. To see why $\partial x_h^{**}/\partial \alpha > 0$, note that y'' is always negative and, therefore,

$$\text{(A.1)} \qquad \frac{\partial x_h^{**}}{\partial \alpha} = \frac{-\gamma}{(1+r)^2(1+\eta)^2\delta y''} > 0 \qquad \text{when} \quad z \le m,$$

$$\frac{\partial x_h^{**}}{\partial \alpha} = \frac{-\gamma}{\varphi(1+r)^2(1+\eta)^2\delta y''} > 0 \qquad \text{when} \quad z > m.$$

The derivation of the result for γ is very similar to (A.1), with α substituting for γ in the numerator. To sign the derivative of x_h^{**} with respect to η, note that

$$\text{(A.2)} \qquad \frac{\partial x_h^{**}}{\partial \eta} = \frac{1 - y' - (1+\eta)(1+r)x_h y''}{(1+r)(1+\eta)^2 y''} < 0 \qquad \text{when} \quad z \le m,$$

$$\frac{\partial x_h^{**}}{\partial \eta} = \frac{1 - y' - (1+\eta)(1+r)x_h y''}{\varphi(1+r)(1+\eta)^2 y''} < 0 \qquad \text{when} \quad z > m.$$

Finally, $\partial x_h^{**}/\partial r < 0$ can be derived in a symmetric fashion by substituting r for η and vice versa.

References

Alesina, Alberto, Ricardo Hausmann, Rudolf Hommes, and Ernesto Stein. 1999. "Budget Institutions and Fiscal Performance in Latin America," *Journal of Development Economics,* 59: 253-273.

Alesina, Alberto, and Roberto Perotti. 1999. "Budget Deficits and Budget Procedures," in Poterba and von Hagen (1999): 13-57.

Alesina, Alberto, Nouriel Roubini, and Gerald D. Cohen. 1997. *Political Cycles and the Macroeconomy*, Cambridge, Massachusetts, MIT Press.

Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. 1999. *New tools and new tests in comparative political economy: The Database of Political Institutions*, Computer file, Compiled by Development Research Group, World Bank.

Bird, Graham. 2001. "IMF Programs: Do They Work? Can They Be Made to Work Better?" *World Development,* 29.11: 1849-1865.

Canning, David, and Peter Pedroni. 1999. "Infrastructure and Long Run Economic Growth," Paper presented at the 1999 Econometric Society Summer Meeting, Madison, Wisconsin.

Coes, Donald V. 1995. *Macroeconomic Crises, Policies, and Growth in Brazil, 1964-90*. Washington, DC: The World Bank.

Davidson, Russel, and James G. MacKinnon. 1993. *Estimation and Inference in Econometrics*, New York, Oxford University Press.

Easterly, William. 1999. "When is Fiscal Adjustment an Illusion?" *Economic Policy*, 14: 55-86.

Jaggers, Keith, and Ted Robert Gurr. 1996. *Polity III: Regime Type and Political Authority, 1800-1994*, Computer file, Boulder, CO.

Joulfaian, David, and Michael L. Marlow. 1991. "The Relationship Between On-Budget and Off-Budget Government," *Economic Letters*, 35: 307-310.

Knack, Stephen, and Philip Keefer. 1995. "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures," *Economics and Politics*, 7.3: 207-227.

Lee, Kevin, M. Hashem Pesaran, and Ron Smith. 1997. "Growth and Convergence in a Multicountry Empirical Stochastic Solow Model," *Journal of Applied Econometrics*, 12: 357-392.

Lee, Kevin, M. Hashem Pesaran, and Ron Smith. 1998. "Growth Empirics: A Panel Data Approach – A Comment," *Quarterly Journal of Economics*, 113: 319-323.

Pedroni, Peter. 1999. "Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors," *Oxford Bulletin of Economics and Statistics*, 61.S1: 653-670.

Persson, Torsten, and Guido Tabellini. 2000. *Political Economics: Explaining Economic Policy*, Cambridge, MA: MIT Press.

Polackova, Hana. 1998. "Government Contingent Liabilities: A Hidden Risk to Fiscal Stability," World Bank Policy Research Working Papers, No. 1989.

Political Risk Services. 1997. *International Country Risk Guide Data, 1982-95*, Computer file, Syracuse, NY. Compiled by IRIS Center, University of Maryland, 1997.

Poterba, James M., and Jürgen von Hagen (eds.). 1999. *Fiscal Institutions and Fiscal Performance*. Chicago: University of Chicago Press.

Przeworski, Adam, and James R. Vreeland. 2000. "The Effect of IMF Programs on Economic Growth," Journal of Development Economics, 62: 385–421.

Prud'homme, Remy. 1995. "On the Dangers of Decentralization." *The World Bank Research Observe*r, 4: 201-210.

