WWW.DAGLIANO.UNIMI.IT

CENTRO STUDI LUCA D'AGLIANO
DEVELOPMENT STUDIES WORKING PAPERS

N. 206

November 2005

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

*Silvia Marchesi**
*Laura Sabani**

* University of Siena and University of Florence

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

Silvia Marchesi and Laura Sabani
University of Siena and University of Florence*

September 2004
last revised November 2005

Abstract

In this paper we suggest that the dual role played by the IMF, as a creditor and as a monitor of economic reforms, might explain the lack of credibility of the Fund threat of sanctioning non-compliance with conditionality. Specifically, we show that the IMF desire to preserve its reputation as a good monitor may distort its lending decisions towards some laxity. Moreover, such distortionary incentives may be exacerbated by the length of the relationship between a country and the Fund. Estimating a dynamic panel of 53 middle-income countries, for the period 1982-2001, we find that a longer relationship does increase IMF disbursements.

Keywords: IMF programmes, conditionality, incomplete information, reputation, dynamic panel.
JEL Classification: C23, D82, F34, N2.

*Corresponding author: Silvia Marchesi, Dipartimento di Economia Politica, Piazza S.Francesco 7, I-53100 Siena. Tel. +39 0577 235088; Fax. +39 0577 232661; E-mail: marchesi@unisi.it. We thank Axel Dreher, Joseph Joyce, Beatriz Mariano, Emanuela Marrocu, Marcus Miller, Alessandro Missale and Rune Hagen for helpful discussions, and seminar participants at the Global Finance Conference (Dublin 2005), WIDER Jubilee Conference (Helsinki 2005), FMG/LSE Lunchtime Workshop and at the Warwick Development Workshop for comments. Marchesi gratefully acknowledges hospitality from the Financial Markets Group Research Centre (FMG).

1 Introduction

There exists a large body of evidence documenting an unsatisfactory record of implementation of IMF conditionality by borrowing countries (e.g., see Joyce, 2004). A large proportion of IMF programmes is interrupted where such interruptions are not an indicator of graduation from the Fund but rather one of future referrals (recidivism).[1] More specifically, the IMF has recently come under criticism for allowing some countries to establish long-term relationships (or prolonged use), while, according to its original mandate, the Fund could only guarantee temporary assistance.[2]

In general, a prolonged use of IMF resources could be justified by thinking of economic adjustment as a multistage process that requires multiple IMF loans to be completed. However, the empirical evidence does not support such optimistic view, since the probability of "graduation" from the IMF by a borrowing country does not appear to be positively related to the number of cumulated lending arrangements (Easterly, 2005). Thus, prolonged use of IMF resources rather suggests a lack of effectiveness of IMF supported programmes (i.e., poor programmes implementation and/or flaws in programmes design).

The possibility that some IMF specific interests may undermine the implementation of an IMF programme has recently been considered. Specifically, it has been argued that if the objective of conditional lending is to induce borrowing countries to carry out reforms (which otherwise would not be implemented), the threat of early interrupting financial assistance in case of non-compliance should be credible.[3] Nev-

[1] According to Bird et al.(2004) and Joyce (2005), recidivist nations seem to be caught in a vicious cycle: they start by entering Fund programmes out of necessity but then, presenting a poor record of compliance, a large proportion of these programmes is cancelled. However, with no penalty for past non-completion, such countries turn soon again to the Fund.

[2] A report published in 2002 by the IMF Independent Evaluation Office (IEO) deals specifically with the issue of prolonged use and provides a definition of prolonged use based on the concept of "time under arrangements"(i.e., a country is defined as being a prolonged user if it has been under an IMF arrangement for at least 7 years out of any 10). Using such definition, in 2001, the arrangements with prolonged users represented about half of the total number of IMF programmes, with a total exposure of about half of the total outstanding obligation to the IMF.

[3] According to Drazen (2002), for example, there exists a conflict of interest between the Fund and its borrowers due to the influence of some private interests in the borrowing government's policy

ertheless, several obstacles to the punishment of non compliance have been identified: political pressures (Barro and Lee, 2003), bureaucratic biases (Vaubel, 1986) and the so called "defensive lending" practice (Ramcharan, 2003).[4]

In this paper we propose a novel explanation of such lack of credibility of the IMF threat. We argue that the repeated nature of the IMF involvement, together with the fact that the Fund acts simultaneously as a lender and as a monitor of economic reforms, can reduce its incentives to punish slippages in the implementation of agreed policies. In a different context, this argument has been first applied by Boot and Thakor (1993) to sustain the view that the lender of last resort should not also be responsible for the surveillance of the banks.

We present a two-period model in which the adjustment process has a multistage structure and the borrowing country needs to enter two consecutive IMF programmes to complete it. In this framework the IMF is entrusted with two tasks. First, the Fund has to monitor the country's compliance with conditionality, where the IMF's ability as a monitor determines the probability with which departures from the required set of economic reforms will be detected and possibly punished. Then, the Fund is responsible for implementing a "social optimal lending rule" which consists in allowing borrowing countries to enter new loan agreements only when the expected return from their investments is positive.

The model is built on two crucial assumptions. Firstly, the Fund, as a monitor of conditionality, is to some extent involved in the success of the adjustment programmes.[5] More specifically, if the Fund is a good monitor, it is more likely that it will discover policy slippages early enough to get the country back on track by threat-

choices. Therefore, with no sanction, the government will not implement any reform.

[4]In the case of Sub-Saharan African countries, Birdsall et al. (2003) find that donors, especially bilaterals, made greater transfers to countries with high multilateral debt, despite their bad policies. Marchesi and Missale (2004) find that while in the case of low income (non-HIPC) countries both multilateral new loans and grants decrease as multilateral debt increase, in the case of HIPC, such "correction" does not take place.

[5]Its responsibility is actually amplified by the fact that the Fund also designs the adjustment path (on this see Marchesi and Sabani, 2005).

ening the interruption of current and future disbursements. On the contrary, if it is a bad monitor, with a high probability the level of reforms actually implemented at the end of the programme will be that privately preferred by the country's government. Secondly, the outcome of the adjustment process can only be imperfectly evaluated by the Fund's stakeholders (or global taxpayers).

In this context we take a political economy approach by assuming that the IMF is a self-interested agent aimed at protecting its own reputation as a monitor and we focus on the consequences that such incentives do have on the lending rule adopted by the Fund in equilibrium. Following Boot and Thakor (1993), we assume that global taxpayers are uncertain about the ability of the IMF as a monitor. They never observe the actual level of the implemented reforms but they do observe the country's output (with one period lag with respect to the Fund) and use this information to revise their beliefs about the IMF quality as a monitor. This circumstance generates incentives for the Fund to exploit its informative advantage to protect its reputation, by hiding its surveillance failures. In turn, such incentives may distort its lending decisions towards greater laxity (relative to social optimum) in punishing non-compliance with conditionality.

Furthermore, 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. In fact, when the Fund decides to interrupt a financial programme, after being involved with a country for many years, this circumstance could strongly signal that the Fund has not been able to monitor the implementation of reforms for a long time.

We empirically test the hypothesis that the longer the relationship between a country and the Fund, the more willing to lend the IMF would be. We estimate a dynamic panel of 53 middle-income countries (listed in Table 1) over the period 1982-2001, controlling for countries' characteristics and their economic performance and including both country-specific effects and time effects. We find that a longer

relationship, represented by the cumulated number of years spent by a country under a Fund programme, significantly increases IMF disbursements.

