Why is fiscal policy often procyclical?*

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Abstract

Fiscal policy is procyclical in many countries, and especially in developing ones. We explain this policy failure with a political agency problem. Procyclicality is driven by voters who seek to "starve the Leviathan" to reduce political rents. Voters observe the state of the economy but not the rents appropriated by corrupt governments. When they observe a boom, voters optimally demand more public goods or fewer taxes, and this induces a procyclical bias in fiscal policy. The empirical evidence is consistent with this explanation: procyclicality of fiscal policy is more pronounced in more corrupt democracies.

1 Introduction

Most economists agree with the normative prescription that tax rates and discretionary government spending as a fraction of GDP ought to remain constant over the business cycle. If governments respected these prescriptions, we should observe a counter-cyclical pattern in fiscal policy. Namely, during a boom: (i) total government spending as a share of GDP should go

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down because of automatic stabilizers (if discretionary spending remained constant in real terms, the effect would be reinforced); (ii) with constant tax rates and some degree of progressivity, government revenues as a share of GDP should go up (the effect would be reinforced by tax cuts in recessions and tax increases in boom.); (iii) as a result, budget surpluses as a share of GDP should increase. The opposite should occur in recessions.[1]

In practice, in many developing countries fiscal policy has the opposite properties: it is procyclical. In particular, government spending as a share of GDP goes up during booms and down in recessions, while deficits increase in booms and decrease in recessions. In OECD countries, instead, fiscal policy is generally counter-cyclical.[2] Gavin and Perotti (1997) were the first to point out that in Latin America fiscal policy is procyclical, but Talvi and Vegh (2005), Catão and Sutton (2002), Manasse (2005) and Kaminski, Reinhart, and Vegh (2004) noted that this is not a Latin American phenomenon only: procyclicality of fiscal policy is common in many – though not all – developing countries.

Why do many countries follow seemingly sub optimal procyclical fiscal policies that add to macro economic instability? A common answer has to do with the supply of credit. In bad times many developing countries cannot borrow, or can do so only at very high interest rates, therefore they cannot run deficits and have to cut spending; in booms they can borrow more easily and choose to do so, increasing public spending (cf. Gavin and Perotti 1997, Catão and Sutton 2001 and Kaminski, Reinhart, and Vegh 2004).

This argument is incomplete, however, since it begs two critical questions. First, why don't these countries self-insure by accumulating reserves in good times, so that they are less likely to face binding credit constraints in recessions? Second, why would lenders not provide funds to countries even in recessions, if they were convinced that the borrowing would optimally

[1] In light of the careful discussion of Kaminski, Reinhart and Vegh (2004) we want to be clear regarding our choice of words. We define as counter-cyclical a policy that follows the tax smoothing principle of holding constant tax rates and discretionary government spending as a fraction of GDP over the cycle. They define such policy as "acyclical". Both we and they would define as procyclical a policy in which tax rates go down in booms and up in recessions and spending over GDP goes up in booms. As those authors themselves note, our definition is the most common in the literature.

[2] Some countries belonging to both groups have accumulated large amounts of public debt. For a review of models that explain excessive deficits, see Alesina and Perotti (1995) and Persson and Tabellini (2000). On the cyclical property of fiscal policy in OECD countries see Perotti (2004)

smooth out the cycle?

To answer both questions one needs to consider the political arena, and this is what we do in this paper. We argue that procyclical and myopic fiscal policy stems from a political agency problem. Voters face corrupt governments that can appropriate part of tax revenues for unproductive public consumption, i.e. political rents. Rents can be thought of as direct appropriation (stealing) of tax revenues by government officials, but also favors paid to special interests such as public employees or "friends" of the government, often identified along ethnic, or religious lines etc. Voters can replace a government that abuses of his powers, but in equilibrium they generally cannot push rents all the way to zero. This agency problem interacts with lack of information: voters observe the state of the economy, but they cannot observe government borrowing, at least not at the margin; for instance, the government can accumulate hidden off-balance-sheet liabilities. Hence, when voters see the economy booming, they demand higher utility for themselves (in the form of lower taxes or better public goods), in a way that resembles the "starve the Leviathan" argument. This forces the government to impart a procyclical bias to fiscal policy, and to borrow too much. Thus, procyclical and myopic fiscal policy (i.e. an increase in government spending during booms and excessive government borrowing) arises from voters' demands. But voters do not demand irrational policies, they are just poorly informed about what the government is really doing. Through a reelection constraint on the government, voters demand and obtain a second-best solution to an agency problem in an environment of corruption and imperfect information. Formally, the model extends to a dynamic environment with public debt a model of moral hazard and political accountability originally formulated by Barro (1973) and Ferejohn (1986), and adapted to public finance by Persson and Tabellini (2000).

We then discuss some features of the data. First, we confirm previous evidence on the widespread procyclicality of fiscal policy. This is mainly due to government spending, whose share in GDP goes up in booms and down in recessions. Second, we show a strong positive correlation between procyclicality and measures of corruption: more corrupt countries display a more procyclical fiscal policy. Third, the correlation between corruption and procyclicality is only or mainly present in democracies, confirming the theoretical idea that procyclicality emerges because voters try to hold corrupt governments accountable. Finally, we ask how robust is the correlation between corruption and procyclicality when also taking into account the evidence on

borrowing constraints. This is not easy, because more corrupt governments might also face more binding credit constraints. As a result, many of the same variables that influence political corruption are also likely to affect the severity of borrowing constraints – indeed, corruption is highly correlated with credit ratings in the data. Nevertheless, we present some suggestive evidence that political agency problems in democracies, rather than credit market imperfections, are the underlying cause of procyclical fiscal policy.

Our main conclusion is that procyclicality of fiscal policy results from a government failure, not a market failure, and takes place irrespective of whether or not the government is up against a credit limit. Fiscal policy is procyclical because rational but uninformed voters "starve the Leviathan" and demand more in good times than in bad times.

We are not the first to suggest a political explanation to the procyclicality of fiscal policy. In Talvi and Vegh (2005), the presence of surpluses increases the government propensity to spend; this distortion is assumed, however, rather than derived from an explicit political model. An alternative political explanation is the "voracity effect" of Tornell and Lane (1999) and Lane and Tornell (1998): when more resources are available (i.e. in booms), the common pool problem is more severe and the fight over common resources intensifies, leading to budget deficits. But we do not know of other papers that link fiscal myopia and procyclicality to a political agency problem.[3] Finally, the idea that voters induce debt accumulation to discipline governments that they do no trust is related to Jensen and Meckling (1976). That seminal contribution shows that debt financing (as opposed to external equity financing) can mitigate the agency problem inside the firm; but of course, the mechanism through which this happens in our political context is different.

Our idea that political agency can lead to excessive debt accumulation when voters are uninformed also differs from two other political models of government borrowing in the literature. The strategic debt argument (Alesina and Tabellini (1990), Persson and Svensson (1989), Tabellini and Alesina (1990)) does not rely on an agency problem: voters are not uninformed about fiscal policy and the results are driven by different preferences amongst political parties or groups of voters alternating in government. In

[3]Satyanath and Subramanian (2004) show empirical evidence that democratic failure explains macroeconomic instability; but they focus on the distinction between democracies vs non-democracies, whereas we argue that procyclical fiscal policy stems from the interaction of democratic accountability and political corruption.

the rational budget cycles literature (Rogoff and Siebert (1989) and Rogoff (1990)), voters face an adverse selection problem and this leads to distorted fiscal policy before the election. The assumption about voters' information is similar to ours, but here the incentive problem is one of moral hazard, not adverse selection. Moreover, those papers do not discuss the reaction of economic policy to external shocks, nor do they allow for a state variable like government debt.

The paper is organized as follows. In section 2 we lay out the model. In section 3 we derive the economic and political equilibrium. Section 4 discusses the empirical evidence. The last section concludes.

