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# IMF concern for reputation and conditional lending failure: theory and empirics

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## Abstract

The IMF is entrusted with the twofold task of enforcing conditionality and deciding whether or not to continue financial assistance. In this paper we examine the implications on IMF lending behaviour of the existence of uncertainty about its ability to monitor governments' actions and to enforce conditionality. It is shown that the existence of an even small degree of uncertainty about the IMF ability as a monitor generates incentives for the IMF to take actions to protect its reputation as a good monitor. In turn, this desire for reputation distorts IMF incentive to interrupt financial assistance, i.e. programmes will be interrupted less often than it would be socially desirable. We have empirically investigated whether IMF disbursements are affected by the IMF own share of debt, which is taken as an indicator of the length of the relationship between a country and the IMF. The longer their relationship, the stronger IMF reputation will be affected in case it ultimately decides to interrupt the lending. Our results show that a higher IMF debt share does increase IMF disbursements.

Keywords: IMF programmes, conditionality, incomplete information, reputation, dynamic panel.

JEL Classification: C23, D82, F34, N2.

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# 1 Introduction

*On March 9th Argentina is supposed to make a scheduled repayment of money it owes to the International Monetary Fund. If no payment is made, the IMF must set in train a process that would eventually declare Argentina in default, and that would be uncomfortable in the extreme for the IMF. The size—\$16 billion has been lent to Argentina—would be unprecedented, with consequences for the Fund’s reputation and for the way it does business. Certainly, the Fund has got into a position that its own experts would condemn if it were a commercial bank. Some 15% of the Fund’s total lending is to Argentina, a huge concentration. And with the \$13.5 billion, three-year facility agreed in September, the Fund is in effect continuing to lend large sums to what is in effect an insolvent debtor, on the understanding that it will use this to repay past loans.*

Which is the victim? The Economist, Mar 4th 2004

*In a nutshell, the Fund’s current resources of \$150 billion seem like enough to cause moral-hazard problems (that is, to induce excessive borrowing) without being enough to deal with a really deep global financial crisis. The Fund is just too politicised to be a consistently effective lender of last resort, and if its financial structure is not changed, there are always going to be Argentinas. (If nothing else, there will always be Argentina.)*

*No, the right future for the Fund, as for the IBRD, is to phase itself out of the lending business. The Fund can still make itself very useful in co-ordinating the global financial system, in offering technical advice, and perhaps even in issuing debt ratings to countries that request it. If the global community can work its way towards an improved bankruptcy procedure for sovereign borrowers, this path will be far easier. I would recommend it regardless.*

The sisters at 60 (Ken Rogoff). The Economist, July 22nd 2004

There exists a large body of evidence supporting the view that IMF conditional lending has not succeeded in forcing countries to implement socially desirable economic reforms.<sup>1</sup> Furthermore, the IMF has recently come under criticism for allowing some countries to establish long-term relationships with the Fund, while, according to its original mandate, the Fund could only guarantee temporary assistance. Indeed, some countries have participated in a continuous series of Fund programmes over time and their duration has been increasing in recent decades (Joyce, 2004b). Moreover, a large proportion of Fund programmes are not successfully completed with non-completion being not an indicator of graduation from the Fund but rather one of future referrals (on “recidivism” see Bird, 2004).<sup>2</sup>

What are the reasons adduced by literature for conditional lending failure? They have generally been investigated looking at the characteristics of the borrowing countries, with more attention being recently devoted also to a country’s political and institutional features. For example, Ivanova et al (2003) conclude that programme implementation depends primarily on borrowing countries’ domestic political economy. More specifically, strong special interests, political instability, inefficient bureau-

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<sup>1</sup>For a review of this literature see, for example, Joyce (2004a).

<sup>2</sup>According to Mussa and Savastano (1999) only 47% of all IMF programs have been successfully completed. They defined as “completed” those programs where 75-80% or more of the planned credit was actually disbursed.

cracies, lack of political cohesion and ethno-linguistic divisions are shown to weaken programme implementation.<sup>3</sup>

However, more recently, the possibility that the IMF specific interests may influence the adoption of an IMF programme (and in turn its implementation) has also been considered. For example, Barro and Lee (2003) find that IMF loans tend to be larger and more frequent when a country has a bigger quota and more professional staff at the IMF and when a country is more connected politically and economically to the United States and other major shareholders. In the case of low income countries (when IMF lending is highly concessional), Svensson, (2000) argues that the welfare of the poor may enter the IMF utility function making its threat of termination of financial assistance not credible.

Furthermore, according to the public choice approach to institutions (Vaubel, 1986, 1991), there would be a shift in responsibility from the Executive Directors to Staff officials, who, in turn, may want to pursue the objectives of maximising their own budget and size without concern for the Fund mandate. Such a bureaucratic bias would lead “the Fund” to simply try to sign as many agreements as it can with the result that it may have little incentive to punish non compliance. Finally, Ramcharan (2003) presents an analytical model in which the IMF (as a creditor) could have little incentive to interrupt financial assistance to borrower countries that did not manage to meet conditionality. When a country’s debt becomes large enough to put its ability to repay at risk, for the IMF (as a creditor) may simply be optimal to keep on lending and rolling over the debt, until a debt restructuring mechanism (acting as a sort of bailout) is available.<sup>4</sup> In turn, such a behaviour, if anticipated by a debtor country’s government, would perversely affect its own willingness to reform.<sup>5</sup>

In this paper we join the view that the lack of credibility of the IMF threat of early terminating financial assistance is responsible for conditionality failure. However, we look at this problem from a different perspective, exploring the implications of the dual role of the IMF which simultaneously acts as a lender and as both a monitor and enforcer of economic reforms. In this context we take a political economy approach, where the IMF has its own objective function not necessarily corresponding to social welfare maximization,<sup>6</sup> and we follow a stream of literature examining the policy implications of a self-interested bank regulator.<sup>7</sup> Although this literature has been developed in a completely different framework, it actually offers useful insights for

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<sup>3</sup>Since the success of a reform crucially depends on its successful implementation (which in turn reflects a country’s political constraints) the IMF has been recently put much emphasis on a country’s “ownership” of a programme (on this see Drazen, 2002).

<sup>4</sup>Marchesi and Missale (2004) have empirically confirmed that existing multilateral debt has a robust impact on multilateral new net loans to Highly Indebted and Poor Countries (or HIPC’s). In the case of Sub-Sahara countries, Birdsall et al. (2002) have found that donors, especially bilaterals, made greater transfers to countries with high multilateral debt, despite their bad policies.

<sup>5</sup>In the case of HIPC’s, Easterly (2002) claims that multilateral creditors have worried so much about their liabilities not to pay enough attention to their ability to generate future income through economic growth. Moreover, this behaviour provided debtor countries with the incentives to avoid or postpone conditional reforms, since they anticipated that lenders would have given them loans anyway.

<sup>6</sup>Self-interest in international financial institutions can take a variety of forms (see, for example, Allegret and Dulbecco, 2004).

<sup>7</sup>See Boot and Thakor (1993), Repullo (2000), Khan and Santos (2001)

the issues tackled in this paper. In fact, bank regulators are supposed to monitor banks' risk taking and compliance with regulation (on taxpayers' behalf) and, in case of financial distress, they should use the collected information to decide whether to support the bank (leave it in the market) or close it. Between global taxpayers and the IMF there exists a similar delegation problem: the IMF acts as a delegated monitor and, through the surveillance function, Fund officials collect private information that should be used to decide whether or not to continue financial assistance. It is the informative advantage which may allow a self-interested bank regulator/Fund to take actions that may sometimes contrast with the taxpayers'/global taxpayers' interest.

Building on Boot and Thakor (1993) we model the IMF self-interest by introducing uncertainty about its ability to monitor governments' actions and to enforce conditionality. Through time global taxpayers, by observing a country's economic performance, can revise their beliefs about the IMF quality as a good monitor (it is actually assumed that the economic reforms imposed by conditionality should improve expected output). This circumstance generates incentives for the IMF to take actions to protect its reputation as a good monitor and, in turn, this desire can create significant departure from social optimum.

More specifically, the inefficiency stems from the fact that, due to its surveillance function, the IMF is always more informed than global taxpayers about the government real economic reform effort. This information advantage implies that the action of closing or continuing a programme provides global taxpayers with some information about a country's implementation of conditionality and in turn this conveys information about the IMF quality as a monitor. Thus, the desire to avoid reputation loss might lead the IMF to exhibit some laxity (relative to social optimum) in interrupting financial programmes, when countries are not meeting with conditionality.<sup>8</sup> In turn, when the threat of stopping lending is not credible, borrowing countries' governments may not have the right incentives to fully comply with conditionality.<sup>9</sup>

In particular, when the Fund decides to interrupt a financial programme, after being involved with a country for many years, it seems quite plausible to think that this circumstance can become a signal of previously bad monitoring by the IMF. The main idea is that the longer (or the more "intensively") the IMF has been involved with a country's conditional reforms, the more its reputation as a good monitor can be damaged if it suddenly decides to stop lending. In this case, a programme closure could actually imply that the Fund had not been able to monitor the implementation of reforms for a long time. As a result, the length of the relationship between the IMF and the borrower country may exacerbate the departure from the socially optimal lending rule towards stronger laxity.

We finally decided to empirically test the hypothesis that the longer the relationship between a country and the Fund the more willing to lend the IMF would be. More specifically, we empirically investigated whether a high debt and its com-

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<sup>8</sup>We should note that, if the IMF supervisory information was observable, the circumstance that the Fund may pursue objectives which are different from social welfare maximization would not cause any problem since it could be forced to take the right actions by its constituency.

<sup>9</sup>We actually make the standard assumption that governments dislike the economic reforms imposed by conditionality because they hinder the use of state apparatus to extract economic and political rents. Among others see Svensson (2000) or Drazen (2002).

position by type of creditors played an important role in explaining the allocation of IMF disbursements, by taking the level of IMF outstanding debt as a proxy for the length of the relationship between the Fund and a country.<sup>10</sup> According to our hypothesis, controlling for countries' characteristics and their economic performance, IMF disbursements should be correlated with the IMF own share of debt.