Such results are confirmed by a different specification of the empirical model where we substituted the variable representing the cumulative years under a programme with the IMF own share of debt (taken as a proxy of the length of the relationship between a country and the Fund). We find that a higher level of IMF debt significantly increases IMF disbursements. Therefore, under both specifications, the empirical evidence is consistent with the main prediction of the theory.

The paper is organized as follows. The model is developed in Section 2, the equilibrium level of reforms are discussed in Section 3, while Section 4 derives the lending policy in a 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 The model

2.1 Overview

The model presented is a four stage game between three agents: the IMF, a borrowing country's government and global taxpayers. All agents are risk neutral and time extends over two periods.

To capture the idea that economic adjustment is a multistage process, which requires multiple investments to be completed, we assume that, at the beginning of each period, the country's government faces two "adjustment options." The first option requires a fixed investment I_1, while the second requires a fixed investment I_2. It is assumed that in both periods the country needs the IMF financial assistance to finance both investments. Financial assistance is provided through IMF programmes whose duration is one period. Thus, the borrowing country's government needs to enter two consecutive programmes to exploit both adjustment options.

For simplicity we suppose that the IMF requires a risk-free interest rate equal to

zero. Moreover, we assume that, at t=0, the country has already some investments in place, which payoff, at t=1, a random amount $\widetilde{y}$. $\widetilde{y}$ has a distribution function $F(.)$ and a density function $f(.)$ with support $[0, \overline{y}]$, where $\overline{y}$ is a positive finite real valued scalar. The assets in place at t=0 expire at t=1 and so there is not payoff from those assets at t=2.

Figure 1 illustrates the time line. At t=0, the country's government and the IMF sign an agreement in which the Fund makes I_1 available to the borrowing country for the duration of the agreement. The government draws on these funds to finance the first adjustment option, whose expected output depends positively on the level of economic reforms R_1 actually implemented by the government in period 1, with $R_1 \in [0, 1]$. On the contrary, the rents that can be extracted by the government for its private gain decrease as the reform level increases.[6] The IMF subordinates the access to its funds to the implementation of a level of economic reforms R^* and it monitors the government's compliance with the suggested reforms. The ability of the Fund as monitor determines the probability with which departures from the required set of economic reforms will be detected. At t=0, the IMF quality as a monitor is unknown to everybody but global taxpayers and the country's government have got a prior belief $\gamma \in (0, 1)$ that it is a good monitor and they will update their beliefs by Bayes' rule, as soon as they receive new information.[7]

At t=1/2 (interim period) the IMF observes the country's reform effort with some noise.[8] If the Fund is a good monitor, it will discover departures from the required reform level R^* with probability ρ_g. If it is a bad monitor, the probability would be ρ_b, with $\rho_g > \rho_b$. If the IMF discovers some departure from R^*, it can credibly threaten the country with the immediate interruption of the current programme and

[6] We make the standard assumption that policy makers dislike the economic reforms imposed by conditionality. Among others see Svensson (2000), Drazen (2002) and Joyce (2003).

[7] The existence of some uncertainty over the IMF ability as a monitor can be justified, for example, by the complexity of the monitoring activity (see for example Cordella and dell'Ariccia, 2003).

[8] In our model, the interim period is meant to capture the traditional structure of an IMF loan, which is divided into tranches whose access is guaranteed by the implementation of conditionality.

the denial of the access to future agreements.[9] This fact will prevent the government from implementing its adjustment options, unless it decides to meet the IMF prescriptions. If the Fund does not detect such departures, the reform level achieved by the government at the end of the first period will be the one which it privately prefers. Global taxpayers cannot directly observe the Fund monitoring activity but they can observe the interruption of the programme.

If not interrupted, the first programme ends at t=1, when the first period output is realised and first period obligations are paid off. The country now needs a second loan to finance the second adjustment option, whose expected output depends both on the level of reforms R_1, implemented in the first period, and on the economic reforms R_2, to be implemented in the second. The IMF now observes R_1 and the country's output with no noise and, on the basis of such information, it decides whether or not to grant a second loan. If the country obtains the loan, although the realized output is less than the first period obligations to the Fund, its first period debt will be postponed to the end of the second period.

At t=2, the second period investment matures. For simplicity, we exclude Fund monitoring in the last period, thus, the level of reforms implemented during the second period will be the one privately preferred by the government.

Global taxpayers are the least informed players. They can observe the country's output only with one period lag and they never observe the actual level of reforms. As a consequence, at t=1, they observe only the Fund decision to refinance (or not) the country and they accordingly update their beliefs. At t=2, if a second agreement has been signed, global taxpayers observe the first period country's output and they accordingly update their beliefs. Otherwise, we assume that their information set at t=2 is the same as it was at t=1.

Let us now examine the model in greater details.

[9] The credibility of such a threat is fundamental in our model. The Fund is invested in the success of its own programmes only if it has some ability to "enforce" its conditions. In our model this ability comes from its leverage as a creditor.

2.2 Adjustment options

The first adjustment option yields a random payoff $\widetilde{X}_1$ at the end of the first period. $\widetilde{X}_1$ may take the value of $X_1 > I_1$, with probability $p_1(R_1) \in (0,1)$, and the value of 0 with the complementary probability.

Assumption 1. We assume $p_1(.)$ is a continuous twice differentiable concave function of R_1. The function is strictly increasing within the range $R_1 \in [0, R^*]$[10]

By undertaking economic reforms up to the level R^* the government increases efficiency and thus it enhances the expected output from the investment. This means that R^*, the level of reforms required by the IMF, is the social optimal level of economic reforms.[11] However, since reforms eliminate economic and other distortions, they 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 R_1. We assume the following:

Assumption 2. $C_1(.)$ is a continuous twice differentiable increasing convex function of the economic reform level, where $C_1(0) = 0$[12]

If the first loan agreement is not interrupted, the country realises $\widetilde{y} + \widetilde{X}_1$ at time t=1. Whatever the realized payoff at t=1 is, we assume that the country always needs IMF financial assistance to implement the second period adjustment option. This means that $\overline{y} + X_1$ is always smaller than $I_1 + I_2$.

The second adjustment option has a random payoff $\widetilde{X}_2$ which takes the value of $X_2 > I_1 + I_2$ with probability $p_2(R_1, R_2)$ and the value of 0 with the complementary probability.[13]

[10] 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 an IMF adjustment program is imposing an unnecessary hardship, the government may lack the political support to continue the adjustment program and efficiency may suffer. 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.

[11] Marchesi and Sabani (2005) consider the possibility that R^* does not maximize the investment expected output, which is equivalent to assume a flaw in the programmes design.

[12] 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.

[13] This parametric restriction guarantees that the borrowing country's government always strictly

Assumption 3. If $R_1 \neq R^*$, $p_2(R_1, R_2) = p_1(R_2)$; *if* $R_1 = R^*$, $p_2(R_1, R_2) = p_1(R_2) + \alpha$, *where* α *is a positive finite real valued scalar such that* $p_1(R^*) + \alpha < 1$.

From assumptions 1 and 3 it follows that $p_2(R_1, R_2)$ is strictly increasing within the range $R_2 \in [0, R^*]$. Furthermore, we assume that the probability of success of the second period adjustment option has a "jump" when the optimal level of reforms R^* is implemented in the first period. The rationale behind this hypothesis rests on the fact that financial assistance is more productive in a good policy environment.[14] As in period 1, the government's private rents are a decreasing function of the second period reform effort. For simplicity we impose the following:

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

2.3 The IMF objective function

We start by assuming that, at t=0, an agreement between the country and the Fund has already been signed. Therefore, we do not model the IMF decision to enter into the first period agreement and the Fund is called to "move" at t=1/2 and at t=1. Let us examine the decision taken at t=1 and then proceed backwards.