2 The Model

2.1 The economy

Consider a small open economy with an infinite horizon. The private sector consists of a representative consumer that maximizes the presented discounted value of expected utility from private and public consumption:

$$E\sum_{t=0}^{\infty}\beta^t\left[u(c_t)+h(g_t)\right] \tag{1}$$

where c_t and g_t denotes private and public consumption respectively in period t, E is the expectations operator, and $u(\cdot)$ and $h(\cdot)$ are smooth and strictly concave increasing functions. For simplicity, we neglect the intertemporal choices of the private sector, and only focus on its political role of controlling the government agency problem. Thus, we assume that private consumption in each period is just given by endowment income (y) net of taxes (τ): $c_t = y_t(1-\tau_t)$. The model is meaningful only if government debt is non-neutral and there is a role for counter-cyclical fiscal policy, and this is the simplest way to get that property. Income is an i.i.d. random variable, drawn each period from a distribution with bounded support over $[\underline{y},\ \bar{y}]$. All variables are expressed in per capita terms.[4]

Besides spending in "useful" government consumption that provides utility to the consumer, g_t, the government can also appropriate (non-negative)

[4]Alternative but more complicated assumptions would be to allow the consumer to borrow or lend in an economy with tax distortions, or to model explicitly a liquidity constraint on private consumption.

rents, $r_t \geq 0$, that benefit the government but not the consumer. In period t the government can issue public debt, b_{t+1}, at a market price β. Government debt is bought by foreign residents and there is full repayment of debt next period.[5] Thus, we can write the government budget constraint as:

$$g_t + r_t + b_t \leq \tau_t y_t + \beta b_{t+1} \tag{2}$$

We assume that there is a limit to how much resources a government can appropriate for his own exclusive benefit: $r_t \leq q_t$. The upper bound q_t denotes what the government can steal from the public coffers without ending up in jail. We consider two alternative assumptions about q_t. In the simplest case, it is a linear and increasing function of current per capita income: $q_t = \bar{q} + \rho y_t$, $\rho > 0$. Thus, as the tax base rises, the government has more opportunities to grab rents. Alternatively, we assume that the upper bound is a decreasing and concave function of public debt outstanding: $q_t = Q(b_t)$, with $Q_b < 0$, $Q_{bb} < 0$. Thus, if the previous legislature accumulated a large amount of government debt, there is less room to steal today. As discussed in the next subsection, debt is only observed by the public at large in the subsequent period, when it has to be repaid. Thus, this second assumption says that, if the government accumulated large liabilities in the previous legislature, it is under more careful scrutiny today, both from the domestic voters and international organizations, and as a result the upper bound on rents is more severe. As we shall see, the assumption that there is an upper bound on rents plays a role even if this constraint is not binding in equilibrium, because it determines the strength of out-of-equilibrium threats. But the policy response to income shocks is similar irrespective of whether the upper bound Q_t does or does not depend on government debt outstanding.

Finally, we assume that government debt can be issued only up to a maximum amount $\bar{b}$. Up to this amount, debt is always repaid in full and there is no default risk nor any credit market imperfection. This upper limit on government debt is low enough (compared to the possible realizations of per capita income), so that the non-negativity constraints on consumption

[5] The assumption of a small open economy is appropriate for our empirical work, in which we consider this kind of countries. Without default risk there is no risk premium, but in the empirical analysis we allow for the effects of risk premia on government-issued liabilities.

and rents are not violated in equilibrium:

$$\underline{y}(1-\rho) - \bar{b} > \bar{q} > 0 \quad (3)$$

$$\underline{y} - \bar{b} > Q(\bar{b}) > 0 \quad (4)$$

The left hand side inequalities in (3), (4) guarantee that outstanding debt can always be repaid in full when rents are at a maximum, without pushing private or public consumption to zero. The right hand side inequality in (4) implies that there is always something to steal, even if the upper bound on rents is a decreasing function of debt, and debt is maximal. These assumptions play no role, other than to make sure that the equilibrium does not violate some non-negativity constraints.

In this simple environment, the optimal policy for the voters certainly entails $r_t = 0$. The optimal debt policy can be characterized by noting that a benevolent social planner in this economy faces exactly the same optimization problem as a consumer with stochastic income and subject to a debt limit. This optimization problem has been analyzed in the literature (cf. Ljungqvist and Sargent (2000, ch. 14). In particular, Aiyagari (1994) has shown that, if income is i.i.d and the interest rate equals the rate of time discount (as is in our model), then asymptotically debt diverges to $-\infty$, i.e., the planner accumulates an unbounded quantity of assets. This implies that asymptotically a benevolent government would behave as if the debt limit did not exist, implementing a policy of full smoothing of public and private consumption. While assets remain finite, a benevolent government would still smooth private and public consumption in the face of income shocks, although not fully, provided that the debt limit is not binding in the current period. In particular, unless the debt limit currently binds, a negative income shocks would lead to some debt accumulation (asset depletion) and the sum of private and public consumption would fall less than one for one with income. Conversely, a positive income shock would induce a debt reduction (asset accumulation) and only a fraction of the income increase would be spent in the current period (see Ljungqvist and Sargent (2000, ch. 14) and Aiyagari (1994) for more details). Also note the asymmetry between positive and negative income shocks: the debt limit can never bind when the economy is hit by a positive income shock, so that debt will always be reduced in this case. A negative income shock instead leads to some debt accumulation only if the debt limit is not currently binding.

2.2 The political system

Elections are held at the end of each period. The incumbent government only cares about grabbing rents for himself. Thus, he maximizes:

$$E\sum_{t=0}^{\infty}\beta^t v(r_t)$$

where it is understood that he can get rents only while in office (if the incumbent is not reappointed, then future political rents will be enjoyed by another politician in office). The utility function $v(\cdot)$ is smooth, increasing and strictly concave.

The political environment is adapted from Barro (1973), Ferejohn (1986) and Persson and Tabellini (2000, chapter 4). Specifically, government policy is chosen after the elections, by the incumbent, and there is no commitment to electoral promises. Thus, there is an element of "contract incompleteness" in the political environment, and the government can only be held accountable ex-post through backward-looking voting strategies. This accountability is made possible by assuming that, at each election, the incumbent is challenged by an identical opponent, whose role is to provide an alternative. Voters coordinate the optimal voting strategy that minimizes their loss of welfare from this agency problem. Relative to the models of Barro (1973), Ferejohn (1986) and Persson and Tabellini (2000), we have added government debt. This makes the model truly dynamic, while the previous literature on political agency had static economic environments.

Voters observe private and public consumption, their income, how much they are paying in taxes. But they do not observe government rents not how much government debt is being accumulated (or decumulated) in the current period. This is equivalent to saying that the government can incur off-balance-sheet liabilities with which to pay for rents. The size of these liabilities only becomes known to the voters after the elections. This assumption is consistent with the vast literature that has emphasized the size and significance of creative accounting and lack of transparency of the budget especially in developing countries; it has the same flavor of the information assumptions of the literature on rational political business and budget cycles.[6] Note how an ex post "discovery" of large government liabilities may

[6]See in particular Von Hagen and Harden(1994), Alesina and Perotti (1995), Milesi Ferretti (2003), amongst others, on the role of lack of transparency in the budget process,

trigger more control over the government and therefore make it more difficult for the government to appropriate rents in the future, which is one of the cases we examine below.

Thus, the sequence of events is as follows: (i) At the start of each period, before government policy is chosen, voters observe their income before taxes in the current periods, y_t, and debt outstanding, b_t; they select a reservation level of current period utility, x_t, and promise re-election to the incumbent conditional on attaining at least that level of current utility (i.e. if $u(c_t) + h(g_t) \geq x_t$). (ii) The government observes the reservation utility demanded by voters as well as their current income, and sets policy for the current period, namely rents (r_t) and government debt (b_{t+1}). (iii) Voters observe their utility from private and public consumption and vote according to their promise This sequence of events is repeated in each period.

An equilibrium is a reservation level of utility that is optimal for the voters in the current period, given the initial conditions and taking into account subsequent equilibrium outcomes, and a policy that is optimal for the government, given the voting strategy and subsequent equilibrium outcomes. Note that this definition of sequential equilibrium rules out pre-commitment by the voters to a sequence of voting rules. Voters can punish the government for bad behavior during the current legislature. But we do not allow voters to punish the government for the policy chosen before the previous election, once they discover how much public debt was accumulated during the previous legislature. In other words, we restrict attention to Markov-perfect equilibria. Since the government is fully informed and there is no asymmetric information, rational voters can fully predict government policy, even if they do not observe it. Hence, in equilibrium no government change occurs and the incumbent is always re-elected, although the threat of out of equilibrium events is a major determinant of the voters' and of the government's decisions.