We estimated a dynamic panel of 53 middle-income countries (listed in Table 1) for the period 1982 to 2001, controlling for countries' characteristics and their economic performance and including both country-specific effects and time effects. We find that a higher level of IMF debt significantly increase IMF disbursements. Moreover, we find that larger loans went to countries in which commercial banks from industrial countries were highly exposed.<sup>11</sup> Thus, the empirical evidence looks consistent with the main prediction of the theory.

The paper is organized as follows. The model is developed in Section 2, the social optimal closure rule and the first period choice of the level of reform are discussed in this Section 3. Section 4 derives the reputational equilibrium. Section 5 develops the empirical framework and Section 6 presents the empirical results. Section 7 finally contains some policy implications and concludes the paper.

## 2 Theoretical model

### 2.1 Sequence of events

In the model there are three agents: the IMF, the government of the country entering an IMF financial programme, and global taxpayers. All agents are risk neutral. Time extends over two periods.

At  $t=0$  the country has investments in place which pay-off at  $t=1$  a random amount:  $\tilde{y} \in [0, \bar{y}]$ ,  $F(\cdot)$ ,  $f(\cdot)$ . Where  $F(\cdot)$  is a cumulative distribution function,  $f(\cdot)$  is the associated probability density function and  $\bar{y}$  is a positive finite real valued scalar. Furthermore, at  $t=0$  the country borrows 1\$ from the IMF to finance a supplementary investment project whose expected payoff depends on the country's choice of a variable  $R_1$ . By  $R_1$  we denote the degree of economic reform selected by the country's government in period 1, with  $R_1 \in [0, 1]$ .

The supplementary investment payoff yields a random payoff  $\tilde{I}_1$  at the end of the first period.  $\tilde{I}_1$  may take the value of  $I_1 > 1$ , with probability  $p_1(R_1) \in (0, 1)$ , and the value of 0 with the complementary probability. For simplicity we suppose that the IMF requires a risk-free interest rate that is assumed to be zero.

*Assumption 1.* We assume  $p_1(\cdot)$  is a continuous twice differentiable concave function of  $R_1$ . The function is strictly increasing within the range  $R_1 \in [0, R^*]$ .<sup>12</sup>

<sup>10</sup>The data show that the correlation between the two is very high (about 0.7).

<sup>11</sup>This is consistent with the evidence presented, among others, by Copelovitch (2004) who argues that IMF lending decisions are responsive to the interests of large industrial countries.

<sup>12</sup>A degree of economic reforms exceeding  $R^*$  has negative effects. This could be explained by referring to output losses due to social conflicts generated by reforms. For example, if the labour force feels that it is paying unduly for the costs of an IMF adjustment program (or that the program is imposing an unnecessary hardship), the government may lack the societal support to continue the adjustment program and efficiency may suffer (e.g. riots, ransacking of supermarkets, workers

By undertaking economic reforms up to the level  $R^*$  the government increases efficiency and thus enhances the expected payoff from the investment. However, since reforms eliminate economic and other distortions, they can also reduce the level of political and economic rents that can be extracted by the government for its private gain. Let  $C_1(R_1)$  be the cost in terms of rents reduction associated to the economic reform level. We assume the following:

*Assumption 2.*  $C_1(.)$  is a continuous twice differentiable increasing convex function of the economic reform level, where  $C_1(0) = 0$ <sup>13</sup>

At time  $t=1$  the country realises  $\tilde{y} + \tilde{I}_1$  and first period debt is paid off. It now needs a second loan to finance another investment project. The new investment also requires 1\$ to be financed. We suppose that, whatever the realized payoff at  $t=1$  is, the country always needs IMF financial assistance, that is  $\tilde{y} + \tilde{I}_1 < 2$ . When  $\tilde{y} + \tilde{I}_1$  is less than 1 the government would not be able to repay first period debt. In this case, if the financial assistance programme is continued, first period debt is postponed to the end of the second period, while, if the programme is interrupted, the IMF loses  $\tilde{y} + \tilde{I}_1 - 1$ . The assets in place at  $t=0$  expire at  $t=1$  and so there is not payoff from those assets at  $t=2$ .

If the country is allowed to continue we assume that the new investment has a random payoff  $\tilde{I}_2$  which takes the value of  $I_2 > 2$ <sup>14</sup> with probability  $p_2(R_2)$  and the value of 0 with the complementary probability. By  $R_2$  we denote the degree of economic reform selected by the government in period 2, with  $R_2 \in [0, 1]$ .

*Assumption 3.* if  $R_1 \neq R^*$ ,  $p_2(.) = p_1(.)$ ; if  $R_1 = R^*$ ,  $p_2(.) = p_1(.) + \alpha$ , where  $\alpha$  is a positive finite real valued scalar such that  $p_1(R^*) + \alpha < 1$ .

From assumptions 1 and 3 it follows that  $p_2(.)$  is strictly increasing within the range  $R_2 \in [0, R^*]$ . Furthermore we assume that the probability of success of the second period project has a "jump" when the the social optimal level of economic reforms  $R^*$  is attained in the first period. The rationale behind this hypothesis rests on the fact that financial assistance is more productive in a good policy environment. Moreover, in period 2, economic and political rents are a decreasing function of the second period reform effort. For simplicity we impose the following:

*Assumption 4.*  $C_2(.) = C_1(.)$

## 2.2 Role of IMF

The IMF is entrusted with two tasks:

1) The IMF identifies and suggests the level of economic reforms  $R^*$  which maximizes the first period country output and monitors the government's reform effort. Due to its quality as a good monitor, the IMF has the possibility to discover early departures from the optimal reform level  $R^*$  and to enforce the corrections needed to reach it by the end of the first period. If the IMF does not detect such departures early enough, it loses the possibility to enforce the right corrections. In this case the

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slowdown). In general it is realistic to consider the economic reform process as a sequential process in which time is essential to allow the economy to adapt to the new environment.

<sup>13</sup>We also assume that  $\frac{\partial p_1(0)}{\partial R_1} > \frac{\partial C_1(0)}{\partial R_1}$  to avoid corner solutions in the maximisation problem.

<sup>14</sup>This restriction guarantees that the government strictly prefers to be allowed to finance the second period project at  $t=1$  even when the total first period payoff is very low.

reform level achieved by the end of the first period will be the one which is privately preferred by the government.

2) The second task consists in the decision to refinance the country at  $t=1$ . At the end of the first period, the IMF is able to observe the actual level of reforms and it has to decide whether or not to continue lending. In the second period, for simplicity we exclude the possibility of monitoring. Moreover, since the economy terminates at the end of it, at this point, the IMF is not able any more to influence the choice of reform effort by the threat of lending termination. Thus, the IMF is not able to control the second period economic reform level.

*Assumption 5. The IMF can be of two types: a good monitor or a bad monitor. If it is a good monitor it will manage to enforce  $R^*$  at the end of the first period with probability  $\rho_g$ , if it is a bad monitor the probability would be  $\rho_b$ , with  $\rho_g > \rho_b$ .*

The IMF's type is unknown to everybody, at  $t=0$ , but global taxpayers and the country's government have got a prior belief  $\gamma \in (0, 1)$  that it is a good monitor. At  $t=1$  the IMF observes the choice of  $R_1$  and  $\tilde{y} + \tilde{I}_1$ . Global taxpayers at this stage do not observe anything apart from the IMF decision to refinance or not refinance the country. At  $t=2$  global taxpayers observe the realisation of the first period output  $\tilde{y} + \tilde{I}_1$ . The sequence of events is described in Figure 1.

The IMF maximizes a weighted sum of two arguments. The first is a "private" gain deriving from its reputation as a good monitor, the second is the social surplus arising from second period investment:

$$\text{Max } \lambda_1 \{\gamma_1 + \delta\gamma_2\} + \lambda_2 \{p_2(R_2)I_2 - 1\} \quad (1)$$

where  $\lambda_1, \delta, \lambda_2$  are positive finite real valued scalars and  $\gamma_1, \gamma_2$  are global taxpayers posterior beliefs about the IMF type at the end of the first and of the second period, respectively. If  $\lambda_1 = 0$ , the IMF would be totally selfless, while if  $\lambda_2 = 0$ , the IMF would be completely selfish.

The government, at  $t=0$ , chooses  $R_1$  to maximize the expected profits all over the two periods. The "continuation probability" is computed on the basis of the IMF conjectured lending policy, to be defined below. At  $t=1$ , if financial assistance is continued, the government chooses  $R_2$  to maximize the second period expected profits.

### 3 Socially optimal lending rule

Whatever the realization of the first period investment and the payoff from assets in place at  $t=1$  are, it will be socially optimal to continue lending if:

$$p_2(R_2)I_2 \geq 1 \quad (2)$$

Thus, the socially optimal lending rule would dictate to stop lending whenever the second period reform level chosen by the government is such that the project's NPV is negative.

By assumption 3, the socially optimal choice for  $R_2$  is:

$$R^* = \text{argmax } p_2(R_2). \quad (3)$$

To better define the socially optimal lending rule, we have to solve for the actual second period reform level that a government, with own capital equal to  $\tilde{y} + \tilde{I}_1 - 1 = \tilde{k}$ , would choose. The government solves the following optimization problem:

$$\underset{R_2}{Max} \ l(R_2) = p_2(R_2)(I_2 - (1 - \tilde{k})) - \tilde{k} - C_2(R_2) \quad (4)$$

where first period reform level is given.

Solving (4) we find that the unique maximizer of (4) is implicitly given by:

$$\frac{\frac{\partial C_2(\hat{R}_2)}{\partial R_2}}{\frac{\partial p_2(\hat{R}_2)}{\partial R_2}} = I_2 + \tilde{k} - 1 \quad (5)$$

**Proposition 1** (i)  $\hat{R}_2 < R^*$  unless  $\frac{\partial C_2(R_2)}{\partial R_2} = 0$ . (ii)  $\frac{\partial \hat{R}_2(\tilde{k})}{\partial \tilde{k}} > 0$

**Proof.** (i) It is immediate from equation (5) (ii) It derives from equation (5) and the implicit function theorem. ■

Proposition 1 implies that the lower the country's second period own capital (i.e. the higher the IMF financial assistance), the lower the reform effort chosen by the government in the second period.<sup>15</sup> This result is quite intuitive since the debt overhang reduces the ownership on the project's output, whereas the cost of reforms in terms of rents reduction are always entirely borne by the government.