At t=1, the IMF decides to approve a second agreement in order to maximize a weighted sum of two arguments. The first argument is a "private" gain deriving from its reputation as a good monitor, while the second is the social surplus arising from the second period investment. That is:

$$Max\ Z = \lambda_1 \{\gamma_1 + \delta\gamma_2\} + \lambda_2 \{p_2(R_1, R_2)X_2 - I_2\}, \tag{1}$$

where $\lambda_1, \delta, \lambda_2$ are positive finite real valued scalars and γ_1, γ_2 are global taxpayers' posterior beliefs about the IMF's type at the end of the first and of the second period,

prefers to continue its relationship with the Fund at t=1.

[14] To take into account the impact of R_1 on the second period expected output we chose this specific functional form because of its analytical advantages. However, the qualitative results would not change by assuming that, at the margin, the effect on p_2 of an increase in R_1 is always positive for each level of R_1.

respectively.[15] Note that, if $\lambda_1 = 0$, the IMF would be totally selfless, while if $\lambda_2 = 0$, the IMF would be completely selfish.

At t=1/2, if any departure from the required set of reforms is detected, the IMF can deny access to current and future loans. Such a threat is credible if the expected payoff of this choice, to the Fund, is greater than the expected payoff deriving from maintaining the programme, despite the government's refusal to implement R^*.[16] For the time being we assume that this threat is credible. We will clarify below under which condition this is actually true in equilibrium.[17]

2.4 The government objective function

The government objective function is simply equal to the expected value of its profits. Thus, at t=0, the government chooses R_1 to maximize the expected return from both investments, net of the private costs related to rents reduction. The choice of R_1 crucially depends on the conjectured IMF lending policy at t=1.

If the level of economic reforms R_1 privately preferred by the government is smaller than R^*, there is a positive probability that such policy slippage will be detected by the Fund at t=1/2. We assume that the government, facing the threat of losing IMF financial assistance and thus the possibility of exploiting both adjustment opportunities, will choose to implement R^*.[18] Specifically, we are assuming that the expected returns of the adjustment options are high enough to compensate the government for any cost associated to the implementation of the IMF prescriptions in the first period.

Finally, in the second period, if financial assistance has been continued, the gov-

[15] We do not include an IMF budget constraint since the Fund might activate supplementary borrowing arrangements (through GAB and NAB) if it believes that its resources might fall short of members' needs. It is plausible to think that the IMF ability to raise its budget depends on its reputation, where reputation building is indeed an argument of the Fund's objective function.

[16] At this stage, the IMF maximises $\lambda_1\gamma_{1/2} + \lambda_2 \{p_1(R_1)X_1 - I_1\} + E(Z)$, where $\gamma_{1/2}$ is the global taxpayers' posterior belief about the IMF type at t=1/2 and the expected value of Z is computed on the basis of the equilibrium lending rule followed by the IMF at t=1.

[17] See footnote 24.

[18] It may be very costly for a government to defect on the IMF, especially when official or private creditors around the world rely on the IMF "seal of approval" to sign their loan agreements. Obviously if the conditions to be implemented are particularly harsh, a country might still prefer to exit from the IMF arrangement. However, for simplicity, we do not model here such possibility.

ernment chooses R_2 to maximize the second period expected profits.

3 The equilibrium level of economic reforms

This section provides a description of the government's equilibrium decisions in both periods. We begin with the second period, taking R_1 as given. Then, we analyse the choice of R_1, taking into account that the government is aware that its choice might influence the Fund lending policy at t=1.

3.1 The equilibrium level of reforms in the second period

At t=1, if the IMF decides to enter into a second loan agreement with the country, the government chooses the level of R_2 by solving the following optimization problem:

$$\underset{R_2}{Max}\ l(R_2) = p_2(R_1, R_2)(X_2 - (I_2 - \widetilde{k})) - \widetilde{k} - C_2(R_2), \tag{2}$$

where R_1 is given and $\widetilde{k} = \widetilde{y} + \widetilde{X}_1 - I_1$ is the borrowing country's own capital, which can also be negative.

Solving (2),we find that the unique maximizer of (2), $\widehat{R}_2$, is implicitly given by:

$$\frac{\frac{\partial C_2(\widehat{R}_2)}{\partial R_2}}{\frac{\partial p_2(\widehat{R}_2)}{\partial R_2}} = X_2 + \widetilde{k} - I_2. \tag{3}$$

Recalling that, by assumption 3, the socially optimal choice for R_2 is:

$$R^* = \text{argmax}\ p_2(R_1, R_2), \tag{4}$$

we have the following:

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

Proof. i) It is immediate from equation (3) (ii) It derives from equation (3) and the implicit function theorem. ■

Proposition 1 implies that the lower the country's own capital $\widetilde{k}$ (i.e., the higher the second period IMF loan), the lower the reform effort chosen by the government in

the second period. This result is quite intuitive since the loan reduces the ownership on the investment's output, whereas the cost of implementing reforms, in terms of rents reduction, is entirely borne by the government.

We now examine the relationship between $\widetilde{k}$ and the government's expected profits in the second period. From equation (2) we obtain:

$$l(\widehat{R}_2(\widetilde{k})) = p_2(R_1, \widehat{R}_2(\widetilde{k}))(X_2 - (I_2 - \widetilde{k})) - \widetilde{k} - C_2(\widehat{R}_2(\widetilde{k})), \tag{5}$$

which represents, for each value of $\widetilde{k}$, the maximum value of the government's expected profits in the second period, conditional on being allowed to enter into a second agreement with the IMF. We can prove the following:

Proposition 2 *Conditional on being allowed to continue, the government is better off with a lower capital, for each given choice of the first period reform level.*

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

$$\frac{\partial l(\widehat{R}_2(\widetilde{k}))}{\partial \widetilde{k}} = p_2(R_1, \widehat{R}_2(\widetilde{k}) - I_2 < 0.$$

■

Proposition 2 tells us that the government has no incentive, at t=0, to insure itself against states of low capital at t=1 (conditional on being allowed to continue), since its second period expected profits increase as its own capital decreases (and the IMF loan increases). Therefore, given the positive relationship between R_1 and the expected value of $\widetilde{k}$ assessed at t=0 (namely $\frac{\partial E_0(\widetilde{k}|R_1)}{\partial R_1} > 0$),[19] the government's incentives to reform, in the first period, might perversely be affected by the perspective to enter into a second IMF agreement. However, as we will see below, if the Fund adopts a "tough" lending policy at t=1 (i.e., a lending policy which punishes bad performers) the government will trade off the incentives to preserve its profits in the second period with the incentives to reform in the first.

[19] This is easy to verify by recalling that $E_0(\widetilde{k} \mid R_1) = \int_0^{\overline{y}} yf(y)dy + p_1(R_1)X_1 - I_1$

3.2 The equilibrium level of reforms in the first period

In this section we want to derive the government's privately optimal level of reforms in the first period. At t=0, the government chooses the level of reforms which maximises the expected profits from the adjustment option, taking into account the continuation probability of the IMF loan. First of all we analyse the case in which the IMF never stops lending at t=1, then we will analyse the case in which the IMF follows a socially optimal lending rule. In the next section we will present the case in which the Fund follows a reputational lending rule.