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and Rogoff (1990), Rogoff and Siebert (1990) and Persson and Tabellini (2000) for rational political cycles. Note that there is an asymmetry: while voters do not observe b_{t+1} until period $t+1$, foreign lenders do not lend to the government past the point $\bar{b}$; hence international financial markets have better information about the debt policy compared to national voters. Qualitatively, this assumption is not implausible, although here for simplicty it is formulated in a very stark form: voters are totally ignorant, while foreign investors are perfectly informed. As we shall see, however, the upper bound $\bar{b}$ plays no role in the case in which the ceiling on rents is a function of debt outstanding: $q_t = Q(b_t)$.

3 Equilibrium policies

In this section, we characterize the equilibrium and then we discuss its properties. Since it is simpler, we start with the case in which the upper bound on rents is a linear function of income irrespective of public debt outstanding: $q_t = \bar{q} + \rho y_t$. The appendix describes the equilibrium under the alternative assumption that $q_t = Q(b_t)$.

Suppose that the incumbent chooses to forgo re-election. In this case, he will certainly grab as many rents as possible, and obtain utility $v(q_t) = v(\bar{q} + \rho y_t)$.[7]

Next, suppose that the incumbent government seeks to please the voters. Let $W(b, y, x)$ be the incumbent's maximal utility in this case, given current income y, debt outstanding b, and voters reservation utility demanded, x. Let a $\prime$ in front of a variable denote next period values. Then $W(b, y, x)$ is defined by:

$$W(b, y, x) = \underset{\tau, g, r, b'}{Max} [v(r) + \beta EV(b', y')] \tag{5}$$

subject to the government budget constraint, (2), to the upper bounds on rents and government debt, and to the reelection constraint: $u\left[y(1-\tau)\right] + h(g) \geq x$. The function $V(\cdot)$ is the equilibrium value of reappointment for the incumbent, in the future state (b', y'). The expectations operator is over the random variable y'.

The incumbent can always choose to forego re-election. Hence, voters cannot push government utility below the threshold $v(\bar{q} + \rho y)$ (what he can achieve by grabbing maximal rents once). In other words, for any values of b and y, voters' demands have to satisfy the following incentive constraint:

$$W(b, y, x) \geq v(\bar{q} + \rho y) \tag{6}$$

Clearly, it is optimal for the voters to demand private consumption up to the point where (6) holds as equality. Not doing that would simply enable the government to grab more rents for itself, without increasing voters' utility in current and future periods. Hence, equilibrium demands by the voters, x^*, are a function $x^* = X(b, y)$, defined implicitly by the condition:

$$W(b, y, x^*) = v(\bar{q} + \rho y) \tag{7}$$

[7] Under our assumptions, government debt policy in this out-of-equilibrium outcome is not well defined (in the sense that the government is indifferent about b_{t+1}). But we don't need to specify the out-of-equilibrium debt to determine the equilibrium outcome, so we leave it at that.

We can then define the equilibrium value of reappointment, namely the function $V(b, y)$ introduced above, as:

$$V(b, y) = W(b, y, x^*) = v(\bar{q} + \rho y) \tag{8}$$

where the last equality follows by (7).

Since (8) must hold for any values of b and y, it must also hold in all future periods. Thus, $V(b', y') = v(\bar{q} + \rho y')$ for all possible values of y' and b'. Based on (5) and (8), equilibrium rents in the current period, r^*, are then implicitly defined by the following condition:

$$v(r^*) + \beta E v(\bar{q} + \rho y') = v(\bar{q} + \rho y) \tag{9}$$

The left hand side of (9) is the incumbent's utility if he pleases the voters, given the equilibrium continuation value of being reappointed tomorrow. The right hand side is his utility if he steals as much as possible today, but is then thrown out of office. In equilibrium, the incumbent must be indifferent between these two options.[8] Equation (9) can be easily solved to obtain equilibrium rents:

$$r^* = R(y) \equiv v^{-1}\left[v(\bar{q} + \rho y) - \beta E v(\bar{q} + \rho y')\right] \tag{10}$$

It remains to determine the other fiscal policy variables for a government seeking re-appointment. Using the previous notation, this is the solution to the following optimization problem:

$$\underset{\tau, g, b'}{Max}[v(\tau y - g + \beta b' - b) + \beta E V(b', y')] \tag{11}$$

subject to $b' \leq \bar{b}$ and to the reelection constraint, $u\left[y(1-\tau)\right] + h(g) \geq x^*$. The expression inside the round brackets corresponds to rents in the current period. The last term is the expected equilibrium continuation value (i.e. what the government expects to get from next period onwards if he is re-appointed).

By the argument above, $EV(b', y') = v(\bar{q} + \rho y)$ for any value of b'. This means that, from the perspective of a government seeking reappointment, issuing public debt in the current period entails no future costs. The costs are fully borne by the consumers. But by assumption, consumers do not observe

[8] Implicitly, we are thus assuming equilibrium rents to be always positive, for all realization of y. This assumption can be easily relaxed with slightly more complicated notation.

government debt until next period. Hence, the incumbent can pocket the proceeds from issuing government debt in the form of higher rents. Indeed, the optimal debt policy that solves (11) is to always borrow as much as possible: $b'^* = \bar{b}$.

Finally, public consumption and tax rates are pinned down by the optimality condition (subscripts denote derivatives):

$$u_c\left[(1-\tau^*)y\right] = h_g(g^*) \tag{12}$$

together with the government budget constraint, (2). Intuitively, a government seeking re-election will allocate available resources between private and public consumption to please the voters in the most efficient possible way, consistent with his desire to grab as many rents as the voters allow.

We summarize all this in the following:

Proposition 1 *Suppose that the upper bound on rents is a linear function of income, $q_t = \bar{q} + \rho y$. Then the equilibrium stochastic steady state has:*

$$\begin{aligned} r^* &= R(y) \equiv v^{-1}\left[v(\bar{q}+\rho y) - \beta E v(\bar{q}+\rho y')\right] \\ b^* &= \bar{b} \end{aligned}$$

Moreover, $g^* = G(y)$ and $\tau^* = T(y)$ are jointly defined by:

$$\begin{aligned} g^* + r^* + \bar{b}(1-\beta) &= \tau^* y \\ h_g(g^*) &= u_c\left[y(1-\tau^*)\right] \end{aligned}$$

The steady state is reached after one period.

The appendix solves the case in which the upper bound on rents depends on debt outstanding: $q_t = Q(b_t)$. The solution procedure is very similar, the only difference being that issuing government debt now is costly for the government, because it reduces the value of its out-of-equilibrium threat next period. As a result, equilibrium debt is now at an interior optimum lower than the upper bound $\bar{b}$, and the steady state is reached gradually rather than at once. But throughout the adjustment to the steady state, and once the steady state is reached, public consumption and the tax rate move with income as described above, except that now equilibrium rents are not affected by income shocks. Equilibrium debt also does not respond to income shocks. More specifically, the appendix proves:

Proposition 2 *Suppose that the upper bound on rents depends on debt outstanding, $q_t = Q(b_t)$. Then the equilibrium stochastic steady state has:*

$$r^* = v^{-1}\left[v(Q(b^*))(1-\beta)\right]$$

and steady state debt is at an interior optimum $b^* < \bar{b}$. Public consumption and tax rates are still defined as in Proposition 1. Under the conditions stated in the appendix, the steady state is locally stable. During the adjustment to the steady state, income shocks only affect public consumption and the tax rate, while rents and government debt are not affected by income shocks.