*Assumption 6.* If  $R_1 = R^*$ , it is socially optimal to continue lending, that is:

$$(p_1(\hat{R}_2(\tilde{k})) + \alpha)I_2 > 1 \quad \forall \tilde{k}$$

Assumption 6 implies that, if in the first period the IMF manages to enforce the socially optimal level of reforms, the net present value of the second period project will be positive, independently of the second period choice of reform effort. Thus, accomplishment of conditionality in the first period is a sufficient condition for having access to a financial programme at  $t=1$ , under a socially optimal lending rule. We can now state the following proposition:

**Proposition 2** If  $R_1 \neq R^*$  there exists a threshold level for  $\tilde{k}$  such that if  $\tilde{k} < \bar{k}$  it is economically rational for the IMF to stop lending. If  $\tilde{k} \geq \bar{k}$ , it is socially optimal to continue, where  $\bar{k}$  is found solving  $p_2(\hat{R}_2(\bar{k}))I_2 = 1$ .

When the IMF follows a socially optimal lending rule, choosing a high level of reforms in the first period, provides insurance against early termination of the programme (due to adverse shocks) because by increasing the first period reform effort the probability of low realizations of  $\tilde{k}$  is reduced. At the limit, i.e. when  $R_1 = R^*$ , the probability of continuing with the programme is one.

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<sup>15</sup>Notice that when  $I + \tilde{k} - 1 \leq 0$ ,  $\hat{R}_2 = 0$ .

### 3.1 The equilibrium level of first period economic reforms

In this Section we want to derive the government's privately optimal level of first period reforms. We start by assuming that the government's privately optimal level of first period reforms is always less than  $R^*$ .<sup>16</sup> First of all we analyse the case in which the IMF will never stop lending, while we will analyse below the case in which the IMF will follow the socially optimal lending rule. Let  $\hat{R}_1^L$  represent the government's privately optimal first period reform under the assumption that the IMF is always willing to lend. Let's now define the expected profits to the government for acceding to the second loan as follows:

$$L(R_1) = p_1(R_1) \int_0^{\bar{y}} p_2(\hat{R}_2(\tilde{k}^s))(I_2 - (1 - \tilde{k}^s)) - \tilde{k}^s - C_2(\hat{R}_2(\tilde{k}^s))f(y)dy + \quad (6)$$

$$(1 - p_1(R_1)) \int_0^{\bar{y}} p_2(\hat{R}_2(\tilde{k}^f))(I_2 - (1 - \tilde{k}^f)) - \tilde{k}^f - C_2(\hat{R}_2(\tilde{k}^f))f(y)dy$$

where  $\tilde{k}^s$  is the country's own capital in case of success of the first period investment while  $\tilde{k}^f$  is the level of capital in case of failure.

Let  $\rho = \gamma\rho_g + (1 - \gamma)\rho_b$  be the prior belief-weighted probability that the IMF will be able to enforce the choice of  $R^*$  in the first period and let  $\phi(R_1) = p_1(R_1)(I_1 - 1) - C_1(R_1)$  denote the government's first period expected profits of the investment project. We can now write the country's government problem, at  $t=0$ , as that of choosing  $R_1$  to maximize the following:

$$X(R_1) = (1 - \rho)(\phi(R_1) + L(R_1)) + \rho(\phi(R^*) + L(R^*)) \quad (7)$$

where  $\hat{R}_1^L$  should satisfy the following:

$$\frac{\partial X(R_1)}{\partial R_1} = (1 - \rho) \left( \frac{\partial \phi(R_1)}{\partial R_1} + \frac{\partial L(R_1)}{\partial R_1} \right) = 0. \quad (8)$$

We want now to examine the relationship between  $\tilde{k}$  and the second period profits. From equation (4) we obtain:

$$l(\hat{R}_2(\tilde{k})) = p_2(\hat{R}_2(\tilde{k}))(I_2 - (1 - \tilde{k})) - \tilde{k} - C_2(\hat{R}_2(\tilde{k})) \quad (9)$$

where  $\hat{R}_2(\tilde{k})$  is given by (5) and (9) represents, for each value of  $\tilde{k}$ , the maximum value of the second period expected profits of the government, conditional on being allowed to continue.

**Proposition 3** *At the beginning of the second period for a given choice of the first period reform, the government is better off with a lower capital, conditional on being allowed to continue.*

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<sup>16</sup>This assumption is needed in order to exclude that the increase in the second period probability of success ( $\alpha$ ), deriving from the choice of  $R^*$  at  $t=0$ , would be sufficient to induce the government to choose the social optimum level of effort. And in any case if the IMF and the recipient government had the same objectives would not be interesting to us.

**Proof.** Using the envelope theorem, it is easy to show that:

$$\frac{\partial l(\widehat{R}_2(\tilde{k}))}{\partial \tilde{k}} = p_2(\widehat{R}_2) - 1 < 0.$$

■

Proposition 3 tells us that the government has an interest in undertaking actions in the first period that result in a lower expected capital in the second period, conditional on being allowed to continue. Therefore, given the positive relationship between  $R_1$  and the expected value of  $\tilde{k}$  (namely  $\frac{\partial E_0(\tilde{k}|R_1)}{\partial R_1} > 0$ ), the government's incentive would be perversely affected. More specifically:

**Proposition 4** *Conditional on being allowed to finance the second period project, the government has an incentive to choose a lower level of reforms  $R_1$  than it would choose in a single-period setting .*

**Proof.** It is obvious by observing that  $\frac{\partial L(R_1)}{\partial R_1} < 0 \forall R_1$ . Thus, when  $R_1 = \widehat{R}_1^L$ , by equation (8),  $\frac{\partial \phi(R_1)}{\partial R_1} > 0$ . ■

Suppose now that the IMF will refuse to concede a new loan whenever  $\tilde{k} < \bar{k}$  and let's assume that  $\tilde{k}^s > \bar{k}$ , for each realisation of  $\tilde{y}$ . On the contrary, when  $\tilde{k} = \tilde{k}^f$ , let  $y_c = \bar{k} + 1$  be the minimum realisation of  $\tilde{y}$  which allows the government to obtain the second loan in case of failure of the first period project. Let's now define  $M(R_1, y_c)$  as the second period expected profits, conditional on the socially optimal lending rule:

$$\begin{aligned} M(R_1, y_c) = & p_1(R_1) \int_0^{\bar{y}} p_2(\widehat{R}_2(\tilde{k}^s))(I_2 - (1 - \tilde{k}^s)) - \tilde{k}^s - C_2(\widehat{R}_2(\tilde{k}^s))f(y)dy + (10) \\ & (1 - p_1(R_1)) \int_{y_c}^{\bar{y}} p_2(\widehat{R}_2(\tilde{k}^f))(I_2 - (1 - \tilde{k}^f)) - \tilde{k}^f - C_2(\widehat{R}_2(\tilde{k}^f))f(y)dy \end{aligned}$$

It is immediate to verify that:

$$M(R_1, y_c) = L(R_1) - (1 - p_1(R_1)) \int_0^{y_c} p_2(\widehat{R}_2(\tilde{k}^f))(I_2 - (1 - \tilde{k}^f)) - \tilde{k}^f - C_2(\widehat{R}_2(\tilde{k}^f))f(y)dy \quad (11)$$

Thus, the government problem, at  $t=0$ , now becomes that of choosing  $R_1$  to maximize the following:

$$X(R_1, y_c) = (1 - \rho)(\phi(R_1) + M(R_1, y_c)) + \rho(\phi(R^*) + L(R^*)) \quad (12)$$

Let now  $\widehat{R}_1^{SO}$  be the level of first period reform which maximises (12).

**Proposition 5** *If the IMF will refuse credit continuation whenever  $\tilde{y} < y_c$  the desire to preserve second period profits will induce the government to choose a higher reform level in the first period, that is  $\widehat{R}_1^{SO} > \widehat{R}_1^L$*

**Proof.** To prove the result it is sufficient to show that:

$$\frac{\partial X(R_1, y_c)}{\partial R_1} \Big|_{R_1 = \widehat{R}_1^L} > 0$$

From equation (8) noting that:

$$\frac{\partial \phi(R_1)}{\partial R_1} + \frac{\partial L(R_1)}{\partial R_1} \Big|_{R_1=\hat{R}_1^L} = 0$$

we have:

$$\begin{aligned} & \frac{\partial X(R_1, y_c)}{\partial R_1} \Big|_{R_1=\hat{R}_1^L} = \\ & -(1-\rho) \left( \frac{\partial(1-p(R_1))}{\partial R_1} \right) \int_0^{y_c} p_2(\hat{R}_2(\tilde{k}^f))(I_2 - (1-\tilde{k}^f)) - \tilde{k}^f - C_2(\hat{R}_2(\tilde{k}^f))f(y)dy \end{aligned}$$

where the right hand side is surely positive. ■

## 4 Lending policy in a reputational equilibrium

In this Section we want to examine whether the socially optimal lending policy is sustainable in equilibrium. We start by assuming that the market (both global taxpayers and the country's government) believe that the IMF will stop lending whenever  $\tilde{k} < \bar{k}$  and we will show that this belief is unsustainable in equilibrium. The first thing to show is that it is always true that:  $\gamma_1(NL) < \gamma_1(L)$ , where NL stands for Not Lending and L for Lending.