Let $\widehat{R}_1^j$ represent the government's privately optimal reforms in the first period, where $j = L, SO, R$ indicates the lending policy followed by the Fund at t=1. L will denote the choice of lending whatever the realised country's output is, SO will denote the choice of following a socially optimal lending rule and, finally, R will denote the choice of a reputational lending rule.

3.2.1 The IMF never stops lending

Let us suppose that the Fund never stops lending and let $L(R_1)$ denote the government's expected profits from obtaining the second loan. They are computed at t=0 and are conditional on a given choice of R_1. That is:

$$\begin{aligned} L(R_1) \;=\; & p_1(R_1)\int_0^{\overline{y}} p_2(\widehat{R}_2(\widetilde{k}^s))(X_2-(I_2-\widetilde{k}^s))-\widetilde{k}^s-C_2(\widehat{R}_2(\widetilde{k}^s))f(y)dy+ \\ & (1-p_1(R_1))\int_{y_c}^{\overline{y}} p_2(\widehat{R}_2(\widetilde{k}^f))(X_2-(I_2-\widetilde{k}^f))-\widetilde{k}^f-C_2(\widehat{R}_2(\widetilde{k}^f))f(y)dy+ \\ & (1-p_1(R_1))\int_0^{y_c} p_2(\widehat{R}_2(\widetilde{k}^f))(X_2-(I_2-\widetilde{k}^f))-C_2(\widehat{R}_2(\widetilde{k}^f))f(y)dy, \qquad (6) \end{aligned}$$

where $\widetilde{k}^s = X_1+\widetilde{y}-I_1$ is the country's own capital in case of success of the first period investment, while $\widetilde{k}^f = \widetilde{y}-I_1$ is the level of capital in case of failure. Moreover, y_c represents the minimum realization of $\widetilde{y}$ such that $\widetilde{k}^f \geqslant 0$, that is $y_c = I_1$.

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. Defining $\phi(R_1) = p_1(R_1)(X_1 -$

$I_1) - C_1(R_1)$, we can now write the country's government problem, at t=0, as that of choosing R_1 to maximize the following:

$$X(R_1) = (1-\rho)(\phi(R_1) + L(R_1)) + \rho(\phi(R^*) + L(R^*)). \tag{7}$$

The government's privately optimal first period reform level$\widehat{R}_1^L$ satisfies the following:

$$\frac{\partial X(\widehat{R}_1^L)}{\partial R_1} = (1-\rho)\left(\frac{\partial \phi(\widehat{R}_1^L)}{\partial R_1} + \frac{\partial L(\widehat{R}_1^L)}{\partial R_1}\right) = 0, \tag{8}$$

where we assume $\widehat{R}_1^L < R^*$.[20]

3.2.2 The IMF follows the social optimal lending rule

Let's start by defining the socially optimal lending rule. Given R_1 and the realisation of the first period output, for the IMF it will be socially optimal to continue lending if:

$$p_2((R_1, \widehat{R}_2(\widetilde{k}))X_2 \geq I_2. \tag{9}$$

More specifically, the socially optimal lending rule would dictate to stop lending whenever the government, in the second period, chooses a level of R_2 such that the adjustment option has a negative NPV. Thus, we have the following:

Proposition 3 *If $R_1 \neq R^*$ there exists a threshold level for $\widetilde{k}$ such that if $\widetilde{k} < \overline{k}$ it is socially optimal for the IMF to stop lending. If $\widetilde{k} \geqslant \overline{k}$, it is socially optimal to continue, where $\overline{k}$ is found solving $p_1(\widehat{R}_2(\overline{k}))X_2 = I_2$.*

Proof. The result follows immediately from Proposition by recalling that $\frac{\partial \widehat{R}_2(\widetilde{k})}{\partial \widetilde{k}} > 0$.

■

Assumption 5. If $R_1 = R^*$, for the IMF it is always socially optimal to continue lending, that is:

$$(p_1(\widehat{R}_2(\widetilde{k})) + \alpha)X_2 > I_2 \qquad \forall \widetilde{k}.$$

[20] We are excluding the possibility that the increase in the second period probability of success (α), due to the choice of R^*, would be sufficient to induce the government to choose the social optimum level of reforms in the first period. However, the case in which the IMF and the recipient government had the same objectives would not be very interesting per sé.

Assumption 5 implies that, if in the first period the socially optimal level of reforms is implemented, the net present value of the second period adjustment option will be positive, independently of $\widehat{R}_2$. Thus, under a socially optimal lending rule, accomplishment of conditionality in the first period is a sufficient condition for obtaining a second loan at t=1.[21]

Suppose now that $\widetilde{k}^s > \overline{k}$, for each realisation of $\widetilde{y}$. On the contrary, when $\widetilde{k} = \widetilde{k}^f$, let $z = \overline{k} + I_1$ be the minimum realisation of $\widetilde{y}$ which allows the government to obtain the second loan in case of failure of the first period investment. Conditional on the socially optimal lending rule, the second period expected profits, assesses at t=0, are:

$$\begin{aligned} L(R_1, z) &= p_1(R_1) \int_0^{\overline{y}} p_2(\widehat{R}_2(\widetilde{k}^s))(X_2 - (I_2 - \widetilde{k}^s)) - \widetilde{k}^s - C_2(\widehat{R}_2(\widetilde{k}^s)) f(y)dy + \\ & (1 - p_1(R_1)) \int_{y_c}^{\overline{y}} p_2(\widehat{R}_2(\widetilde{k}^f))(X_2 - (I_2 - \widetilde{k}^f)) - \widetilde{k}^f - C_2(\widehat{R}_2(\widetilde{k}^f)) f(y)dy + \\ & (1 - p_1(R_1)) \int_z^{y_c} p_2(\widehat{R}_2(\widetilde{k}^f))(X_2 - (I_2 - \widetilde{k}^f)) - C_2(\widehat{R}_2(\widetilde{k}^f)) f(y)dy, \quad (10) \end{aligned}$$

where the last integral is zero if $z > y_c$. It is immediate to verify that:

$$L(R_1, z) = L(R_1) - (1 - p_1(R_1)) \int_0^z p_2(\widehat{R}_2(\widetilde{k}^f))(X_2 - (I_2 - \widetilde{k}^f)) - C_2(\widehat{R}_2(\widetilde{k}^f)) f(y)dy, \quad (11)$$

if $z \leq y_c$, and:

$$\begin{aligned} L(R_1, z) &= L(R_1) - (1 - p_1(R_1)) \int_{y_c}^z p_2(\widehat{R}_2(\widetilde{k}^f))(X_2 - (I_2 - \widetilde{k}^f)) - \widetilde{k}^f - C_2(\widehat{R}_2(\widetilde{k}^f)) f(y)dy - \\ & (1 - p_1(R_1)) \int_0^{y_c} p_2(\widehat{R}_2(\widetilde{k}^f))(X_2 - (I_2 - \widetilde{k}^f)) - C_2(\widehat{R}_2(\widetilde{k}^f)) f(y)dy, \end{aligned}$$

if $z > y_c$.

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

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

[21] Alternatively, even with $R_1 = R^*$, it would be possible to assume that there exists a threshold value of k such that, for smaller values of k, for the IMF it would never be socially optimal to keep on lending. However, while complicating the analysis, this hypothesis would not change significantly our results.