3.1 Discussion

How does fiscal policy respond to income shocks? Differentiating the expression for equilibrium rents in Proposition 1, we obtain:

$$R_y = \frac{\rho v_r(\bar{q} + \rho y)}{v_r(r^*)} > 0 \tag{13}$$

What is the interpretation? Equilibrium rents are procyclical. As income increases, the incumbent temptation to grab maximal rents and forego reelection also increases. Optimizing voters must thus accept an increase in equilibrium rents. The size of the increases in rents depends on the parameter ρ (that captures the extent to which the upper bound of rents varies with income) and on the curvature of the government preferences. Procyclicality of rents is more pronounced the higher is ρ (i.e. the more the ceiling on rents increases with income), and the less the marginal utility of rents declines as rents increases (i.e., the smaller is v_{rr} in absolute value).

Next, applying the implicit function theorem to the expressions for $G(y)$ and $T(y)$ in Proposition 1, we obtain:

$$\begin{aligned} T_y &= \frac{(1-\tau)u_{cc} + (R_y - \tau)h_{gg}}{(u_{cc} + h_{gg})y} \gtrless 0 \\ G_y &= \frac{u_{cc}(1-R_y)}{u_{cc} + h_{gg}} \gtrless 0 \end{aligned} \tag{14}$$

The signs of T_y and G_y are ambiguous. To see why the tax rate can move either way with income, suppose that $R_y = \tau < 1$ and consider a positive income shock. In this special case, if the tax rate were to remain constant,

all the additional tax revenues would be fully absorbed by rents leaving public consumption unchanged. But this cannot be optimal, because part of the positive income shock would also increases private consumption (since $\tau < 1$). To maintain equality in the marginal utilities of private and public consumption, the government is then forced to raise the tax rate with income. This holds a fortiori if $R_y > \tau$. As R_y falls below τ, however, equality in the marginal utilities of private and public consumption may require tax rates to go down. Thus, a procyclical tax rate is more likely the more rents are procyclical, and the more concave is the utility of private consumption relative to that of public consumption (i.e. the larger is h_{gg} relative to u_{cc} in absolute value, so that public consumption behaves more like a luxury good relative to private consumption).

Equations (13) and (14) also imply that:

$$G_y + R_y = \frac{u_{cc} + R_y h_{gg}}{u_{cc} + h_{gg}} > 0$$

Therefore total public outlays net of interest payments (the sum of productive government consumption and rents) always increase with income. As a percentage of GDP, productive government spending plus rents can go up or down depending on parameter values, but it is more likely to go up the higher is R_y, that is the more procyclical are rents.

Under the assumptions of Proposition 2 (i.e. if $q_t = Q(b_t)$), equilibrium rents do not react to income shocks, while the expressions for G_y and T_y are the same except that now $R_y = 0$. Thus, the increase in income is entirely captured by the consumer with a combination of more public and private consumption.

Finally, note that, as long as $R_y < 1$, the sum of private and public consumption (and hence voters' utility) always increases with income; and in the case in which $R_y = 0$ (as in Proposition 2 or if $\rho = 0$), total consumption increases with income one for one. Government debt, instead, is not affected at all by income shocks. Thus, positive income shocks are not saved through the government budget to bring about higher utility for tomorrow; and negative income shocks do not lead to more government borrowing.

These implications of the model contrast with the socially optimal policy. As discussed in the previous section, in this same model economy a benevolent government would accumulate unbounded assets (rather than incur debt) and asymptotically achieve full consumption smoothing. More importantly, a benevolent government would always respond to a positive income

shock with an increase in the budget surplus. And a negative income shock would be met with a fall in the surplus, unless the government is up against a debt limit. In our political equilibrium, instead, the budget surplus does not respond to income shocks at all. These different debt policies imply that the response of private and public consumption to income shocks would be smoother under a benevolent government than in the political equilibrium described above.

Summarizing, compared to the socially optimal policy, the equilibrium response of fiscal policy to a *positive* income shock in the model is distorted in the following way: (i) the budget surplus increases less than socially optimal (it does not increase at all here, while it increases under a benevolent government); (ii) total government consumption and wasteful government spending (political rents) increase more than socially optimal. We cannot unambiguously compare the response of the equilibrium tax rate to the social optimum, however. A benevolent government would hold the tax rate roughly constant in the face of income shocks (the tax rate could actually go up or down depending on the relative concavity of the utility from private vs public consumption). Likewise, in the equilibrium described above, the tax rate can go up or down in response to a positive income shock, depending on how responsive are equilibrium rents to income shocks. Thus, although for different reasons, the response of the tax rate to income shocks is ambiguous both in this equilibrium and under a benevolent government. A *negative* income shock would imply correspondingly different responses of fiscal policy in our equilibrium vs the social optimum (with signs reversed), except if the social planner was up against a debt limit, in which case a negative income shock would induce similar responses in the social optimum and in our political equilibrium.

Thus in our model the policy response to income shocks is distorted irrespective of whether the government is up against its debt ceiling or not (i.e. under both Propositions 1 and 2, and also outside of the steady state). This failure to smooth income shocks with fiscal policy is due to an agency problem, not to a credit market imperfection. The intuition is straightforward: consumers do not observe debt accumulation. They also know that they cannot trust the government. Thus, when they see better macroeconomic conditions, they demand higher utility for themselves. If they did not do that, the government would simply appropriate more rents, and they would not receive any higher consumption in the future anyway. The converse happens when income is seen to go down.

Finally, note that in the model the degree of "corruption" is a zero-one variable: either the government can appropriate rents, in which case fiscal policy is procyclical, or it cannot, in which case fiscal policy is socially optimal. This stark contrast comes from the strong assumptions on government preferences. We also solved a two-period version of this model with a relative weight capturing how much the government cares about rents relative to consumer welfare. In such a model, the degree of procyclicality is a function of the weight given to consumer welfare: the more government cares about rents, the larger is the reaction of private utility to income shocks (i.e., the more procyclical is fiscal policy in the sense described above).

4 Evidence

4.1 Empirical strategy

The previous sections outlined two alternative explanations of procyclicality in fiscal policy. The most common explanation maintains that policy is set by a benevolent government and attributes procyclicality to a binding credit constraint. This implies that fiscal policy should be prociclical only in recessions, when the government would like to borrow but is prevented from issuing more debt. The alternative hypothesis explains procyclical fiscal policy as the result of a political agency problem. Voters do not trust the government, and demand higher utility (in the form of lower taxes or higher productive government spending) when they see aggregate output going up. This type of procyclicality arises both in booms and recessions, but should be more prevalent in countries where political corruption is widespread and the government is somewhat accountable to the voters. If the government was totally unaccountable (say in a stable dictatorship), then corruption would be high but voters could not influence what the government does, and hence the procyclical bias should go away. We now discuss the evidence in light of these alternative explanations.

We cannot really say that we are testing one hypothesis against the other, because the model is too abstract and simplified and does not yield specific and unique testable predictions. Rather, we describe some robust patterns in the data and ask whether they are consistent with the general implications of these two alternative models.

Our measure of cyclicality in fiscal policy follows Catão and Sutton (2002),

who in turn adapt Gavin and Perotti's (1997) specification. We measure procyclicality in country i by the coefficient β_i from the following panel regression (t subscripts denote years):

$$\Delta F_{it} = \beta_i OUTPUT\_GAP_{it} + \gamma X_{it} + \lambda F_{it-1} + \alpha_i + \upsilon_t + \varepsilon_{it} \qquad (15)$$

where F_{it} is a fiscal policy indicator (government surplus, or public spending), $OUTPUT\_GAP_{it}$ is a measure of the business cycle, X_{it} is a vector of other controls and $\alpha_i, \upsilon_t, \varepsilon_{it}$ are unobserved error terms. All these variables are defined below.[9]

We have data on 87 countries over the period 1960 to 1999. Despite the parsimonious specification, however, many countries have data for a shorter period and a few countries have as little as five years of data. The working paper version provides more detail on available countries and years (NBER Wp. N. 11600).

We proceed in two ways. Our preferred method is to estimate equation (15) in a panel of yearly data, pooling all countries together. Country fixed effects are generally included, so the estimates only reflect within country variations. The political agency model suggests that procyclicality is more likely in countries where corruption is widespread. Hence, we interact the variable $OUTPUT\_GAP$ with a measure of the control of corruption. If the interaction term suggests that fiscal policy is more procyclcical in more corrupt countries, we interpret this as evidence in favor of the political agency model (the sign of β_i consistent with a procyclcical policy response depends on the precise definition of the fiscal policy variable F).