If global taxpayers observe L this can be the consequence of two events: either  $R_1 = R^*$ , or  $R_1 = \hat{R}_1^{SO}$  and  $\tilde{k} > \bar{k}$ . Applying Bayes' rule we have

$$\gamma_1(L) = \text{prob}(g | L) = \frac{\gamma \text{prob}(L | g)}{\gamma \text{prob}(L | g) + (1-\gamma) \text{prob}(L | b)} \quad (13)$$

where:

$$\text{prob}(L | g) = \rho_g + (1-\rho_g) \int_{\bar{k}}^{I+\bar{y}-1} h(\tilde{k} | R_1 = \hat{R}_1^{SO}) d\tilde{k} \quad (14)$$

and

$$\text{prob}(L | b) = \rho_b + (1-\rho_b) \int_{\bar{k}}^{I+\bar{y}-1} h(\tilde{k} | R_1 = \hat{R}_1^{SO}) d\tilde{k} \quad (15)$$

by which it is easy to show that  $\gamma_1(L) > \gamma$  noting that (14) is greater than (15).<sup>17</sup> Alternatively, if global taxpayers observe NL, this event signals that the joint event  $R_1 < R^*$  and  $\tilde{k} < \bar{k}$  has realized. The interruption of the lending programme provides global taxpayers with the information that the IMF has not been able to monitor and finally enforce the optimal level of reforms. Since this is more likely for a bad monitor than for a good monitor, applying Bayes' rule, we have:

$$\gamma_1(NL) = \text{prob}(g | NL) = \frac{\gamma \text{prob}(NL | g)}{\gamma \text{prob}(NL | g) + (1-\gamma) \text{prob}(NL | b)}$$

where

$$\text{prob}(NL | g) = 1 - \rho_g$$

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<sup>17</sup>  $h$  is the probability density function of the sum of the two stochastic variables  $\tilde{I}_1$  and  $\tilde{y}$ .

and

$$prob(NL | b) = 1 - \rho_b$$

by which it is easy to show that  $\gamma_1(NL) < \gamma$ . Therefore  $\gamma_1(NL) < \gamma < \gamma_l(L)$ .

If the IMF was completely selfish its objective function would be the first argument of (1). If the financial assistance programme was stopped at the end of the first period the IMF would end up with:

$$\gamma_1(NL) + \delta\gamma_1(NL)$$

since the information set remains the same over the two periods (i.e.  $\gamma_1 = \gamma_2$ ). While, if the IMF did not stop lending, it would obtain:

$$\gamma_1(L) + \delta\gamma_2(L, \tilde{k})$$

**Proposition 6**  $\gamma_2(L, \tilde{k}) > \gamma_1(NL) \quad \forall \tilde{k}$

**Proof.** (i) If  $\tilde{k} > \bar{k}$ , global taxpayers, applying Bayes' rule, would obtain:

$$prob(L, \tilde{k} > \bar{k} | g) = \rho_g prob(\tilde{k} > \bar{k} | R_1 = R^*) + (1 - \rho_g) prob(\tilde{k} > \bar{k} | R_1 = \hat{R}_1^{SO})$$

$$prob(L, \tilde{k} > \bar{k} | b) = \rho_b prob(\tilde{k} > \bar{k} | R_1 = R^*) + (1 - \rho_b) prob(\tilde{k} > \bar{k} | R_1 = \hat{R}_1^{SO})$$

Since  $\frac{\partial E_0(\tilde{k}|R_1)}{\partial R_1} > 0$ , we observe that

$$\frac{prob(L, \tilde{k} > \bar{k} | b)}{prob(L, \tilde{k} > \bar{k} | g)} < \frac{1 - \rho_b}{1 - \rho_g}$$

by which it is easy to show the result.

(ii)  $\tilde{k} < \bar{k}$ , given the conjectured equilibrium, strategies, this observation would be consistent only with the choice of  $R_1 = R^*$ , then:

$$\frac{prob(L, \tilde{k} < \bar{k} | b)}{prob(L, \tilde{k} < \bar{k} | g)} = \frac{\rho_b}{\rho_g} < \frac{1 - \rho_b}{1 - \rho_g}$$

and the result is straightforward. ■

Therefore, it follows that, for each level of  $\tilde{k}$  observed by global taxpayers at the end of the second period, it would never be rational for the “completely selfish” IMF to interrupt the financial assistance programme. Thus, when the IMF is totally selfish, the socially optimal lending rule cannot be sustainable in equilibrium.<sup>18</sup> Alternatively, when the IMF objective function is a mix of the two arguments (reputation and second period project's NPV), the IMF will weight the reputation loss deriving from the decision of stopping the programme against the welfare loss deriving from the decision to finance a negative NPV project. In this case, the following Proposition describes the IMF optimal strategies, given the global taxpayers equilibrium beliefs.

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<sup>18</sup>When the IMF is completely selfless (i.e. it is just a social surplus maximizer) it will always apply the socially optimal lending rule and so this will be the only possible equilibrium.

**Proposition 7** *The following strategies and beliefs constitute a Bayesian subgame perfect equilibrium.*

IMF equilibrium strategies (*reputational lending rule*).

When  $R_1 = R^*$ , the IMF will continue lending whatever the level of capital is. When  $R_1 \neq R^*$ , the IMF will stop lending if  $\tilde{k} \leq \overleftarrow{k}$ , while it will continue lending if  $\tilde{k} \geq \overrightarrow{k}$ . For intermediate  $\tilde{k}$ , i.e.  $\overleftarrow{k} < \tilde{k} < \overrightarrow{k}$ , the IMF will continue lending with probability  $\theta(\tilde{k})$ , where  $\frac{\partial \theta(\tilde{k})}{\partial \tilde{k}} > 0$  and  $\theta(\overrightarrow{k}) = 1$  and  $\theta(\overleftarrow{k}) = 0$ .

Global taxpayers equilibrium beliefs.

*First stage.*

If global taxpayers observe  $L$ , they would know that this can be due to two events: either  $R_1 = R^*$  or, with probability  $\theta(\tilde{k})$ ,  $R_1 \neq R^*$  and  $\tilde{k} > \overleftarrow{k}$ , and they would update their beliefs accordingly, using Bayes' rule. Alternatively, if they observe  $NL$ , they would know with certainty that  $R_1 \neq R^*$  and they would update their beliefs accordingly using Bayes' rule.

*Second stage.*

(i)  $L$  has been observed at  $t=1$ . If global taxpayers observe  $\tilde{k} \leq \overleftarrow{k}$  they would know with certainty that  $R_1 = R^*$  and they would update their beliefs accordingly, using Bayes' rule. If global taxpayers observe  $\tilde{k} > \overleftarrow{k}$  they would know that this can be due because of two events: either  $R_1 = R^*$  or, with probability  $\theta(\tilde{k})$ ,  $R_1 \neq R^*$  and  $\tilde{k} > \overleftarrow{k}$ , and they would update their beliefs accordingly using Bayes' rule.

(ii)  $NL$  has been observed at  $t=1$ . Since the information set remains the same over the two periods:  $\gamma_1 = \gamma_2$ .

**Proof.** See the Appendix ■

Proposition 7 implies that in equilibrium the IMF will stop lending less often than it would be recommended by a socially optimal lending rule. Figure 2 represents the welfare loss and the private gain in reputation of the government as a function of the quantity of the level of capital. Three relevant cases are represented, according to the value of  $\tilde{k}$ . If  $-1 \leq \tilde{k} \leq \overleftarrow{k}$ , since the welfare loss of the choice  $L$  cannot be smaller than the private gain in reputation of the choice  $L$ , the IMF will not have any incentive to deviate from the equilibrium strategy ( $NL$ ). Alternatively, if  $\overleftarrow{k} \leq \tilde{k} \leq \overrightarrow{k}$ , the private gain in reputation associated to  $L$  is greater than the welfare loss associated to  $NL$ , and so the Fund will lend with probability one even when  $R_1 \neq R^*$ . Finally, if  $\overleftarrow{k} \leq \tilde{k} \leq \overrightarrow{k}$ , for the equilibrium strategies to be consistent with the equilibrium beliefs, the probability of lending ( $\theta(\tilde{k})$ ) should be such that the welfare loss and the private gain of  $L$  should be the same, namely the IMF should be indifferent between  $L$  and  $NL$ .

**Proposition 8** *Given the IMF reputational lending rule, the government will choose  $R_1$  to maximise the expected profits over the two periods. Calling  $\hat{R}_1^R$  such optimal value of  $R_1$ , we have that  $\hat{R}_1^R < \hat{R}_1^{SO}$ .*

**Proof.** Since in equilibrium the IMF will stop lending less often than it would be recommended by a social optimal lending rule, this result is proved by applying Proposition 5 ■

**Lemma 9** *The reform level chosen by the government in the first period is a decreasing function of the weight that the IMF attaches to the pursuit of its reputation as a good monitor.*

**Proof.** This result easily follows noting that:

$$\frac{\partial \overleftarrow{k}}{\partial \lambda_1} < 0$$

that is, the greater the weight that the IMF attaches to its reputation gain, the lower the threshold level of capital that would prevent the country from obtaining a second loan. Therefore, the departure from the socially optimal lending rule increases with  $\lambda_1$ . ■

The threat of future termination of an IMF programme is meant to be the main factor which may contrast the government's adverse incentives towards reforming. However, we have shown that if the IMF cares about its reputation as a good monitor, the existence of uncertainty about its ability to enforce conditionality can distort its lending policy towards a too lax behaviour. This in turn implies a departure from the socially optimal level of reform in the first period of the programme. Moreover, the more lax the lending policy, the higher the probability of financing a negative NPV project in the second period, since the level of second period reform is an increasing function of a country's capital.

## 5 Empirical model

The main result of the theoretical model implies that the desire to avoid reputation loss might lead the IMF to exhibit some laxity (relative to social optimum) in interrupting financial programmes. This conclusion would also, intuitively, suggests that the longer (or the more intensively) the IMF has been involved with a country's reforms, the more its reputation as a good monitor could be damaged if it suddenly decides to stop lending. Thus, taking IMF debt as a proxy for the length of the relationship between the Fund and a country, in this Section we empirically test the hypothesis that the longer this relationship the more willing to lend the IMF would be. More specifically, we expect to find a positive correlation between IMF disbursements and the lagged value of the IMF own debt share.