Let $\widehat{R}_1^{SO}$ be the level of first period reform which maximises (12), we now show the following:

Proposition 4 *If the IMF will interrupt the disbursements whenever $\widetilde{k} < \overline{k}$ 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:

$$\frac{\partial X(R_1, z)}{\partial R_1} \mid_{R_1=\widehat{R}_1^L} > 0.$$

From equation (8) noting that:

$$\frac{\partial \phi(R_1)}{\partial R_1} + \frac{\partial L(R_1)}{\partial R_1} \mid_{R_1=\widehat{R}_1^L} = 0,$$

for $z \leq y_c$ we have:

$$\frac{\partial X(R_1, z)}{\partial R_1} \mid_{R_1=\widehat{R}_1^L} =$$
$$-(1-\rho)\left(\frac{\partial(1-p(\widehat{R}_1^L))}{\partial R_1}\right)\int_0^z p_2(\widehat{R}_2(\widetilde{k}^f))(X_2 - (I_2 - \widetilde{k}^f)) - C_2(\widehat{R}_2(\widetilde{k}^f))f(y)dy,$$

where the right hand side is surely positive. For $z > y_c$ we find an analogous result.

■

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 $\widetilde{k} < \overline{k}$ 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 circumstance can be the consequence of two events: either $R_1 = R^*$, or $R_1 = \widehat{R}_1^{SO}$ and $\widetilde{k} > \overline{k}$. Applying Bayes' rule we have:

$$\gamma_1(L) = prob(g \mid L) = \frac{\gamma prob(L \mid g)}{\gamma prob(L \mid g) + (1-\gamma) prob(L \mid b)}, \tag{13}$$

where:

$$prob(L \mid g) = \rho_g + (1 - \rho_g) \int_{\overline{k}}^{X_1 + \overline{y} - I_1} h(\widetilde{k} \mid R_1 = \widehat{R}_1^{SO}) d\widetilde{k}, \tag{14}$$

and:

$$prob(L \mid b) = \rho_b + (1 - \rho_b) \int_{\overline{k}}^{X_1 + \overline{y} - I_1} h(\widetilde{k} \mid R_1 = \widehat{R}_1^{SO}) d\widetilde{k}. \tag{15}$$

Since (14) is greater than (15), it is easy to show that $\gamma_1(L) > \gamma$.[22] Alternatively, if global taxpayers observe NL, this event signals that the joint event $R_1 < R^*$ and $\widetilde{k} < \overline{k}$ has realised. The interruption of the lending programme provides global taxpayers with the information that the IMF has not been able to detect policy slippages in the interim period 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:

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

where:

$$prob(NL \mid g) = 1 - \rho_g,$$

and:

$$prob(NL \mid b) = 1 - \rho_b,$$

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

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 $\gamma_1 = \gamma_2$. While, if the IMF did not stop lending, it would obtain:

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

We now show the following:

[22] h is the probability density function of the sum of the two stochastic variables $\widetilde{I}_1$ and $\widetilde{y}$.

Proposition 5 $\gamma_2(L,\widetilde{k}) > \gamma_1(NL) \quad \forall \widetilde{k}$

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

$$\gamma_2(L,\widetilde{k}) = prob(g \mid L,\ \widetilde{k} > \overline{k}) = \frac{\gamma prob(L,\ \widetilde{k} > \overline{k} \mid g)}{\gamma prob(L,\ \widetilde{k} > \overline{k} \mid g) + (1-\gamma) prob(L,\ \widetilde{k} > \overline{k} \mid b)},$$

where:

$$prob(L, \widetilde{k} > \overline{k} \mid g) = \rho_g prob(\widetilde{k} > \overline{k} \mid R_1 = R^*) + (1-\rho_g) prob(\widetilde{k} > \overline{k} \mid R_1 = \widehat{R}_1^{SO}),$$

and:

$$prob(L, \widetilde{k} > \overline{k} \mid b) = \rho_b prob(\widetilde{k} > \overline{k} \mid R_1 = R^*) + (1-\rho_b) prob(\widetilde{k} > \overline{k} \mid R_1 = \widehat{R}_1^{SO}).$$

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

$$\frac{prob(L, \widetilde{k} > \overline{k} \mid b)}{prob(L, \widetilde{k} > \overline{k} \mid g)} < \frac{1-\rho_b}{1-\rho_g},$$

by which it is easy to show the result.

(ii) If $\widetilde{k} < \overline{k}$, given the conjectured equilibrium strategies, this event would be consistent only with $R_1 = R^*$. Then:

$$\frac{prob(L, \widetilde{k} < \overline{k} \mid b)}{prob(L, \widetilde{k} < \overline{k} \mid g)} = \frac{\rho_b}{\rho_g} < \frac{1-\rho_b}{1-\rho_g},$$

and the result is easy to prove. ■

Therefore, it follows that, for each level of $\widetilde{k}$ which is observed by global taxpayers at the end of the second period, it would never be rational for the "completely selfish" IMF to interrupt the programme. Thus, when the IMF is totally selfish, the socially optimal lending rule cannot be sustainable in equilibrium.[23] Alternatively, when the IMF objective function is a mix of the two arguments (reputation and the NPV of the second period adjustment option), the IMF will weight the reputation loss deriving from the decision of stopping the programme against the welfare loss deriving

[23] 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.

from the decision to finance an investment with a negative NPV. In this case, the following Proposition describes the IMF optimal strategies, given the global taxpayers equilibrium beliefs.

Proposition 6 *The following strategies and beliefs constitute a Bayesian sub-game 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* $\widetilde{k} \leq \overleftarrow{k}$, *while it will continue lending if* $\widetilde{k} \geqslant \overrightarrow{k}$. *For intermediate* $\widetilde{k}$, *i.e.* $\overleftarrow{k} < \widetilde{k} < \overrightarrow{k}$, *the IMF will continue lending with probability* $\theta(\widetilde{k})$, *where* $\frac{\partial \theta(\widetilde{k})}{\partial \widetilde{k}} > 0$, $\theta(\overrightarrow{k}) = 1$ *and* $\theta(\overleftarrow{k}) = 0$.

Global taxpayers equilibrium beliefs.

At t=1, if global taxpayers observe L, they would know that this can be due to two events: either $R_1 = R^*$ *or, with probability* $\theta(\widetilde{k})$, $R_1 \neq R^*$ *and* $\widetilde{k} > \overleftarrow{k}$, *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.*

At t=2, we should distinguish two events:

(i) L has been observed at t=1. If global taxpayers now observe $\widetilde{k} \leq \overleftarrow{k}$ *they would know with certainty that* $R_1 = R^*$ *and they would update their beliefs accordingly, using Bayes' rule. If global taxpayers observe* $\widetilde{k} > \overleftarrow{k}$ *they would know that this can be due to two events: either* $R_1 = R^*$ *or, with probability* $\theta(\widetilde{k})$, $R_1 \neq R^*$ *and* $\widetilde{k} > \overleftarrow{k}$, *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 6 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 IMF as a function of the level of capital $\widetilde{k}$. According to the value of $\widetilde{k}$, three relevant cases are represented.

If $-I_1 \leq \widetilde{k} \leq \overleftarrow{k}$, since the welfare loss associated to the choice of lending is greater than the private gain in reputation, the IMF will not have any incentive to deviate from the equilibrium strategy "not lending" (NL). Alternatively, if $\overrightarrow{k} \leq \widetilde{k} \leq \overline{k}$, the private gain in reputation associated to lending (L) is greater than the welfare loss associated to the same strategy when $R_1 \neq R^*$, and so the Fund will lend with probability one. Finally, if $\overleftarrow{k} \leq \widetilde{k} \leq \overrightarrow{k}$, for the equilibrium strategies to be consistent with the equilibrium beliefs, the probability of lending ($\theta(\widetilde{k})$) should be such that the private gain in reputation from choosing L instead of NL is exactly offset by the welfare loss associated to the lending strategy when $R_1 \neq R^*$, namely the IMF should be indifferent between L and NL.