As an alternative, we also estimate (15) on each country separately, and then regress the estimated β_i coefficients on a measure of corruption and other controls in a cross-country regression. The lagged dependent variable is always included, both in the panel and when estimating (15) on each country separately. Both procedures yield very similar results.

[9]Note that, as in these papers, implicitly we view policy as entirely endogenous, and the stochastic process for income as entirely exogenous. This seems appropriate in a model that seeks to explain fiscal policy. Allowing for endogenous politicy shocks and for cross country differences in the transmission mechanism from policy shocks to output fluctuations would require a very different analytical set up.

4.2 Data

Fiscal Policy The model's predictions concern two fiscal policy variables: the budget surplus and total government consumption plus rents appropriated by the government. We measure both variables in percent of GDP. The budget surplus refers to the central government, and the source is the World Bank's Global Development Network Growth Database (GDNGD), based on data originally from the International Monetary Fund's *Government Finance Statistics.* Since data on the composition of government spending are notoriously unreliable, we mainly measure the variable $(g+r)$ in the model by means of total spending of central government (which also includes transfer payments to the private sector). The source for this variable as well as for every otrher fiscal variable unless otherwise indicated is the IMF *Government Finance Statistics.* Below we also report some results on government consumption measured in different ways.

As discussed in the previous section, the model does not have clear cut predictions about how the response of the tax rate τ to income shocks is affected by corruption. Both in the social optimum and in the political equilibrium, the tax rate could go up or down in response to a positive income shock, depending on specific assumptions. Nevertheless, we comment below on some results where the dependent variables F refers to tax revenues, and to tax revenues minus social security and welfare payments (a better proxy of what τ stands for in the model); this variable too refers to the central government and it is scaled to GDP.

Income shocks The variable $OUTPUT\_GAP$ is defined as the log deviation of GDP from its Hodrik-Prescott trend. Developing countries are likely to be exposed to more volatile economic shocks, and this may make it more difficult to run a countercyclical fiscal policy. To cope with this difficulty, we follow Catão and Sutton (2002) and Gavin and Perotti's (1997), and in all regressions we also always include a measure of terms of trade shocks, defined as the logarithmic deviation from a Hodrick-Prescott-filtered series of the terms of trade (TOT_GAP). The source for the GDP and terms of trade series is the World Development Indicators (WDI).

Control of corruption To measure the degree of corruption, we use the *Control of Corruption* index from Kaufman, Kraay and Mastruzzi's (2004) aggregate governance indicators, which aggregates several scores and

ratings from different sources on a scale of -2.5 to 2.5. This index is decreasing in the amount of corruption and is available for 1996, 1998, and 2000. Throughout, we take the average of the three years.

Democracy To capture how *democratic* a country is, we rely on the variable *Polity2*, which subtracts the country's score in an "Autocracy" index from its score in a "Democracy" index (resulting in a range from -10 to 10), from the Polity IV Project database. We then define the dummy variable *Democracy* as equal to 1 if *Polity*2 is strictly positive and zero otherwise. In some specifications, we also use the continuous variable *Polity*2. In the cross country regressions, we average the variables *Democracy* and *Polity*2 over the sample used to compute the fiscal policy measure, but in the panel regressions these two variables vary over time and refer to the relevant year.

Per capita income To allow for differences in the level of economic development, in the cross country regressions we control for real per capita income; we measure it as real GDP per capita in international prices (PPP adjusted) in the first year of the sample over which the measure of procyclicality of fiscal policy is computed for each country. The source is the WDI. This variable is called *Initial GDP (per capita)*. In the panel regressions, per capita income is omitted, but differences in the level of economic development are captured by the country fixed effects.

Borrowing constraints As others have noted (e.g. Gavin and Perotti 1997), procyclical fiscal policy may also result from tight credit constraints. We make use of two variables to proxy for the degree of *financial constraints* facing a country's government. One of them is an average of the existing sample of ratings attributed by Standard & Poor's to a country's long-term foreign-denominated sovereign debt (*S&P Rating*).[10] We interpret this average as an inverse measure of the degree of financial constraints facing a

[10] Adapting Cantor and Packer's (1996) approach, we attribute numbers from 0 to 6 to S&P's letter-based system: C (default or selective default); B (high-risk obligations); BB (likely to fulfill obligations, ongoing uncertainty); BBB (adequate payment capacity); A (strong payment capacity); AA (high quality); AAA (highest quality). Countries rated at BBB or better are said to have "investment-grade" ratings.

Since changes in ratings occur at irregular intervals, we computed the average by weighing a given rating by the first integer greater than the number of years over which it was kept.

country's government. The other variable is the logarithm of the spread (in basis points) of a country's sovereign debt over U.S. Treasury bonds at the time of issuance (*Spread*), which comes from Capital Data Bondware and SDC Platinum.[11] This constitutes a direct measure of financial constraints. Both variables are available for a limited number of countries (70 and 47, respectively) and only over the most recent period (for most countries the sample starts in the 1990s). To avoid losing too many observations, here we always take the average of these variables over the available time period. Thus, like for the measure of corruption, the variables measuring borrowing constraints do not vary over time and their average is not taken over the sample used to compute the fiscal policy variable.

4.3 Results

4.3.1 Procyclicality

We start by studying the cyclical response of the budget surplus and total government spending in two samples of countries. Table 1 displays the β coefficient in equation (15), estimated separately in two panels for OECD and NON-OECD countries respectively (OECD membership is as defined in 1975). Country fixed effects are included in evenly numbered columns, not in odds columns, as indicated.

Columns 1-4 refer to the budget surplus in percent of GDP. The difference between the two samples of countries is striking. The β coefficients are positive in OECD countries and negative in developing countries. Thus, fiscal policy is countercyclical in developed countries and it is procyclical in developing ones. The estimated coefficients are always statistically different from zero, and obviously statistically different from each other. Also, note that the inclusion of country fixed effects does not make a big difference (if anything the differences between the two samples of countries are greater), suggesting that the within country pattern dominates the sample or is consistent with the cross-country variation.

These results are in line with previous empirical studies (cf. Kaminski, Reinhart and Vegh 2004). They are consistent with the predictions of the political agency model: as is well known, corruption is much more widespread

[11] Similarly to the case of ratings, the issuance of new debt occurs at irregular intervals. We thus use a similar weighting system to compute the average spread, taking into account the length of of the period between emissions.

in developing countries. Indeed, the control of corruption indicator (that varies from -2.5 to +2.5) is 1.7 on average in OECD countries, while it is -0.2 in the non-OECD sample. They are also consistent with a simple credit contraints explanation, since credit rationing is liekly to be more frequent in non-OECD countries.

Columns 5-8 refer to total government spending also in percent of GDP. Again, the sign is opposite in developing and developed countries and it is consistent with columns 1-4. In developed countries spending over GDP declines when the output gap goes up (a countercyclical policy consistent with optimality) , while it increases with the output gap in developing countries (as expected under a corrupt government).

We have repeated the same regressions with tax revenue in percent of GDP as a dependent variable, but we did not find a clear pattern. In the OECD countries, taxes over GDP go up with the output gap but the coefficient β is not significantly different from zero. In non-OECD countries, the same coefficient is very close to zero and statistically insignificant (results are available from the authors). Thus, it appears that on average cyclical movements of the surplus are driven by the dynamics of spending with relatively constant tax revenues in percent of GDP. This too is consistent with the political agency model, that predicts that corruption leads to procyclicality of government spending, but not necessarily of tax rates.

These average estimates could conceal large variation between countries, however. We now ask whether this variation is related to observable country features.

4.3.2 Procyclicality and corruption

Here we explore the relationship between procyclicality and corruption more systematically, by interacting the output gap with a measure of control of corruption.

Consider a positive income shock. As discussed in the previous sections, the socially optimal countercyclical policy entails a rise in the budget surplus and no change (or possibly a small increase) in total government spending. The equilibrium under a corrupt government, instead, has no change in the budget surplus and an increase in total government spending (a procyclical policy). When variables are scaled to GDP, the budget surplus should rise or remain constant in the social optimum, but it unambiguously falls with a corrupt government. Similarly, total government spending in percent of GDP

should fall under a benevolent government, while it could rise or remain constant or fall under a corrupt government.[12] Hence, compared to a benevolent social planner, a corrupt government should display a more procylical policy response.