We will examine the behaviour of IMF disbursements for the period 1982- 2001. The reason we focus on this period is that the debt crisis of the early 1980s arguably marked a shift in regime. Data on loans are from Global Development Finance (GDF) and World Development Indicator statistics of the World Bank. We confine our attention to long-term loans (except in the IMF case where there is no such distinction), since the GDF database does not provide any information on the type of creditor in the case of short-term loans. However, long-term loans are fairly representative of the aggregate behaviour, since short-term loans have been a small share of total loans for the period under investigation.<sup>19</sup>

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<sup>19</sup>Figure 3 shows that the short term debt share is comprised between 10 and 20% throughout the all sample

We estimate a dynamic panel of 53 middle-income countries for the period 1982 to 2001 including both country-specific and time effects. Data availability has also limited the sample group to 53 middle-income countries, instead of the 93 original sample. We have chosen a dynamic specification, i.e. we include a lag of the dependent variable among the regressors, to account for the short run dynamics of IMF disbursements. The dynamic specification allows for a correct estimation of the effect of high levels of debt by controlling for the autocorrelation of IMF disbursements.

The estimated equations for net loans and grants are as follows:

$$D_{i,t} = b_0 + b_1 D_{i,t-1} + b_2 D_{i,t-1}^j + b_3 B_{i,t-1}^j + b_4 Z_{i,t-1} + b_5 C_i + b_6 T_t + b_7 H_i B_{i,t-1}^j \quad (16)$$

where  $D_{i,t}$  denotes IMF disbursements (relative to GDP) to country  $i$  and  $D_{i,t-1}^j$  denotes long-term disbursements (relative to GDP) to country  $i$  from creditor  $j$  (i.e. bilateral, multilateral and private creditors, as distinguished between commercial banks loans and bonds). To examine the relation between IMF disbursements and a country's degree of indebtedness, we consider the stock of debt owed to the IMF and the stock of long-term debt (relative to GDP) owed to bilateral, multilateral and private creditors (distinguished between commercial banks and private bondholders) and enter the five types of debt separately. That is,  $B_{i,t-1}^j$  is the vector of the stocks of debt held by different creditors.<sup>20</sup> As we have already explained in the Introduction, the IMF debt share is taken as a proxy for the length of the relationship between the Fund and a country.

To control for countries characteristics, we include the set of variables  $Z_{i,t-1}$  as explanatory variables. They have been chosen among those suggested by the literature on IMF loans determinants, which however does not specifically distinguish between the determinants of the loan amount and the determinants of the arrangements themselves. As Knight and Santaella (1997) point out, the regressions can be interpreted as a reduced form derived from both the "demand" for an IMF programme by a recipient country and the IMF "supply". In the "demand side," their estimates suggest that lower level of international reserves, per capita GDP, domestic investment and higher values of the external debt service, movements in the real exchange rate, a dummy indicating previous Fund arrangements are significant determinants of a country's interest in a Fund arrangement. Among the supply factors, they find that policy measures to increase fiscal revenue, to reduce government expenditure, to tighten domestic credit and to adjust the exchange rate, positively affect the Fund approval of an arrangement. More recently, following the increasing interest on the impact of political and institutional factors on economic performance (among others see Acemoglu et al. 2001, Knack and Keefer, 1995), political, institutional and social type of variables have also been considered.<sup>21</sup> According to Sturm et al. (2004), however, while mostly economic variables are robustly related to IMF lending activity, most political variables are non-significant.<sup>22</sup>

Therefore, the set  $Z_{t-1}$  include (previous year) economic performance as measured with the per capita income, the rate of inflation, GDP growth, the amount of inter-

<sup>20</sup>Figure 4 actually shows the pattern of all these debt shares in the period 1981-'01.

<sup>21</sup>For example, ethnic, demographic and geographic variables.

<sup>22</sup>To the extent that political factors matter, they seem more closely related to the conclusion of IMF agreements than to the disbursement of IMF credits.

national reserves (to imports), the current account balance (to GDP), the domestic (fixed) investments (to GDP), the growth of government consumption (to GDP), total debt service (to exports). These variables should control for the demand side of IMF loans. More specifically, lower per capita income, higher inflation, lower GDP growth, lower investments, smaller reserves, higher deficits of the current account, higher growth in government expenditure and higher debt service should all increase the probability that a country ultimately turns to the IMF for funding. At the same time, however, the willingness of the IMF to provide funds may be lower in case of high inflation and increasing government expenditure (supply side). Among the "supply side variables" we also include population among the regressors, as larger countries may more easily get support to the extent that the "systemic" or "contagion" risk of a balance of payments problem in these countries is higher than in smaller countries (the "too big to fail" hypothesis). As for the quality of institutions we include a PRCL dummy, i.e. a dummy=1 for either free or partly free countries and 0 otherwise (according to the index of "Political Rights and Civil Liberties" or PCRL). The IMF should generally prefer lending to countries that are more liberal (proxied by dPRCL) and with better institutions (Bird and Rowlands, 2001).<sup>23</sup>

The countries dummies  $C_i$  are used to control for country specific characteristics. We also expect them to capture some other supply side (strategic) motivations for IMF loans, which have been examined in the literature (e.g. Barro and Lee, 2003 and Ivanova et al., 2003), for example measures of political cohesion, of ethnic fractionalisation (leading to conflicts in society and thus undermining the reform efforts), special interests (such as special interests represented in parliament), share of IMF quotas. Finally,  $T_t$  is a set of time dummies.

To further investigate on the possibly positive relation between IMF loans and the degree of a country's indebtedness we test whether this relation is significantly different than in the case of more (than the sample average) indebted countries respect to the rest of the sample. We do so by interacting the debt (relative to GDP) owed to the IMF, to bilateral and multilateral creditors, to commercial banks and private bondholders with the dummy  $HD_i$  (high ratios of both debt to export and debt to GDP) which takes the value of one in the case of a more (than the average) indebted country. More specifically, HD is equal to one if a country reaches either a value of its debt to export ratio greater than the sample average (199%) or a value of its debt to GDP ratio greater than the sample average (56%). In particular, under the hypothesis of "lending driven by reputation", the amount of loans that the IMF is willing to provide, should increase with the stock of debt held.

Tables 2 and 3 contain all the details on our variable definitions and sources.

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<sup>23</sup>We did not consider the effect that elections might have on the incentive of a government to turn to the Fund. Przeworski and Vreeland (2000), for example, find evidence which suggests that governments are more likely to enter an agreement early in the election term, hoping that any perceived stigma of signing it will be forgotten before the next elections. Dreher and Vaubel (2004) report that the net credit supplied by the Fund is higher on election time, which in turn suggests that IMF credit might help governments to finance electoral campaigns.

## 5.1 The estimation method

We adopt a GLS fixed effect estimator in order to control for countries unobservables and to correct for heteroskedasticity across countries. To account for the short run dynamics of net loans and grants we include a lag of the dependent variable among the regressors. The dynamic specification allows for a correct estimation of the effect of high levels of debt by controlling for the autocorrelation of the IMF disbursements. Indeed, a strong dependence of the IMF disbursements from the IMF debt share in the static specification might actually reflect the autocorrelation of the disbursements which are typically disbursed in a number of installments over time. Without correcting for the short run dynamics, a correlation between loans and debt could reflect a common deterministic trend. The time dummies capture the contemporaneous correlations across countries.

In a typical panel, which has vastly more individuals than time periods, the inclusion of the lagged dependent variable would introduce a bias since the dependent variable, and thus the lagged dependent variable (a right hand regressor), are functions of the individual specific component of the error term. Nickell (1981) shows that in the AR(1) case the bias in estimating a dynamic fixed effects model becomes less important as  $T$  grows. Judson and Owen (1999) test the performance of the least squares fixed effects estimator by means of Monte Carlo simulations, concentrating on panels with typical macroeconomic dimensions (like ours), i.e. small  $N$  and  $T$ . Their analysis suggest that the fixed effects estimator performs fairly well when  $T > 20$ , i.e. with a  $T$  dimension similar to ours.

The fixed effects assumes homoskedasticity and if the assumption is not met then the estimates will be inefficient. A groupwise likelihood ratio heteroskedasticity test was performed on the residuals of the baseline model estimated by OLS. The test is chi-squared distributed with  $N-1$  degrees of freedom, where  $N$  is the number of groups in the sample. The result of the test led to a rejection of the null hypothesis of homoskedasticity across groups for both net loans and grants regressions.

Baltagi and Li (1995) suggest an LM test for serial correlation in fixed effects models where the asymptotic distributions of the test statistics is calculated for large  $T$ . Under the alternative assumption for the error autocorrelation structure, i.e. an AR(1), the null hypothesis of no serial correlation in the disturbance is not rejected at conventional levels. Thus, we did not correct for the autocorrelations in the residuals and to adopt a feasible fixed effect GLS estimator, incorporating only heteroskedasticity across countries.

## 6 Estimation results

We estimate our panel of 53 countries for the period 1982 to 2001 by GLS with country-specific effects and time effects. The hypotheses of not significance of country dummies and time dummies were indeed rejected at any reasonable significance level, is shown in Table 4. The results of the estimation of equation (1) is also presented in Table 4.

As expected, IMF loans are rather persistent. Interestingly, and consistently with

other results in this literature, economic performance does appear to influence IMF lending. Column 1 shows that a lower GDP growth, lower international reserves, higher current account deficits, and smaller investments all have a positive effect on IMF lending (i.e. a worse economic performance increase the demand for IMF loans) and these effects are significant at the 5% level (except for the impact of the reserves level which is significant only at the 10%). By contrast, per capita GDP and the rate of inflation do not significantly affect IMF loans and the growth rate of government consumption negatively affects the probability of an agreement with the IMF (though not at conventional levels of significance). A heavy debt service burden (relative to exports) increases countries' need for external finance to service their debt and thus the demand for loans, where this effect is highly significant (at the 1%).<sup>24</sup> Finally, the dummy for greater "Political Rights and Civil Liberties" has the expected positive sign even if it is not significant at the conventional level.