Proposition 7 *Given the IMF reputational lending rule, $\widehat{R}_1^R$ is the value of R_1 which maximises the government's expected profits over the two periods. We have that $\widehat{R}_1^R < \widehat{R}_1^{SO}$.*

Proof. Since in equilibrium the IMF will stop lending less often than it would be recommended by a socially optimal lending rule, this result is proved by applying Proposition 4 ■

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 larger departures from R^*, in the first period, with respect to the level of reforms implemented under the socially optimal lending rule. Moreover, the more lax the lending policy, the higher the probability of financing an adjustment option with a negative NPV in the second period, since the level of second period reforms chosen by the government is

an increasing function of a country's capital.[24]

5 Empirical model

The main result of the theoretical model implies that the desire to avoid a loss of reputation might lead the IMF to exhibit some laxity (relative to social optimum) in interrupting financial programmes. Moreover, the theoretical model suggests that the longer 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 (i.e., the more "biting" its reputational concern would be).

More specifically, we argue that a programme interruption is more likely to be decided at the very beginning of the relationship between the Fund and a country, rather than after a few years. This circumstance is actually confirmed by the evidence presented by Mussa and Savastano (2000), who find that the greatest proportion of the cancelled programmes is found at the very beginning of the relationship between the Fund and the country (specifically before the disbursement of less than a quarter of the initially agreed support) and then it declines with the disbursements.

Therefore, we empirically test the hypothesis that the longer this relationship, the more willing to lend the IMF would be. We measure the length of such relationship in two ways. First, we build a variable where we progressively number the years spent consecutively by a country under a Fund agreement. When the IMF programme spell is interrupted such variable goes to zero and, as soon as a new programme

[24] Under the reputational lending rule, the condition that should be satisfied, for the threat of interrupting the programme at t=1/2 to be credibile, is the following:

$$\lambda_1\gamma_{1/2} + \lambda_2\left\{p_1(\widehat{R}_1^R)X_1 - I_1\right\} + E(Z(\widehat{R}_1^R)) < \lambda_1\left\{\gamma_{1/2} + \gamma_1 + \delta\gamma_2\right\}.$$

The left hand side represents the Fund's expected payoff from not interrupting the first agreement, even if the government is not implementing R^*. While the right hand side represents the Fund's expected payoff from breaking the contract. When the programme is continued, global taxpayers' beliefs, at t=1/2, are equal to prior beliefs, since they do not receive new information at this stage. On the contrary, when the agreement is interrupted, global taxpayers' beliefs will be positively revised at t=1/2 (i.e., $\gamma_{1/2} = \frac{\gamma\rho_g}{\gamma\rho_g+(1-\gamma)\rho_b} > \gamma$), since this event is more likely with a good monitor. After t=1/2 global taxpayers' beliefs will remain the same ($\gamma_{1/2} = \gamma_1 = \gamma_2$). Since the agreement is never interrupted in equilibrium, these beliefs are out of equilibrium.

begins (after an interval of at least one year), we start counting again.

The rationale behind this choice rests on the fact that each spell interruption can be the result of two alternative events: either the graduation of the country from the IMF, or the IMF decision to interrupt its disbursements because the welfare losses are higher than the losses in reputation. In both cases, when a new programme starts, we argue that the IMF behaviour would not be affected by the past since, in the worst event, global taxpayers have already updated their beliefs. We believe that an interruption of at least one year is sufficient to induce global taxpayers to revise their prior beliefs about the IMF ability.[25] In fact, according to Mussa and Savastano (2000), in more than half of the episodes of early cancellations, subsequent arrangements are approved up to one month following the cancellation of the prior ones.[26]

Second, we take the IMF own share of debt as a proxy for the length of the relationship between the Fund and a country. We expect to find a positive correlation between the IMF disbursements and both the number of years spent by a country under a Fund programme and the (lagged) value of the IMF own debt share.[27]

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

[25] However, to check the robustness of our results, we have also tried to use a "looser" criterion, according to which a new programme can be interpreted also as a new relationship only if it begins after an interruption of at least two years. The coefficient of such a variable is still positive and significant, even if its level of significance is lower (at the 10% level).

[26] Such short interruptions indicate that, following deviations from performances clauses, the borrowing country and the IMF were able to rapidly agree on a revised programme and that the "new" agreement should actually be interpreted as a revision of the old one.

[27] Among IMF programmes we consider Stand-By Arrangements (SBA), Extended Fund Facility (EFF), Structural Adjustment Facilities (SAF) and Enhanced Structural Adjustment Facilities (ESAF) (renamed Poverty Reduction and Growth Facility (PRGF) since 1999).

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.[28]

We estimate a dynamic panel of 53 middle-income countries for the period 1982 to 2001 including both country-specific and time effects.[29] Data availability has also limited the sample group to 53 middle-income countries, instead of the original 93. 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 estimated equation for IMF disbursements is the following:

$$D_{i,t} = b_0 + b_1 D_{i,t-1} + b_2 D^j_{i,t-1} + b_3 B^j_{i,t-1} + b_4 Z_{i,t-1} + b_5 Y_{i,t} + b_6 C_i + b_7 T_t. \qquad (16)$$

$D_{i,t}$ denotes IMF disbursements (relative to GDP) to country i and $D^j_{i,t-1}$ denotes long-term disbursements (relative to GDP) to country i from creditor j (i.e., bilaterals, multilaterals, excluding the Fund, and private creditors, as distinguished between commercial banks and private bondholders). To examine the relation between IMF disbursements and a country's degree of indebtedness, we consider the stock of long-term debt (relative to GDP) owed to bilateral, multilateral and private creditors, and enter the four types of debt separately. That is, $B^j_{i,t-1}$ is the vector of (lagged) debt shares held by the different j types of creditors.[30]

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

[28] Figure 3 shows that the short-term debt share is comprised between 10 and 20% throughout the whole sample.

[29] The World Bank divides economies among income groups according to their gross national income (GNI) per capita. To be classified as middle income a country should have an annual GNI per capita included in the range between $826 and $10,065.

[30] Figure 4 actually shows the pattern of all these debt shares in the period 1981-'01.

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 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. According to Sturm et al. (2005), however, while mostly economic variables are robustly related to IMF lending activity, most political variables are non-significant.[31]

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 international 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 give a loan may be lower in case of high inflation and increasing government expenditure.

Among the "supply side variables" we include population among the regressors,

[31] To the extent that political factors matter, they seem more closely related to the conclusion of an agreement with the IMF than to the disbursement of a loan.

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 ones (the "too big to fail" hypothesis). As far as the quality of institutions is concerned, 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).[32]

The variable $Y_{i,t}$ represents the cumulative years spent by a country under each Fund programme. In a second specification we will substitute $Y_{i,t}$ with the (lagged) value of the IMF own share of debt by including it in the $B^j_{i,t-1}$ vector.

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 which should capture the contemporaneous correlations across countries.

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

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 IMF loans we include a lag of the dependent variable among the regres-

[32] 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.

sors. 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, in the static specification, a strong dependence of the IMF disbursements from the IMF debt share might actually reflect the autocorrelation of the disbursements, which are typically disbursed in a number of installments over time.

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 autocorrorrelations 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 1982-2001 by GLS, including both country-specific and time effects. The hypotheses of not significance of country dummies and time dummies were indeed rejected at any reasonable significance level, as Table 4 shows. The results of the estimation of equation (1) are 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 of IMF loans) and these effects are significant at the 5% level. 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 and thus their demand for IMF loans, where this effect is highly significant (at the 1%).[33] 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.