Keeping these predictions in mind, let us now look at the evidence. In Table 2 the dependent variable is the surplus in per cent of GDP. Two additional regressors (TOT_GAP and the lagged surplus) and country fixed effects are always included but not reported for brevity. Column (1) shows that better control of corruption indeed pushes towards a positive effect of "Output Gap", corresponding to a more countercyclical fiscal policy.[13] This confirms that procyclical fiscal policy is more prevalent in the more corrupt countries. The coefficients suggest that a country with the mean level of corruption (normalized to zero in the KKZ scale) displays slightly procyclical fiscal policy – though the coefficient is not significantly different from zero –, and improving corruption by one standard deviation (normalized to one) is enough to invert that picture. Column (2) shows that statistical significance suffers when year fixed effects are included, but the signs of the coefficients are unaltered.

In columns (3) and (4) we control for the role of democracy (with and without year fixed effects respectively). The results in both columns suggest that corruption has an effect on procyclicality only in democracies, in accordance with the political agency model. In other words, it is the interaction of democratic accountability and corruption that leads to pro-cyclicality, not corruption per se (nor democracy per se).

These results are robust to alternative specifications. First we used the continuos variable Polity 2 to measure democracy, with no changes in the results. Second we considered the fact that Control of corruption is positively correlated with GDP per capita. We controlled for this variable (GDP per capita) entered alone and as an interaction with the output gap, but our results are qualitatively and quantitatively unchanged. All these results are available upon request.

Table 3 reports the same regressions as in Table 2, but now the dependent variable is total government spending in percent of GDP. The results are very similar. In columns 1 and 2, the interaction of output gap with Con-

[12] If it falls even with the corrupt government it falls less than with a benevolent planner given the implication on the budget balance discussed above.

[13] Note that the variable Control of Corruption alone could not be included because of collinearity with the country fixed effects.

trol of corruption has the excepted (negative) sign both with and without year fixed effects. Thus, more control of corruption leads to a more countercyclical fiscal policy (a smaller response of government spending to income shocks). In columns 3 and 4 we add the interaction between control of corruption and democracy, and it also has the expected (negative) sign. The estimated coefficient is statistically significant at standard confidence level in the regression without year fixed effects; it loses significance but maintains the same sign with year fixed effects. We successfully performed the same sensitivity analysis as with the surplus regression of Table 2.

4.3.3 Borrowing constraints

The major alternative explanation of a procyclical fiscal policy, different from our own, is that of borrowing constraints. How can we discriminate between these two explanations, corruption vs borrowing constraints?

The key difficulty in addressing this issue is that corruption and credit ratings are very highly correlated. The correlation coefficient between the variables *S&P Rating* and *Control of corruption* is 0.92. *Control of corruption* is also highly correlated with available data on interest rate spreads (*Spread*), a correlation of -0.82. In fact, these variables are correlated by construction. For instance Standard and Poor may look (directly or indirectly) to perception of corruption as one of their inputs in assigning ratings to countries. And perceptions of corruption may be influenced by foreigners' views of a country credit worthiness. As a result, it is very hard to disentangle the effects of one versus the other. When one or the other of the variables *S&P Rating* and *Spread* is added to the specification of tables 2 and 3, both alone and as interactions with the output gap, the results are inconclusive: generally both variables of interest (corruption and spread or rating) are insignificant.

Thus, we have to discriminate between our corruption hypothesis and a simple credit rationing explanation of procyclicality in other ways. A first observation relates to the results on the interaction between democracy and corruption. As illustrated in the previous subsection, the correlation between corruption and procyclicality is stronger in democracies. This is a direct implication of our model. To be also consistent with a borrowing constraint story, corrupt democracies would have to be worst borrowers than corrupt dictatorships (while less corrupt governments would be equally trustworthy in democracies and autocracies). A priori one can think of many reason why

it might be the opposite, or at least why the interaction between democracy and corruption would not be relevant in determining credit worthiness.

Table 4 presents a second bit of evidence against a simple credit rationing explanation of procyclicality. In Table 4 we repeat the same regressions of Table 1, with the budget surplus as a dependent variable, but here we estimate two sub-samples: pre and post 1982, the year of the Mexican debt crises that opened up two decades of debt crises, defaults etc. Sovereign borrowers were much more likely to be up against a binding credit ceiling after 1982 than before, as concerns about default and credit worthiness became an issue mainly after the Mexican debt crisis. Yet, as shown in Table 4, there is no evidence that procyclicality increased after 1982. Developed countries display countercyclical fiscal policy (a positive estimated β coefficient) both before and after 1982. In developing countries, the estimated β coefficient is more negative (that is more procyclicality) before rather than after 1982, even though now the standard errors are larger so that neither of the two coefficients in the sub samples is statistically different from zero. The same results are obtained with regard to total government spending. Overall, the procyclicality of fiscal policy in developing countries is not driven by post 1982 observations. If anything, the reverse seems true.

In Table 5 we report another indirect test. Here we estimates the response of the budget surplus to downturns (negative output gap) and upturns (positive output gap) separately. As discussed in section 2, borrowing constraints can only bind the socially optimal policy in downturns; hence, if procyclicality is driven by a debt limit, it should be particularly pronounced with a negative income shock. In an upturn, a benevolent government aware of its future borrowing constraints should save rather than overspend. Hence, under a debt limit we should observe a negative β coefficient (procyclical policy) in a recession, but not in a boom. This is exactly the opposite of what we find in developing countries. Columns 1 and 2 of Table 5 refer to OECD countries (with and without year effects); columns 3 and 4 refer to non-OECD countries. One result is especially striking: in developing countries the procyclicality (negative β) of fiscal policy is entirely driven by the upturns. That is, the surplus falls (in percent of GDP) when the output gap goes up. During recessions, instead, the budget surplus in percent of GDP does not significantly respond to the output gap, meaning that non-OECD countries are able to runner larger deficits in a recession. This seems inconsistent with a theory that relies on borrowing constraints.

Summarizing, there is nothing in the data that points to the superiority

of the borrowing constraint hypothesis over our theory of political constraints and imperfect control of government. If anything, the evidence reported in this subsection is hard to reconcile with the borrowing constraint approach.

4.3.4 Sensitivity analysis

Finally, we perform several robustness checks.

Different procedures for testing degree of procyclicality Estimating the cyclical response of fiscal policy in a large panel of heterogeneous countries, as done in the previous tables, constraints some slope coefficients to be the same in all countries. This increase in efficiency of the estimates may come at the expenses of specification bias. To assess the robustness of the results, here we estimate the effect of corruption on procyclicality in a two step procedure; more details are available in the Working Paper version of this paper (NBER Wp. N. 11600).

First, we estimate the β coefficients in (15) separately for each country. The estimated β coefficients vary considerably across countries, and generally indicate more procyclical fiscal policy in developing countries, particularly in Latin America and in Sub Saharan Africa. This is consistent with the results reported in Table 1 above.

Then we run a cross country regressions of the following type:

$$Beta_i = \phi_0 + \phi_1 Control\_of\_corruption_i + \phi_2 X_i + u_i \qquad (16)$$

where the i subscript denotes countries and X is a vector of controls that includes per capita income measured the year before the start of the sample and the other controls listed in the various tables. When fiscal policy refers to the budget surplus, a higher $Beta$ means a more countercyclical fiscal policy, and viceversa for government spending. The coefficient of interest is ϕ_1, which we expect to be positive when $Beta$ refers to the budget surplus, negative when $Beta$ refers to government spending: fiscal policy is more counter-cyclical when there is better control of corruption.