The important evidence concerns the effect of the debt shares (that we divide into IMF, bilateral, multilateral, commercial bank debt and into debt held by private bondholders) on the IMF disbursements, depending on the debt holder type. Column 1 shows that the coefficients on the debt ratios are all positive (except for the debt share of the multilaterals which is negative) but that only the coefficients of the IMF quota is highly significant (at the 5%), while the coefficient of the share of debt held by commercial banks is also significant but only at the 10% level. Thus, the IMF looks strikingly more generous with high-(IMF) debt countries than with low-(IMF) debt countries.<sup>25</sup> The estimated regressions show that IMF disbursements are not significantly related to previous-year disbursements from any other group of creditors: only the lagged dependent variable is strongly significant (at 5%).

This relation between IMF new loans and IMF debt suggests that debt ownership appears to be an important determinant of the Fund lending decisions. Indeed, IMF disbursements significantly increase with the lagged value of the IMF outstanding debt, while the impact of bilateral and multilateral debt and of the debt share held by private bondholders is not significant, at least at conventional levels. This evidence clearly confirms that the IMF is positively influenced by its own debt share when deciding about whether continuing lending. In turn, this is consistent with the main prediction of the theoretical model, according to which the longer (or the more "intense") the relationship between the country and the IMF, the stronger the IMF concern for reputation and so the more willing to lend the IMF will be.

However, we should stress here that this evidence could also be consistent with the hypothesis of the IMF just being concerned with avoiding default with a country, for example not to report an economic loss in its balance sheets (the so called defensive lending hypothesis). A concern for financial stability looks, instead, as a weaker explanation for IMF disbursements. In fact, if it was really an issue, new disbursements should be correlated also with other creditors' debt shares and not only with the IMF one (especially since it is the lowest, as Figure 4 shows).

To check the robustness of our results, we re-estimated equations (1) using a di-

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<sup>24</sup>If interpreted as a supply side type of variable, it could also imply that the IMF is more willing to give loans if a country is used to service its debt.

<sup>25</sup>We should note that this relationship cannot be explained by the IMF being the greatest creditor of these countries. On the contrary, Figure 4 shows that the IMF debt share is the lowest.

chotomic variable as a proxy of high indebtedness and the results are presented in column 2 of Table 4. Previous results are generally confirmed by the new estimates. IMF disbursements are highly persistent and, among the regressors related to a borrower’s economic performance, those having significant coefficients are the same as those presented in column 1. Namely, the growth rate of GDP (negative and significant at 5%), the level of international reserves (negative and significant at 5%), the deficit of the current account (now only significant at 10%) and the total debt service (positive and significant at 1%). More importantly, while a higher stock of IMF debt is not related to IMF disbursements, for “below the average-indebted countries”, in the case of “above the average-indebted countries”, the coefficient of the IMF debt share, interacted with the HD dummy, is positive and significant at the 5% level. Since this result does not apply for all the other debt shares interacted with the HD dummy, we believe this represents further evidence in support of our theoretical results.

## 7 Conclusions

IMF conditionality specifies policies and structural reforms which borrowing countries must meet to receive its financial resources. In principle, the Fund can enable governments to implement economic reforms as a result of the leverage it exerts as a creditor. In practice the effectiveness of the conditional lending approach has been limited and numerous empirical studies have shown that a large proportion of Fund programs have not been successfully completed. In other words, long term financial assistance has often come with an increasing debt burden but with only modest reforms.

This unsatisfactory record of conditional lending has been explained referring to both demand side and supply side factors. Among the latter (i.e. sources of inefficiency within the IMF), the literature has pointed out how the existence of bureaucratic and political biases and altruism might be responsible for the lack of credibility characterising the IMF threat of interrupting financial assistance, when a country is not complying with conditionality.

In this paper we also argue that the lack of credibility of the termination threat may be one possible explanation of conditional lending failure. However, we suggest that such lack of credibility might be attributed to a concern for reputation of the IMF, which acts at the same time as a creditor and a monitor and enforcer of reforms.

The IMF desire to hide its surveillance failures, in order to preserve its reputation of being a good monitor, may actually distort its lending decisions towards greater laxity (relative to social optimum) in punishing non-compliance with economic reforms. Moreover, such distortionary incentives (towards excessive lending) may be exacerbated by the length of the relationship between a country and the IMF. In fact, the longer this relationship, the more informative (for the quality of the IMF monitoring) the decision to interrupt a programme will be, since this outcome will have been influenced by many past monitoring actions.

We have empirically tested the hypothesis that larger departures from socially optimal lending rule are associated with longer relationships between a country and

the IMF, namely that the longer the IMF has been involved with a country, the larger its disbursements will be. The Fund own share of debt is taken here as a proxy of the duration of its relationship with a country. Estimating a dynamic panel of 53 middle-income countries in the period 1982 to 2001, we have empirically investigated whether a high debt, and its composition by type of creditors, played an important role in explaining the allocation of IMF disbursements, while controlling for countries' characteristics and their economic performance. Our empirical results show that a higher level of IMF debt significantly increases IMF disbursements. Thus, the empirical evidence is consistent with the main prediction of the theory.

An immediate policy implication of our analysis would be that, in order to eliminate distortions in the IMF lending policy, it would be better to separate its responsibility of lending from that of monitoring. For example, the IMF could be responsible for designing appropriate policy conditions, monitoring and reporting, while, based on such reports, financial support could be decided by a separated intergovernmental body. An alternative proposal would envisage giving back to governments the responsibility for designing and implementing economic reforms. The surveillance function should be limited to the periodical evaluation of the attainment of objectives, rather than to the implementation of particular policy measures (Collier et al., 1997). In other words, substituting "procedures conditionality" with "target conditionality", the IMF would be less involved in managing reforms at a micro level and, in turn, it would be less responsible for observed disappointing results in the recipient countries.

## References

- [1] Acemoglu, D., Robinson, J.A., Johnson, S., 2001. The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review* 91, 1369-1401.
- [2] Allegret, J.P., Dulbecco, P., 2004. The Institutional Failures of Bretton Woods Institutions Conditionality. Mimeo.
- [3] Baltagi, B., Li, Q., 1995. Testing AR(1) against MA(1) disturbances in error component model. *Journal of Econometrics* 68.
- [4] Barro, R.J., Lee, J.W., 2003. IMF Programs: who is chosen and what are the effects? Harvard University, mimeo.
- [5] Bird, G. , Rowlands, D., 2001. IMF Lending: How Is It Affected by Economic, Political, and Institutional Factors. *Journal of Policy Reform* 4, 243-270.
- [6] Bird, G., Hussain, M., Joyce, J.P., 2004. Many Happy Returns? Recidivism and the IMF. *Journal of International Money and Finance* 23.
- [7] Birdsall, N., Claessens, S., Diwan, I., 2002. Policy Selectivity Foregone: Debt and Donor Behaviour in Africa. Center for Global Development Working Paper No. 17.

- [8] Boot, W.A., Thakor A.V., 1993 Self-Interested Bank Regulation. *American Economic Review* 83, 206-212.
- [9] Burnside, C., Dollar, D., 2000. Aid, Policies and Growth. *American Economic Review* 90, 847–868.
- [10] Collier, P., Guillaumont, P., Guillaumont, S., Gunning J.W., 1997. Redesigning conditionality. *World Development* 25, 1399-1407
- [11] Copelovitch, M., 2004. Private debt composition and the political economy of IMF lending. Harvard University, mimeo.
- [12] Drazen, A. 2002. Conditionality and Ownership in IMF Lending: A Political Economy Approach. IMF Staff Papers No. 49, 36-67.
- [13] Dreher, A., Vaubel, R., 2004. Does the IMF Cause Moral Hazard and Political Business Cycles? Evidence from Panel Data. *Open Economies Review* 15, 5-22.
- [14] Easterly, W., 2002. How did highly indebted poor countries become highly indebted? Reviewing two decades of debt relief. *World Development* 30, 1677–1696.
- [15] Joyce, J.P., 2004(a), The Adoption, Implementation and Impact of IMF Programs: A Review of the Evidence. *Comparative Economic Studies*, forthcoming.
- [16] Joyce, J.P., 2004(b), Time Present and Time Past: A Duration Analysis of IMF Program Spells, *Review of International Economics*, forthcoming.
- [17] Judson, R.A., Owen, A.L., 1999. Estimating dynamic panel data models: a guide for macroeconomists. *Economic Letters* 65, 9–15.
- [18] Khan, C.M., Santos, J., 2001. Allocating bank regulatory powers: lender of last resort deposit insurance and supervision. BIS Working Paper No. 102.
- [19] Knack, S., Keefer, P., 1995. Institutions and Economic Performance: Cross Country Tests Using Alternative Institutional Models. *Economics and Politics* 7, 207–227.
- [20] Knight, M., Santaella, J.A., 1997. Economic Determinants of IMF Financial Arrangements. *Journal of Development Economics* 54, 405-436.
- [21] Ivanova, A., Mayer, W., Mourmouras, A., Anayiotos, G., 2003. What Determines the Implementation of IMF-Supported Programs IMF Working Paper 03/08.
- [22] Marchesi, S., Missale, A., 2004. What does motivate lending and aid to the HIPC's? Centro Studi d'Agliano Development Working Papers No. 189.
- [23] Mussa, M and Savastano, MA. 2000. The IMF Approach to Economic Stabilization. In Bernanke, BS and Rotemberg, JJ (eds.). *NBER Macroeconomics Annual 1999*. MIT Press: Cambridge, MA, pp. 79-122.

- [24] Nickell, S.J., 1981. Biases in Dynamic Models with Fixed Effects. *Econometrica* 49, 802–816.
- [25] Nunziata, L., 2000. `hetgrot.ado`: a Stata command for a Likelihood Ratio test for groupwise heteroskedasticity.
- [26] Nunziata, L., 2002. `xtbac.ado`: a Stata command for the Baltagi autocorrelation test in panel data.
- [27] Przeworski, A., Vreeland, J.R., 2000. The Effect of IMF Programs on Economic Growth. *Journal of Development Economics* 62, 385–421.
- [28] Ramcharan, R., 2003. Reputation, debt and policy conditionality. IMF Working Paper No. 192.
- [29] Repullo, R., 2000. Who should act as lender of last resort? An incomplete contract model. *Journal of Money, Credit & Banking* 3, 580–605.
- [30] Sturm, J.E., Berger, H., de Haan, J., 2004. Which variables explain decisions on IMF credit? An extreme bounds analysis. mimeo.
- [31] Svensson, J., 2000. When Is Foreign Aid Policy Credible? Aid Dependence and Conditionality. *Journal of Development Economics* 61, 61–80.
- [32] The Economist. Which is the victim? March 4th 2004.
- [33] The Economist. The sisters at 60. July 22nd 2004.
- [34] Vaubel, R., 1986. A Public choice approach to international organizations. *Public Choice* 51, 39–57.
- [35] Vaubel, R., 1991. Problems at IMF. *Swiss Review of World Affairs* 40, 20–22.