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 coefficient of the share of debt held by commercial banks is significant (at the 5% level).[34] 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 the 1% level).

[33] If interpreted as a supply side type of variable, it could also imply that the IMF is more willing to give new loans if a country is used to service its debt.

[34] 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.

The coefficient of the variable representing the cumulative number of years spent by a country under a Fund programme is positive and highly significant (at 1%). This relation between IMF new loans and the number of years cumulatively spent under each programme suggests that the length of the relationship with the Fund appears to be an important determinant of the Fund lending decision.

Column 2 presents the results of the second specification of the empirical model, where we have substituted the variable representing the number of years spent by a country under each Fund programme with the IMF debt share. As can be seen by comparing columns 1 and 2, the coefficients of the variables explaining bilateral loans are remarkably stable across specifications.[35]

We find that the coefficient of the IMF own debt share is positive and significant at the 5% level.[36] 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.[37] Moreover, comparing the results presented in columns 1 and 2 suggests that the IMF debt share is a good proxy of the length of the relationship between the Fund and a country.

This evidence clearly confirms that the IMF is positively influenced by the length of its relationship with a borrowing country. This is consistent with the main prediction of the theoretical model, according to which the longer the relationship between

[35] The main changes concern the coefficient of the level of reserves (now significant only at the 10% level) and the coefficient of the commercial banks debt share (now significant only at the 10% level). Including the IMF stock of debt among the regressors clearly reduces (slightly) the significance of the coefficient of the lagged IMF disbursments (now significant at the 5% level).

[36] 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.

[37] 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 (or defensive lending). However, even the case of defensive lending looks consistent with the existence of a concern for reputation.

the country and the IMF, the stronger the IMF concern for reputation and the more willing to lend the IMF would be.

7 Conclusions

IMF conditionality specifies policies and structural reforms which borrowing countries must meet in order to obtain an IMF loan. 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 long-term financial assistance has often come with an increasing debt burden but only with 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 "defensive lending" practices 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 Fund, which acts at the same time as a creditor and as a monitor 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 its relationship with a borrowing country. In fact, the longer this relationship, the more informative (for the quality of the IMF monitoring) the decision to interrupt a programme would be, since this outcome will have been influenced by many past Fund monitoring actions

Estimating a dynamic panel of 53 middle-income countries for the period 1982-2001, we have empirically investigated whether the duration of the relationship between the country and the Fund (measured by the cumulated number of years spent by a country under a programme) 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 longer relationship significantly increases IMF disbursements.

Such results are confirmed by a different specification in which we substituted the variable representing the cumulative years spent by a country under a programme with the IMF own share of debt, which is taken as a proxy of the length of a country's relationship with the Fund. In both specifications, the empirical evidence is consistent with the main prediction of the theory.

In order to eliminate distortions in the Fund lending policy, an immediate policy implication of our analysis would be that of separating its responsibility as a lender from that as a monitor. 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. However, for this solution to be effective, it is crucial that these two bodies share the same set of information.

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 (on this see 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.

Appendix

Proof. of Proposition 7

Let's start from the second stage. Let's suppose that $-I_1 \leq \widetilde{k} \leq \overleftarrow{k}$ and that, at t=1, lending (L) has been observed. Applying Bayes' rule, we obtain:

$$\gamma_2(L, -I_1 \leq \widetilde{k} \leq \overleftarrow{k}) = \frac{\gamma\rho_g}{\gamma\rho_g + (1-\gamma)\rho_b}.$$

Then, the IMF private gain from reputation would be equal to: $\gamma_1(L) + \delta\gamma_2(L, -I_1 \leq \widetilde{k} \leq \overleftarrow{k})$, where:

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

and:

$$prob(L \mid g) = \rho_g + (1-\rho_g) \int_{\overleftarrow{k}}^{X_1+\overline{y}-I_1} \theta(\widetilde{k}) h(\widetilde{k} \mid R_1 = \widehat{R}_1^R) d,$$

and:

$$prob(L \mid b) = \rho_b + (1-\rho_b) \int_{\overleftarrow{k}}^{X_1+\overline{y}-I_1} \theta(\widetilde{k}) h(\widetilde{k} \mid R_1 = \widehat{R}_1^R) d\widetilde{k}.$$

Alternatively, if $-I_1 \leq \widetilde{k} \leq \overleftarrow{k}$ 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:

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

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

$$G\max = \gamma_1(L) + \delta\gamma_2(L, -I_1 \leq \widetilde{k} \leq \overleftarrow{k}) - (\gamma_1(NL) + \delta\gamma_1(NL)), \qquad \text{(A-1)}$$

which can be easily shown to be positive.

Now let:

$$WL(\widetilde{k}) = I_2 - p_2(\widehat{R}_2(\widetilde{k}))X_2$$

be the welfare loss of the second period project. Notice that WL is continuously decreasing with $\widetilde{k}$ (see Proposition 1) and that WL(.)=0 when $\widetilde{k} = \overline{k}$. We also assume that the maximum value of $\lambda_2 WL(\widetilde{k})$ $(\lambda_2 WL(\widetilde{k} = -I_1)$ is greater than $\lambda_1 G\max$.

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

$$\lambda_2 WL(\widetilde{k}) \geqslant \lambda_1 G \max, \quad \text{for } -I_1 \leq \widetilde{k} \leq \overleftarrow{k}\,.$$

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

$$\lambda_2 WL(\overleftarrow{k}) = \lambda_1 G \max\,.$$

Therefore, when $-I_1 \leq \widetilde{k} \leq \overleftarrow{k}$, the IMF has no incentive to deviate from the equilibrium strategy NL.

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

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

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

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

Moreover:

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

and:

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

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

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

where:

$$\frac{\partial G(\theta(\widetilde{k}))}{\partial \widetilde{k}} < 0, \ \lim_{\widetilde{k} \to \overleftarrow{k}} G(\theta(\widetilde{k})) = G\text{max and } G(\theta(\widetilde{k})) \mid_{\overrightarrow{k} \leq \widetilde{k} \leq \overline{k}} = G\text{min},$$

Since the probability to continue lending is increasing with $\widetilde{k}$, the signal becomes less informative as capital grows. Notice that Gmin is found substituting (17) into (A-4) and Gmax 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 $\theta(\widetilde{k})$:

$$\lambda_1 G(\theta(\widetilde{k})) = \lambda_2 WL(\widetilde{k}), \tag{A-5}$$

so that, when $\overleftarrow{k} \leq \widetilde{k} \leq \overrightarrow{k}$, 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 $\widetilde{k}$, when the probability of continuing lending is 1. Since $WL(\widetilde{k} = \overline{k}) = 0$ and Gmin> 0, it is immediate to verify that $\overrightarrow{k} < \overline{k}$.

Finally, as $G(\widetilde{k}) = G\min > 0$, when $\overrightarrow{k} \leq \widetilde{k} \leq \overline{k}$, it follows that $\lambda_1 G\min \geq \lambda_2 WL(\widetilde{k})$. Thus, in this interval, the IMF will lend with probability one even if the social surplus is negative. ■

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] Baltagi, B., Li, Q., 1995. Testing AR(1) against MA(1) disturbances in error component model. Journal of Econometrics 68, 133–151

[3] Barro, R.J., Lee, J.W., 2003. IMF Programs: who is chosen and what are the effects? Harvard University, mimeo.