Table 6 illustrates the results. Here $Beta$ is estimated from the budget surplus, hence a higher value of $Beta$ means a more countercyclical fiscal policy. The sign of the coefficient on Control of Corruption is positive and significant, as expected (columns 1 and 2). Moreover the interaction of this coefficient with the variable Democracy is consistent with what we found in

Table 2, namely that Control of Corruption is especially relevant in Democracies (columns 3-6). As mentioned above, here we control for per capita income, but the results hold even if we do not, or if the controls X include the size of government (measured by total government spending over GDP averaged over the relevant time period). Results are similar also when we weight observations by the inverse of the standard errors of the estimated $Beta$ coefficients, to account for possible differences in measurement error in the dependent variable across countries.

Table 7 displays similar results when $Beta$ is estimated from total government outlays over GDP. Here a higher $Beta$ means a more procyclical policy. Control of corruption always has a negative and significant effect on the cyclical response of government spending, as expected. And this effect is particularly pronounced in democracies (columns 4 and 6). This confirms the results obtained in the panel regressions, namely that the procyclicality of surpluses in developing countries comes form movement in spending not in taxation.

To allow for a non-linear relationship between corruption and procyclicality of fiscal policy, we also estimated a probit version of (16), where the dependent variable is 1 if $Beta_i > 0$ (counter-cyclical fiscal policy) and 0 if $Beta_i < 0$ (procyclical fiscal policy). Thus, we estimate the probability of observing procyclical fiscal policy in country i. The regressors are the same that appear on the right hand side of (16). Our results (available in the working paper version) are consistent with those presented in Tables 6 and 7 above.

We also tried to disentangle the effects of Spreads and Rating versus corruption, by adding these variables to the right hand side of (16). Despite the high correlation between corruption and credit ratings or spreads, some suggestive results emerge. The results are summarized in Table 8, for the $Beta$ estimated from the budget surplus regressions. Control of Corruption interacted with Democracy is always statistically significant and with the right sign, despite the inclusion of $S\&P$ $Rating$ or $Spread$ (although Control of Corruption on its own in never significant, and the same generally applies to both credit rating variables). We have also repeated the same regressions weighting observations by the (inverse of) the standard errors of the β coefficients and using the Probit method, with similar results.

Transfers, public goods and taxes The definition of government outlays from standard statistical sources includes spending both on goods and transfers. In the model instead the variable g corresponds to spending on public consumption, while transfers should be considered as a negative tax. Unfortunately, it is well known that the quality of data on the composition of government outlays (transfers, goods, investment) is very poor, especially for developing countries. With this caveat in mind, we repeated the panel estimation of Table 3, but as a dependent variable we used government consumption measured in two alternative ways: first, as total government spending net of interest payments plus social security and welfare payments; second, as government consumption as defined in the Penn World Tables. The results (not reported but available upon request) are very similar to those reported in Table 3 for total government spending. In particular, as in Table 3, the estimated coefficient of $OUTPUT\_GAP$ interacted with Control of Corruption is always negative and generally significant, suggesting that better control of corruption induces a more countercyclical behavior of public consumption.

Although the model does not have clear cut predictions on how corruption impacts on the cyclical response of tax rates, we have also estimated equation (15) on panel data with the dependent variable defined as either tax revenue in percent of GDP, or tax revenue minus transfers (i.e, interest payments plus social security and welfare payments) in percent of GDP. The specification of the panel regressions is the same as in Tables 2 and 3. The results (not reported but available upon request) are as follows. On the one hand, the cyclical response of tax revenue alone is not affected by corruption. On the other hand, tax revenue minus transfers is more procyclical in less corrupt countries (i.e., the estimated coefficient of $OUTPUT\_GAP$ interacted with Control of Corruption is positive and significant). Given that taxes alone do not display this pattern, the procyclicality of this variable is mainly driven by countercyclical transfer payments. Hence, our conclusion from these results is that positive income shocks induce a larger increase in all kinds of government outlays in more corrupt countries, compared to non-corrupt countries. In other words, the larger procyclicality of fiscal policy in more corrupt countries seems to occur through government spending, and through all kinds of government spending, and not just in public consumption. Tax revenue instead plays only a secondary role.

Different measures of corruption We repeated all our tests using data on perceptions from corruption from ICRG (available for the period 1982-97) and from Transparency International (available from 1996 onward). The results were very similar, since these corruption indicators are highly correlated with each other and move slowly over time. These results are available upon request.

5 Conclusions

In many developing countries fiscal policy is procyclical. Our explanation is that rational voters do not trust corrupt governments with resources. When voters realize that a positive income shock has hit the economy, they demand immediate benefits in the form of tax cuts or increases in productive government spending or transfers. They fear that otherwise the available extra resources would be "wasted" in rents. Faced with these procyclical demands by voters, governments do not accumulate reserves in good times, on the contrary they incur large debts. From the voters' point of view, this seemingly myopic policy is a second best: they give up on consumption smoothing opportunities, but at least they avoid leaving excessive rents to corrupt governments. This political distortion, related to the "starve the Leviathan"argument, leads to excessive accumulation of government debt and procyclical fiscal policy.

Credit constraints come into play indirectly because the political distortion may push the government towards levels of debt that are at the limit of what they can repay and therefore at the limit of what borrowers can lend. Other explanations of procyclical fiscal policy have argued that the "malfunctioning" of credit markets makes it hard or impossible for developing countries to borrow exactly when they need it more, namely in bad times. But this argument fails to explain why welfare maximizing governments don't take this into account, building up reserves in good times, so as to avoid being credit constrained in bad times.

Our theoretical model suggests that this failure to self-insure stems from a political agency problem inside each country. The evidence supports this explanation. On the one hand, procyclicality of fiscal policy is more pronounced in countries where corrupt governments are held accountable by voters through democratic institutions. On the other hand, in developing countries procyclicality of fiscal policy is more often driven by a distorted

policy reaction to booms, rather than to recessions.

6 Appendix

Proof of Proposition 2

Now consider the case in which the upper bound on rents is a decreasing function of debt outstanding: $R_t = R(b_t)$, with R_b, $R_{bb} < 0$. Going through the same steps as in section 3, in equilibrium the government must be indifferent between pleasing the voters and being reappointed (taking into account the future equilibrium continuation value), or grabbing as many rents as possible today. This indifference condition (the analogue of (9) in section 3) here can be written as:

$$v(r) + \beta v(R(b')) = v(R(b)) \tag{17}$$

Hence, equilibrium rents are determined jointly with equilibrium government debt. Repeating the steps of Section 3, a government seeking reappointment chooses public debt so as to maximize (11). But here, $EV(b', y') = v(R(b'))$. Hence, equilibrium public debt is determined by the following optimality condition:

$$v_r(r) = -v_r(R(b'))R_b(b') \tag{18}$$

the left hand side of (18) is the marginal benefit of borrowing, namely the additional rents that the government can grab today with the debt proceeds. The right hand side is the marginal cost of issuing debt, namely the reduction in the upper bound of rents tomorrow, which in turn reduces the value of the incumbent's future out-of-equilibrium threat. Together, (9) and (18) determine the equilibrium time paths of rents and public debt.

The steady state is obtained imposing $b' = b = b^*$ in (17), to yield an expression for equilibrium rents that closely resembles equation (10) in Section 3:

$$v(r^*) = v(R(b^*))(1 - \beta) \tag{19}$$

By (19), equilibrium rents are below the upper bound in the steady state: $r^* < R(b^*)$. With strictly concave preferences, equation (18) then implies that the steady state is at an interior optimum (i.e. $b^* < \bar{b}$) only if $R_b(b^*) > 1$. Intuitively, for the government to borrow less than the maximum $\bar{b}$, the cost of issuing government debt must be high enough. With $r^* < R(b^*)$, the marginal utility of current rents is higher than the marginal utility of rents

evaluated at the upper bound; hence the government finds it optimal not to issue more debt only if the upper bound on rents shrinks more than one for one as more debt is issued: $R_b(b^*) > 1$. Assuming that this condition holds for some $b < \bar{b}$, then the steady state can correspond to an interior optimum for government debt.