## 8 Appendix: Omitted proofs

**Proof.** of Proposition 7

Let's start from the second stage. Let's suppose that  $-1 \leq \tilde{k} \leq \overleftarrow{k}$  and that at  $t=1$  lending (L) has been observed. Applying Bayes' rule, we obtain:

$$\gamma_2(L, -1 \leq \tilde{k} \leq \overleftarrow{k}) = \frac{\gamma \rho_g}{\gamma \rho_g + (1 - \gamma) \rho_b}$$

Then, the IMF private gain from reputation would be equal to:  $\gamma_1(L) + \delta \gamma_2(L, -1 \leq \tilde{k} \leq \overleftarrow{k})$ , where:

$$\gamma_1(L) = \text{prob}(g | L) = \frac{\gamma \text{prob}(L | g)}{\gamma \text{prob}(L | g) + (1 - \gamma) \text{prob}(L | b)}$$

and

$$\text{prob}(L | g) = \rho_g + (1 - \rho_g) \int_{\overleftarrow{k}}^{I+\overline{y}-1} \theta(\tilde{k}) h(\tilde{k} | R_1 = \hat{R}_1^R) d\tilde{k}$$

and

$$\text{prob}(L | b) = \rho_b + (1 - \rho_b) \int_{\overleftarrow{k}}^{I+\overline{y}-1} \theta(\tilde{k}) h(\tilde{k} | R_1 = \hat{R}_1^R) d\tilde{k}.$$

Alternatively, if  $-1 \leq \tilde{k} \leq \overleftarrow{k}$  and at  $t=1$  not lending (NL) has been observed, the IMF private gain from reputation would be equal to:  $\gamma_1(NL) + \delta \gamma_1(NL)$ , where:

$$\gamma_1(NL) = \text{prob}(g | NL) = \frac{\gamma(1 - \rho_g)}{\gamma(1 - \rho_g) + (1 - \gamma)(1 - \rho_b)}.$$

Therefore, if the IMF chooses to continue lending, irrespective of  $\tilde{k}$  being too small, its private gain in reputation with respect to the alternative strategy would be

$$G_{\max} = \gamma_1(L) + \delta \gamma_2(L, -1 \leq \tilde{k} \leq \overleftarrow{k}) - (\gamma_1(NL) + \delta \gamma_1(NL)) \quad (\text{A-1})$$

which can be easily shown to be positive.

Now let:

$$WL(\tilde{k}) = 1 - p_2(\hat{R}_2(\tilde{k})) I_2$$

be the welfare loss of the second period project. Notice that WL is continuously decreasing with  $\tilde{k}$  (see Proposition 1) and that  $WL(\cdot)=0$  when  $\tilde{k} = \overleftarrow{k}$ . We also assume that the maximum value of  $\lambda_2 WL(\tilde{k})$  ( $\lambda_2 WL(\tilde{k} = -1)$ ) is greater than  $\lambda_1 G$ .

In order to have equilibrium strategies consistent with the equilibrium beliefs, the following inequality must hold:

$$\lambda_2 WL(\tilde{k}) \geq \lambda_1 G_{\max}, \quad \text{for } -1 \leq \tilde{k} \leq \overleftarrow{k}.$$

Then, let  $\overleftarrow{k}$  be such that

$$\lambda_2 WL(\overleftarrow{k}) = \lambda_1 G_{\max}$$

Therefore, when  $-1 \leq \tilde{k} \leq \overleftarrow{k}$ , the IMF has no incentive to deviate from the equilibrium strategy (NL).

Let's now suppose that  $\overleftarrow{k} < \tilde{k} \leq \overline{k}$  and that at  $t=1$  lending (L) has been observed. Noting that, when  $\tilde{k} < \overline{k}$ , the first period project has surely failed ( $\tilde{k} = \tilde{k}^f$ ), applying Bayes' rule, we obtain:

$$\gamma_2(L, \overleftarrow{k} < \tilde{k} \leq \overline{k}) = \frac{\gamma(\rho_g(1 - p_1(R^*)) + (1 - \rho_g)\theta(\tilde{k})(1 - p_1(\hat{R}_1^R))}{\gamma(\rho_g(1 - p_1(R^*)) + (1 - \rho_g)\theta(\tilde{k})(1 - p_1(\hat{R}_1^R)) + (1 - \gamma)(\rho_b(1 - p_1(R^*)) + (1 - \rho_b)\theta(\tilde{k})(1 - p_1(\hat{R}_1^R))} \quad (\text{A-2})$$

from which it is easy to show that (17) reaches its maximum value when  $\theta(\overleftarrow{k}) = 0$  and its minimum when  $\theta(\overrightarrow{k}) = 1$  and:

$$\frac{\partial \gamma_2(L, \overleftarrow{k} < \tilde{k} \leq \overline{k})}{\partial \tilde{k}} < 0$$

Moreover,

$$\lim_{\tilde{k} \rightarrow \overleftarrow{k}} \gamma_2(L, \tilde{k}) = \frac{\gamma \rho_g}{\gamma \rho_g + (1 - \gamma) \rho_b}$$

and

$$\gamma_2(L, \overleftarrow{k} < \tilde{k} \leq \overline{k}) = \frac{\gamma(\rho_g(1 - p_1(R^*)) + (1 - \rho_g)(1 - p_1(\hat{R}_1^R))}{\gamma(\rho_g(1 - p_1(R^*)) + (1 - \rho_g)(1 - p_1(\hat{R}_1^R)) + (1 - \gamma)(\rho_b(1 - p_1(R^*)) + (1 - \rho_b)(1 - p_1(\hat{R}_1^R))}. \quad (\text{A-3})$$

Therefore, if the IMF chooses to continue lending, when  $\overleftarrow{k} < \tilde{k} \leq \overline{k}$ , its private gain in reputation with respect to the alternative strategy would be:

$$G(\theta(\tilde{k})) = \gamma_1(L) + \delta \gamma_2(L, \overleftarrow{k} < \tilde{k} \leq \overline{k}) - (\gamma_1(NL) + \delta \gamma_1(NL)) \quad (\text{A-4})$$

where

$$\frac{\partial G(\theta(\tilde{k}))}{\partial \tilde{k}} < 0, \quad \lim_{\tilde{k} \rightarrow \overleftarrow{k}} G(\theta(\tilde{k})) = G_{\max} \text{ and } G(\theta(\tilde{k}))|_{\overrightarrow{k} \leq \tilde{k} \leq \overline{k}} = G_{\min},$$

Since the probability to continue lending is increasing with  $\tilde{k}$ , the signal becomes less informative as capital grows. Notice that  $G_{\min}$  is found substituting (17) into (A-4) and  $G_{\max}$  was defined in A-1.

For the equilibrium strategies to be consistent with the equilibrium beliefs, the probability to continue lending is found implicitly, solving for  $\theta(\tilde{k})$ :

$$\lambda_1 G(\theta(\tilde{k})) = \lambda_2 WL(\tilde{k}) \quad (\text{A-5})$$

so that, when  $\overleftarrow{k} \leq \tilde{k} \leq \overrightarrow{k}$ , the payoff associated to the strategy NL is the same as the payoff associated to the strategy L. Notice that  $\overrightarrow{k}$  is found by solving (A-5) for  $\tilde{k}$  when the probability of continuing lending is 1. Since  $WL(\tilde{k} = \overline{k}) = 0$  and  $G_{\min} > 0$ , it is immediate to verify that  $\overrightarrow{k} < \overline{k}$ .

Finally, as  $G(\tilde{k}) = G_{\min} > 0$ , when  $\overleftarrow{k} \leq \tilde{k} \leq \overline{k}$ , it follows that  $\lambda_1 G_{\min} \geq \lambda_2 WL(\tilde{k})$ . Thus, in this interval, the IMF will lend with probability one even if  $R_1 \neq R^*$ . ■

**Table 1: List of middle income countries in the sample**

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1) Algeria	28) Malaysia
2) Argentina	29) Mauritius
3) Belize	30) Mexico
4) Bolivia	31) Morocco
5) Botswana	32) Oman
6) Brazil	33) Panama
7) Cape Verde	34) Paraguay
8) Chile	35) Peru
9) China	36) Philippines
10) Colombia	37) Poland
11) Costa Rica	38) Romania
12) Dominica	39) Seychelles
13) Dominican Republic	40) Sri Lanka
14) Ecuador	41) St. Kitts and Nevis
15) Egypt, Arab Rep.	42) St. Lucia
16) El Salvador	43) St. Vincent and the Grenadines
17) Fiji	44) Swaziland
18) Gabon	45) Syrian Arab Republic
19) Grenada	46) Thailand
20) Guatemala	47) Tonga
21) Guyana	48) Trinidad and Tobago
22) Honduras	49) Tunisia
23) Hungary	50) Turkey
24) Indonesia	51) Uruguay
25) Iran, Islamic Rep.	52) Vanuatu
26) Jamaica	53) Venezuela, RB
27) Jordan	

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Source: World Bank, GDF CD-ROM, 2004