Rodrik, Dani. 1998. "Why Do More Open Economies Have Bigger Governments?" *Journal of Political Economy*, 106.5: 997-1032.

Roubini, Nouriel and Jeffrey D. Sachs. 1989. "Political and Economic Determinants of Budget Deficits in the Industrial Democracies," *European Economic Review*, 33: 903-938.

Shah, Anwar. 1998. "Fiscal Federalism and Macroeconomic Governance: For Better or For Worse?" World Bank Working Paper. Washington, DC: The World Bank.

Tanzi, Vito. 1996. Fiscal Federalism and Decentralization: A Review of Some Efficiency and macroeconomic Aspects," *Annual World Bank Conference on Development Economics, 199*5. Washington, DC: The World Bank: 295-316.

Velasco, Andres. 1999. "A Model of Endogenous Fiscal Deficits and Delayed Fiscal Reforms," in Poterba and von Hagen (1999).

Table 1: Summary Statistics of the Variables Used in the Regression

Explanatory Variables:	Mean	Median	Maximum	Minimum	Std. Dev.	No. of Obs.
NEBDA	0.047	0.027	0.578	–0.157	0.075	716
Real LIBOR	3.297	3.920	7.380	–1.870	2.495	716
Debt-GDP Ratio	0.396	0.333	1.558	0.016	0.252	716
Contract Reliability	6.695	6.596	10.000	2.000	1.947	716
Black Market Premium (BMP)	0.268	0.033	42.636	–0.100	1.829	716
BMP × GDP Share of Agric.	0.107	0.003	24.448	–0.033	1.025	716
GDP Share of Agriculture	0.158	0.120	0.597	0.002	0.137	716
Openness	0.779	0.612	4.234	0.063	0.623	716
Fractionalization	0.620	0.608	1.000	0.000	0.290	716
Political Division	0.489	0.000	3.000	0.000	0.801	716
Decentralization	0.747	1.000	2.000	0.000	0.820	716
Real Lending Interest Rate	4.273	4.886	38.164	–49.956	8.328	479
GDP Share of SOEs	0.115	0.089	0.482	0.006	0.096	403

Table 2: Estimation Results for Equation (4.2)

Dependent Variable: First Difference of Net Extra-Budgetary Debt Assumption by the Government
(*p-Values Based on Newey-West HAC Standard Errors*)

Model	**Basic OLS**		**2SLS Pooled Regression**		**2SLS Fixed Effects**	
Explanatory Variables:	**Coefficient**	*p-Value*	**Coefficient**	*p-Value*	**Coefficient**	*p-Value*
Speed of adjustment						
Constant	0.1372	*0.193*	–0.2482	*0.009*	0.3429	*0.008*
Debt-GDP Ratio	0.4572	*0.002*	1.2525	*0.000*	0.5074	*0.002*
Steady-State Expression						
Constant	0.1213	*0.475*	0.0338	*0.552*	0.0736	*0.261*
Real LIBOR	0.0028	*0.763*	–0.0025	*0.638*	–0.0040	*0.123*
Debt-GDP Ratio	–0.1469	*0.113*	0.0098	*0.830*	0.0642	*0.041*
Contract Reliability	–0.0368	*0.020*	–0.0144	*0.023*	–0.0155	*0.025*
Black Market Premium (BMP)	0.1060	*0.099*	0.2061	*0.074*	0.0882	*0.045*
BMP × GDP Share of Agric.	–0.0891	*0.450*	–0.3419	*0.102*	–0.1559	*0.044*
Openness	0.1511	*0.002*	0.0734	*0.000*	0.0470	*0.029*
Fractionalization	0.2386	*0.010*	0.0876	*0.033*	0.0794	*0.020*
Political Division	–0.0052	*0.543*	0.0005	*0.972*	0.0106	*0.103*
Transitory Factors **						
Executive Elections	0.0106	*0.032*	0.0146	*0.011*	0.0103	*0.056*
Lagged Executive Elections	0.0084	*0.062*	0.0076	*0.189*	0.0059	*0.264*
Standby Program Dummies						
Year Before Start	0.0120	*0.210*	0.0111	*0.859*	0.0755	*0.033*
First Year	0.0513	*0.004*	0.0098	*0.866*	0.0818	*0.165*
Other Years	0.0329	*0.014*	0.1004	*0.123*	0.0776	*0.020*
Last Year	–0.0063	*0.663*	0.1234	*0.048*	–0.0214	*0.681*
First Post-Program Year	–0.0024	*0.831*	–0.0884	*0.092*	–0.0560	*0.017*
Second Post-Program Year	–0.0101	*0.313*	–0.0199	*0.121*	–0.0206	*0.185*
R^2	0.3745		0.0778		0.3317	
Adjusted R^2	0.3490		0.0513		0.2705	
Number of Observations	716		716		716	