We now show that the steady state is locally stable (i.e. that $\frac{db'}{db} < 1$ in a neighborhood of the steady state). Equation (18) implicitly defines equilibrium rents as a function of government debt: $r = F(b')$. Applying the implicit function theorem to (18), we also have:

$$F_b(b') = \frac{v_{rr}(R(b'))R_{bb}(b')}{v_{rr}(F(b'))} < 0 \tag{20}$$

Replacing $r = F(b')$ in (17), the equilibrium law of motion of government debt is implicitly defined by:

$$v[F(b')] + \beta v[R(b')] - v[R(b)] = 0 \tag{21}$$

Now use (21) to compute $\frac{db'}{db}$ in a neighborhood of the point $b' = b = b^*$. After some simplifications we have:

$$\frac{db'}{db} = \frac{1}{\beta - F_b(b^*)} > 0 \tag{22}$$

Thus, recalling that $F_b(b) < 0$, that $F(b) < R(b)$ and that $R_{bb} < 0$, and using (20), we have that $\frac{db'}{db} < 1$ provided that $v_{rrr} \geq 0$ and that R_{bb} is not too close to 0 in absolute value.

Finally, note that in equilibrium (on and off the steady state) neither rents nor public debt depend on income. The budget constraint then implies that temporary income shocks change consumption one for one.

7 References

References

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Table 1 – Cyclicality of Fiscal Policy: OECD versus Non-OECD

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: ΔCGSurplus				Dependent variable: ΔTotal Expenditure			
	OECD sample		Non-OECD sample		OECD sample		Non-OECD sample	
Output_Gap	0.125 (0.048)***	0.140 (0.049)***	-0.049 (0.026)*	-0.046 (0.027)*	-0.095 (0.053)*	-0.154 (0.057)***	0.033 (0.023)	0.051 (0.022)**
Country FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	686	686	1404	1404	499	499	1073	1073
R-squared	0.091	0.149	0.135	0.240	0.042	0.148	0.039	0.177

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Controls: TOT_Gap, Lagged surplus in cols 1-4, Lagged total expenditures in cols 5-8

Table 2 – Pooled Sample: Corruption and the Cyclicality of the Budget Surplus in Democracies and Non-Democracies
(Dependent variable: ΔCGSurplus in % of GDP)

	(1)	(2)	(3)	(4)
Output_Gap	-0.023	-0.024	-0.038	-0.025
	(0.022)	(0.024)	(0.029)	(0.030)
Control_CorruptionXOutput_Gap	0.052	0.037		
	(0.025)**	(0.026)		
Control_CorruptionXOutput_GapXDemoc			0.081	0.067
			(0.031)***	(0.031)**
Control_CorruptionXOutput_GapXNonDemoc			0.022	0.024
			(0.038)	(0.039)
Country FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Observations	2030	2030	1976	1976
R-squared	0.217	0.259	0.199	0.243

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Controls: TOT_Gap, Lagged surplus; Columns (3), (4) also Democ and Output_GapXDemoc.

Table 3 – Pooled Sample: Corruption and the Cyclicality of Total Expenditures in Democracies and Non-Democracies
(Dependent variable: ΔTotal Expenditures in % of GDP)

	(1)	(2)	(3)	(4)
Output_Gap	0.020	0.033	0.039	0.037
	(0.019)	(0.020)*	(0.028)	(0.027)
Control_CorruptionXOutput_Gap	-0.068	-0.045		
	(0.022)***	(0.022)**		
Control_CorruptionXOutput_GapXDemoc			-0.100	-0.060
			(0.035)***	(0.037)
Control_CorruptionXOutput_GapXNonDemoc			-0.041	-0.039
			(0.037)	(0.035)
Country FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Observations	1489	1489	1456	1456
R-squared	0.168	0.226	0.170	0.225

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Controls: TOT_Gap, Lagged total expenditues; Columns (3), (4) also add Democ and Output_GapXDemoc.

Table 4 – Cyclicality of Fiscal Policy: OECD versus Non-OECD, Pre- and Post-1982
(Dependent variable: ΔCGSurplus in % of GDP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Pre-1982				Post-1982			
	OECD sample		Non-OECD sample		OECD sample		Non-OECD sample	
Output_Gap	0.104	0.097	-0.066	-0.069	0.183	0.252	-0.029	0.002
	(0.051)**	(0.052)*	(0.043)	(0.049)	(0.083)**	(0.085)***	(0.026)	(0.028)
Country FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	345	345	580	580	341	341	824	824
R-squared	0.048	0.133	0.132	0.335	0.11	0.238	0.139	0.31

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Controls: TOT_Gap, Lagged Surplus.

Table 5 – Cyclicality of Fiscal Policy: OECD versus Non-OECD in Booms and Recessions
(Dependent variable: ΔCGSurplus in % of GDP)

	(1)	(2)	(3)	(4)
	OECD sample		Non-OECD sample	
Output_GapXBoom	-0.039	-0.002	-0.114	-0.139
	(0.07)	(0.08)	(0.039)***	(0.047)***
Output_GapXRecession	0.287	0.282	0.035	0.071
	(0.103)***	(0.108)***	(0.03)	(0.037)*
Country FE	No	Yes	No	Yes
Observations	686	686	1404	1404
R-squared	0.099	0.155	0.143	0.25

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Controls: TOT_Gap, Lagged surplus.

Table 6 – Cross country regressions: Cyclicality of Budget Surplus
(Dependent variable: Beta of budget surplus)

	(1)	(2)	(3)	(4)	(5)	(6)
Control_Corruption	0.107 (0.027)***	0.149 (0.037)***	0.142 (0.040)***	0.024 (0.034)	0.145 (0.044)***	0.076 (0.036)**
Initial GDP (per capita)		- 0.062 (0.040)	- 0.049 (0.039)	- 0.059 (0.041)	- 0.048 (0.038)	- 0.055 (0.041)
Democracy			- 0.013 (0.057)	0.022 (0.046)		
DemocracyXControl_Corruption				0.146 (0.046)***		
Polity2					- 0.002 (0.006)	- 0.001 (0.006)
Polity2XControl_Corruption						0.011 (0.004)**
Observations	87	83	81	81	81	81
R-squared	0.17	0.20	0.21	0.24	0.21	0.25

Robust standard errors in parenthesis; intercepts not reported.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7 – Cross country regressions: Cyclicality of Total Government Spending

(Dependent variable: Beta of central government spending)

	(1)	(2)	(3)	(4)	(5)	(6)
Control of Corruption	- 0.117***	- 0.144***	- 0.171***	- 0.086**	- 0.179***	- 0.107***
	(0.029)	(0.041)	(0.048)	(0.036)	(0.052)	(0.037)
Initial GDP (per capita)		0.038	- 0.010	- 0.003	- 0.004	0.005
		(0.047)	(0.044)	(0.046)	(0.045)	(0.048)
Democracy			0.243***	0.222***		
			(0.087)	(0.077)		
Democracy*Control of Corruption				- 0.109*		
				(0.058)		
Polity2					0.015**	0.015**
					(0.008)	(0.007)
Polity2*Control of Corruption						- 0.012**
						(0.005)
R-squared	0.15	0.16	0.24	0.25	0.19	0.22
n	83	79	77	77	77	77

Robust standard errors in parenthesis; intercepts not reported.

* significant at 10%

** significant at 5%

*** significant at 1%

Table 8 – Cross country regressions: Cyclicality of Budget Surplus, Corruption and Credit Ratings
(Dependent variable: Beta of Budget Surplus)

	(1)	(2)	(3)	(4)
Control_Corruption	- 0.074	- 0.011	- 0.048	- 0.014
	(0.061)	(0.070)	(0.042)	(0.040)
S & P Rating	0.057	0.053		
	(0.037)	(0.037)		
Spread			- 090	- 0.090
			(0.052)*	(0.051)*
Initial GDP	- 0.070	- 0.055	- 0.055	- 0.023
(per capita)	(0.050)	(0.047)	(0.064)	(0.059)
Democracy	- 0.007		- 0.022	
	(0.045)		(0.056)	
DemocracyXControl_Corruption	0.161		0.142	
	(0.041)***		(0.054)**	
Polity2		- 0.007		- 0.012
		(0.006)		(0.008)
Polity2XControl_Corruption		0.013		0.014
		(0.004)***		(0.005)***
Observations	63	63	45	45
R-squared	0.30	0.31	0.36	0.39

Robust standard errors in parenthesis; intercepts not reported. * significant at 10%; ** significant at 5%; *** significant at 1%