**Table 2: Variables definition**

<b>Variable</b>	<b>Definition</b>	<b>Units</b>
Population	Population	Billions units
Pc-GDP	Gross Domestic Product	Ratio to Population (thousands units)
Inflation	Consumer Price Index	Annual Rate of change
Gr-GDP	Real GDP growth	Annual Rate of change
Reserves	International reserves	Ratio to Imports
Current Account	Current Account	Ratio to GDP
Investments	Goss fixed domestic investments	Ratio to GDP
Gr-Government Consumption	Gov Consumption growth	Annual Rate of change
dPRCL	Political Right&Civil Liberties	Dummy variable=1 for either partially or totally free countries; 0 otherwise
Total debt service	Total debt service	Ratio to Exports
IMF Disbursements	IMF Disbursements	Ratio to GDP
Multilateral Disbursements	Bilateral Grants	Ratio to GDP
Bilateral Disbursement	Multilateral Disbursements	Ratio to GDP
Bank Disbursements	Bank Disbursements	Ratio to GDP
Bonds Disbursements	Bonds Disbursements	Ratio to GDP
IMF Debt	IMF Debt	Ratio to GDP
IMF Debt	IMF Debt	Ratio to GDP
Multilateral Debt	Long term Mul Debt	Ratio to GDP
Bilateral Debt	Long term Bilateral Debt	Ratio to GDP
Bank Debt	Long term Bank Debt	Ratio to GDP
Bonds Debt	Long term Bonds Debt	Ratio to GDP
Bureaucracy quality	Bureaucracy quality	Index
Corruption	Corruption	Index
Inv Profile	Investment profile	Index
Law & Order	Law & Order	Index

**Table 3: Data source**

<b>Variable</b>	<b>Source</b>
Population	International Financial Statistics
Pc-GDP	World Economic Outlook (WEO)
Inflation	World Economic Outlook (WEO)
Gr-GDP	World Economic Outlook (WEO)
International reserves	Global Development Finance (GDF)
Current Account	Global Development Finance (GDF)
Investments	World Development Indicators
Gr-Government Consumption	World Development Indicators
Political Rights and Civil Liberties	Freedom House
Total debt service	Global Development Finance (GDF)
IMF Disbursements	Global Development Finance (GDF)
Multilateral Disbursements	Global Development Finance (GDF)
Bilateral Disbursement	Global Development Finance (GDF)
Bank Disbursements	Global Development Finance (GDF)
Bonds Disbursements	Global Development Finance (GDF)
IMF Debt	Global Development Finance (GDF)
Multilateral Debt	Global Development Finance (GDF)
Bilateral Debt	Global Development Finance (GDF)
Bank Debt	Global Development Finance (GDF)
Bonds Debt	Global Development Finance (GDF)
Bureaucracy quality	ICRG
Corruption	ICRG
Investment profile	ICRG
Law & Order	ICRG

**Table 4 IMF Debt Disbursements**

	IMF Dis	IMF Dis with interactions
Population	0.0116 (1.300)	0.0122 (1.377)
Pc-GDP (-1)	0.00005 (0.222)	0.00002 (0.102)
Inflation (-1)	0.00004 (0.896)	0.00005 (1.039)
Gr-GDP (-1)	-0.0081** (2.199)	-0.0088** (2.361)
Reserves (-1)	-0.0014* (1.823)	-0.0016** (2.007)
Current Account (-1)	-0.0055** (2.172)	-0.0043* (1.681)
Investment (-1)	-0.0069** (2.291)	-0.0069** (2.281)
Gr-Gov Consumption (-1)	-0.0009 (1.090)	-0.0008 (0.898)
dPRCL	0.0010 (1.487)	0.0009 (1.451)
Total Debt Service (-1)	0.0035*** (2.826)	0.0034*** (2.789)
Debt Share M (-1)	-0.0061 (1.545)	-0.0045 (0.929)
Debt Share IMF (-1)	0.0364** (2.568)	0.0065 (0.351)
Debt Share B (-1)	0.0026 (1.103)	0.0024 (0.607)
Debt Share Banks (-1)	0.0049* (1.832)	-0.0001 (0.028)
Debt Share Bonds (-1)	0.0015 (0.292)	-0.0065 (0.740)
Disbursements M (-1)	0.0074 (0.488)	0.0109 (0.719)
Disbursements IMF (-1)	0.0596** (1.985)	0.0761** (2.462)
Disbursements B (-1)	0.0061 (0.531)	0.0084 (0.727)
Disbursements Banks (-1)	-0.0008 (0.087)	0.0024 (0.255)
Disbursements Bonds (-1)	-0.0216 (1.070)	-0.0208 (0.994)
Debt Share M (-1) dHD		-0.0015 (0.397)
Debt Share IMF (-1) dHD		0.0490** (2.464)
Debt Share B (-1) dHD		-0.0005 (0.117)
Debt Share Banks (-1) dHD		0.0031 (0.792)
Debt Share Bonds (-1) dHD		0.0085 (1.028)
Constant	0.0044** (2.311)	0.0046** (2.459)
Observations	1060	1060
Number of countries	53	53
Number of years	20	20
SE of regression	0.011	0.011
SE of Dependent variable	0.013	0.013
TD joint significance test	Prob>chi2=0.018	Prob>chi2=0.034
CD joint significance test	Prob>chi2=0.067	Prob>chi2=0.193

Absolute value of z statistics in parentheses \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

COUNTRY: borrows 1, chooses  $R_1$ ; Borrows  $1-\tilde{k}$ , chooses  $R_2$ ,  $\tilde{y}+\tilde{I}_1$  is realised.  
 IMF: lends 1; Observes  $R_1$  and  $\tilde{y}+\tilde{I}_1$ ; decides L or NL; Observes  $R_2$  and  $\tilde{y}+\tilde{I}_2$ .  
 GT: Observes L or NL; Observes  $\tilde{k}$ .

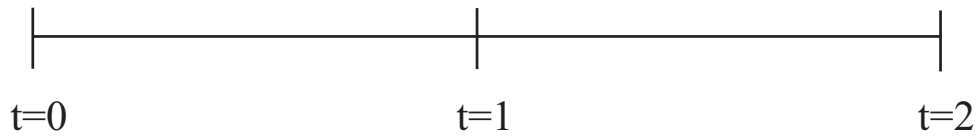


Figure 1

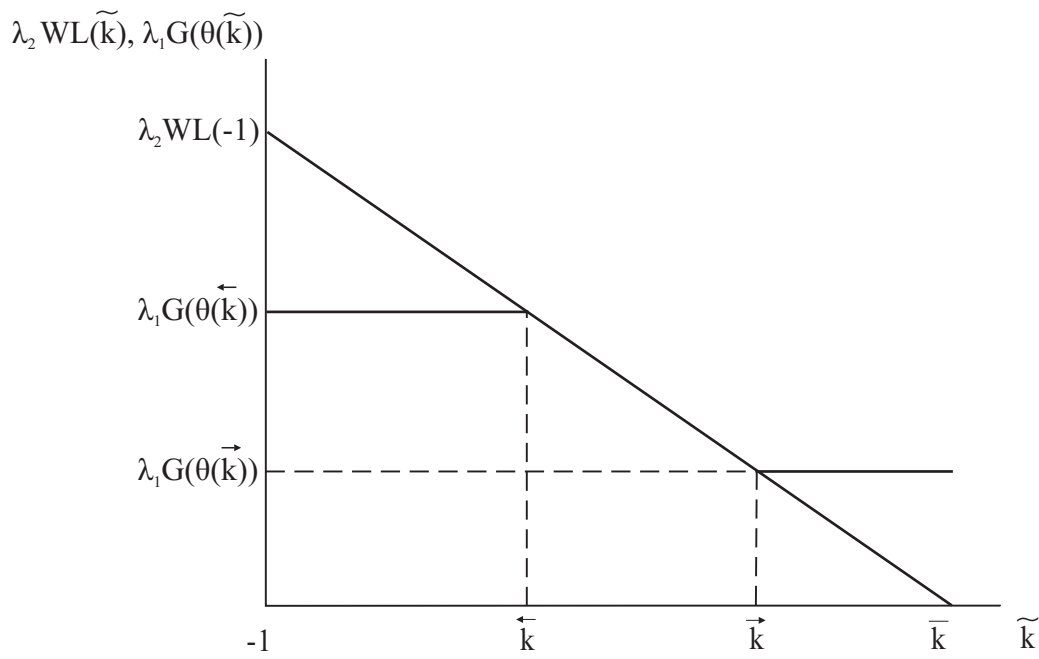
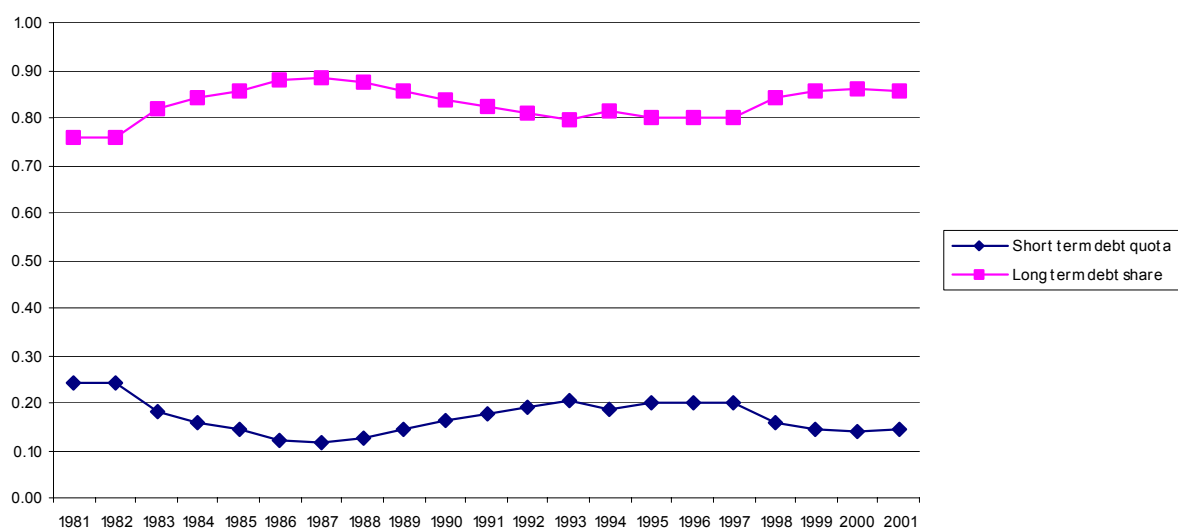


Figure 2

**Figure 3: Long and short term debt shares**



**Figure 4: Disaggregated debt shares - middle income countries**