* 43 countries included: Australia, Bahamas, Bahrain, Botswana, Canada, Chile, Costa Rica, Cyprus, El Salvador, Ethiopia, Ghana, Greece, Guatemala, Guyana, Hungary, Iceland, India, Indonesia, Jordan, Korea, Malaysia, Malawi, Malta, Mexico, Morocco, New Zealand, Norway, Oman, Pakistan, Papua New Guinea, Philippines, Sierra Leone, Singapore, Sri Lanka, Sweden, Thailand, Tunisia, United Kingdom, United States, Uruguay, Venezuela, Zaire (Congo Dem. Rep.), Zimbabwe.

** Regressions include the lagged first differences of the dependent and independent variables, not shown here to keep the table focused on parameter estimates of interest.

Table 3: The Role of Decentralization, State Ownership, and Domestic Interest Rates

Dependent Variable: First Difference of Net Extra-Budgetary Debt Assumption by the Government

(*p-Values Based on Newey-West HAC Standard Errors*)

Model: *2SLS Estimates with Fixed Effects*	**LIBOR Replaced with Lending Interest Rate***		**LIBOR, Decentralization**		**LIIBOR, GDP Share of SOEs****	
Explanatory Variables:	**Coefficient**	*p-Value*	**Coefficient**	*p-Value*	**Coefficient**	*p-Value*
Speed of adjustment						
Constant	0.3969	*0.003*	0.3438	*0.008*	0.6053	*0.000*
Debt-GDP Ratio	0.4816	*0.008*	0.5063	*0.002*	0.1168	*0.692*
Steady-State Expression						
Constant	0.0379	*0.528*	0.0734	*0.275*	0.0860	*0.267*
Real Interest Rate	–0.0042	*0.005*	–0.0038	*0.142*	–0.0018	*0.452*
Debt-GDP Ratio	0.0597	*0.105*	0.0581	*0.074*	0.0074	*0.850*
Contract Reliability	–0.0111	*0.110*	–0.0161	*0.023*	–0.0114	*0.078*
Black Market Premium (BMP)	0.1302	*0.247*	0.0858	*0.051*	0.0934	*0.014*
BMP × GDP Share of Agric.	–0.2286	*0.279*	–0.1503	*0.052*	–0.1616	*0.017*
Openness	0.0477	*0.434*	0.0516	*0.058*	–0.0718	*0.392*
Fractionalization	0.0652	*0.102*	0.0779	*0.022*	0.0405	*0.108*
Political Division	0.0139	*0.097*	0.0100	*0.111*	0.0418	*0.010*
Decentralization			0.0052	*0.692*		
GDP Share of SOEs					–0.2051	*0.524*
Transitory Factors***						
Executive Elections	0.0164	*0.028*	0.0100	*0.058*	0.0134	*0.140*
Lagged Executive Elections	0.0096	*0.150*	0.0056	*0.282*	0.0059	*0.264*
Standby Program Dummies						
Year Before Start	0.0691	*0.072*	0.0739	*0.045*	0.0124	*0.761*
First Year	0.1282	*0.106*	0.0666	*0.238*	0.0025	*0.963*
Other Years	0.0658	*0.142*	0.0676	*0.027*	0.0793	*0.073*
Last Year	–0.0623	*0.280*	–0.0145	*0.774*	0.0102	*0.841*
First Post-Program Year	–0.0897	*0.042*	–0.0519	*0.026*	–0.0563	*0.071*
Second Post-Program Year	–0.0259	*0.309*	–0.0187	*0.234*	–0.0223	*0.188*
R^2	0.3521		0.3443		0.3688	
Adjusted R^2	0.2713		0.2832		0.2688	
Number of Observations	479		716		403	

* 34 countries included: Australia, Bahamas, Bahrain, Botswana, Canada, Chile, Cyprus, Ethiopia, Greece, Guatemala, Guyana, Iceland, India, Indonesia, Jordan, Korea, Malaysia, Malta, Morocco, New Zealand, Norway, Oman, Papua New Guinea, Philippines, Sierra Leone, Singapore, Sri Lanka, Sweden, Thailand, Tunisia, United Kingdom, United States, Uruguay, Zimbabwe.

** 26 countries included: Botswana, Chile, Costa Rica, El Salvador, Ghana, Greece, Guatemala, Guyana, India, Indonesia, Korea, Malaysia, Malawi, Mexico, Morocco, Pakistan, Philippines, Sierra Leone, Thailand, Tunisia, United Kingdom, United States, Uruguay, Venezuela, Zaire (Congo Dem. Rep.), Zimbabwe.

*** Regressions include the lagged first differences of the dependent and independent variables, not shown here.