[4] Bird, G., Rowlands, D., 2001. IMF Lending: How Is It Affected by Economic, Political, and Institutional Factors. Journal of Policy Reform 4, 243–270.

[5] Bird, G., Hussain, M., Joyce, J.P., 2004. Many Happy Returns? Recidivism and the IMF. Journal of International Money and Finance 23, 231–251.

[6] Birdall, N., Claessens, S., Diwan, I., 2003. Policy Selectivity Foregone: Debt and Donor Behaviour in Africa. World Bank Economic Review (WBER) 17, 409–435.

[7] Boot, W.A., Thakor A.V., 1993. Self-Interested Bank Regulation. American Economic Review 83, 206–212.

[8] Collier, P., Guillaumont, P., Guillaumont, S., Gunning, J.W., 1997. Redesigning conditionality. World Development 25, 1399–1407

[9] Copelovitch, M., 2004. Private debt composition and the political economy of IMF lending. Harvard University, mimeo.

[10] Cordella, T., Dell'Ariccia, G., 2003. Budget Support versus Project Aid: a Theoretical Appraisal. IMF Working Paper No. 88.

[11] Drazen, A., 2002. Conditionality and Ownership in IMF Lending: A Political Economy Approach. IMF Staff Papers No. 49, 36–67.

[12] 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.

[13] Easterly, W., 2005. What did structural adjustment adjust? The association of policies and growth with repeated IMF and World Bank adjustment loans. Journal of Development Economics, 76, 1-22.

[14] IEO/IMF., 2002. Report of the Independent Evaluation Office (IEO) on prolonged Use of IMF Resources.

[15] Ivanova, A., Mayer, W., Mourmouras, A., Anayiotos, G., 2003. What Determines the Implementation of IMF-Supported Programs IMF Working Paper No. 8.

[16] Joyce, J.P., 2003. Promises Made, Promises Broken: A Model of IMF Program Implementation. Wellesley College Department of Economics Working Paper No. 4

[17] Joyce, J.P., 2004. The Adoption, Implementation and Impact of IMF Programs: A Review of the Evidence. Comparative Economic Studies 46, 451–467.

[18] Joyce, J.P., 2005. Time Present and Time Past: A Duration Analysis of IMF Program Spells. Review of International Economics 13, 283–297.

[19] Judson, R.A., Owen, A.L., 1999. Estimating dynamic panel data models: a guide for macroeconomists. Economic Letters 65, 9–15.

[20] Knack, S., Keefer, P., 1995. Institutions and Economic Performance: Cross Country Tests Using Alternative Institutional Models. Economics and Politics 7, 207–227.

[21] Knight, M., Santaella, J.A., 1997. Economic Determinants of IMF Financial Arrangements. Journal of Development Economics 54, 405–436.

[22] Marchesi, S., Missale, A., 2004. What does motivate lending and aid to the HIPCs? Centro Studi d'Agliano Development Working Papers No. 189.

[23] Marchesi, S., Sabani, L., 2005. Prolonged use and conditionality failure: investigating the IMF responsibility. Forthcoming in the WIDER Jubilee Conference Volume.

[24] Mussa, M., Savastano, M.A., 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.

[25] Nickell, S.J., 1981. Biases in Dynamic Models with Fixed Effects. Econometrica 49, 802–816.

[26] Nunziata, L., 2000. hetgrot.ado: a Stata command for a Likelihood Ratio test for groupwise heteroskedasticity.

[27] Nunziata, L , 2002. xtbac.ado: a Stata command for the Baltagi autocorrelation test in panel data.

[28] Przeworski, A , Vreeland, JR., 2000. The Effect of IMF Programs on Economic Growth. Journal of Development Economics 62, 385–421.

[29] Ramcharan, R., 2003. Reputation, debt and policy conditionality. IMF Working Paper No. 192.

[30] Sturm, J.E., Berger, H., de Haan, J., 2005. Which variables explain decisions on IMF credit? An extreme bounds analysis. Economics and Politics 17, 177-213.

[31] Svensson, J., 2000. When Is Foreign Aid Policy Credible? Aid Dependence and Conditionality. Journal of Development Economics 61, 61–80.

[32] Vaubel, R., 1986. A Public choice approach to international organizations. Public Choice 51, 39–57.

Table 1: List of middle income countries in the sample

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	

Source: World Bank

Table 2: Variables definition

Variable	Definition	Units
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 Disbursments	IMF Disbursments	Ratio to GDP
Multilateral Disbursments	Bilateral Grants	Ratio to GDP
Bilateral Disbursment	Multilateral Disbursments	Ratio to GDP
Bank Disbursments	Bank Disbursments	Ratio to GDP
Bonds Disbursments	Bonds Disbursments	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
Cumulative Years	Cumulative years spent under each programme	Sequence of years

Table 3: Data source

Variable	Source
Population	International Financial Statistics (IFS)
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 (WDI)
Gr-Government Consumption	World Development Indicators (WDI)
Political Rights and Civil Liberties	Freedom House (FH)
Total debt service	Global Development Finance (GDF)
IMF Disbursments	Global Development Finance (GDF)
Multilateral Disbursments	Global Development Finance (GDF)
Bilateral Disbursment	Global Development Finance (GDF)
Bank Disbursments	Global Development Finance (GDF)
Bonds Disbursments	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)
Cumulative years	International Financial Statistics (IFS)

Table 4 IMF Debt Disbursments

	IMF Dis	IMF Dis
Population	0.0141	0.0116
	(1.572)	(1.300)
Pc-GDP (-1)	0.0001	0.00005
	(0.366)	(0.222)
Inflation (-1)	0.00006	0.00004
	(1.343)	(0.896)
Gr-GDP (-1)	-0.0086**	-0.0081**
	(2.317)	(2.199)
Reserves (-1)	-0.0016**	-0.0014*
	(2.015)	(1.823)
Current Account (-1)	-0.0051**	-0.0055**
	(1.976)	(2.172)
Investment (-1)	-0.0073**	-0.0069**
	(2.389)	(2.291)
Gr-Gov Consumption (-1)	-0.0009	-0.0009
	(0.987)	(1.090)
dPRCL	0.0010	0.0010
	(1.417)	(1.487)
Total Debt Service (-1)	0.0034***	0.0035***
	(2.777)	(2.826)
Debt Share M (-1)	-0.0035	-0.0061
	(0.954)	(1.545)
Debt Share B (-1)	0.0024	0.0026
	(1.019)	(1.103)
Debt Share Banks (-1)	0.0056**	0.0049*
	(2.076)	(1.832)
Debt Share Bonds (-1)	0.0019	0.0015
	(0.378)	(0.292)
Disbursments M (-1)	0.0024	0.0074
	(0.159)	(0.488)
Disbursments IMF (-1)	0.0920***	0.0596**
	(3.513)	(1.985)
Disbursments B (-1)	0.0142	0.0061
	(1.240)	(0.531)
Disbursments Banks (-1)	-0.0006	-0.0008
	(0.066)	(0.087)
Disbursments Bonds (-1)	-0.0237	-0.0216
	(1.160)	(1.070)
Cumulative years under each programme	0.0003***	
	(3.341)	
Debt Share IMF (-1)		0.0364**
		(2.568)
Constant	0.0041**	0.0044**
	(2.154)	(2.311)
Observations	1060	1060
Number of panelid	53	53
Number of years	20	20
SE of regression	0.0114	0.0113
SE of Dependent variable	0.0131	0.0131
CD joint significance test	Prob>chi2=0.0059	Prob>chi2=0.018
TD joint significance test	Prob>chi2=0.0059	Prob>chi2=0.067

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

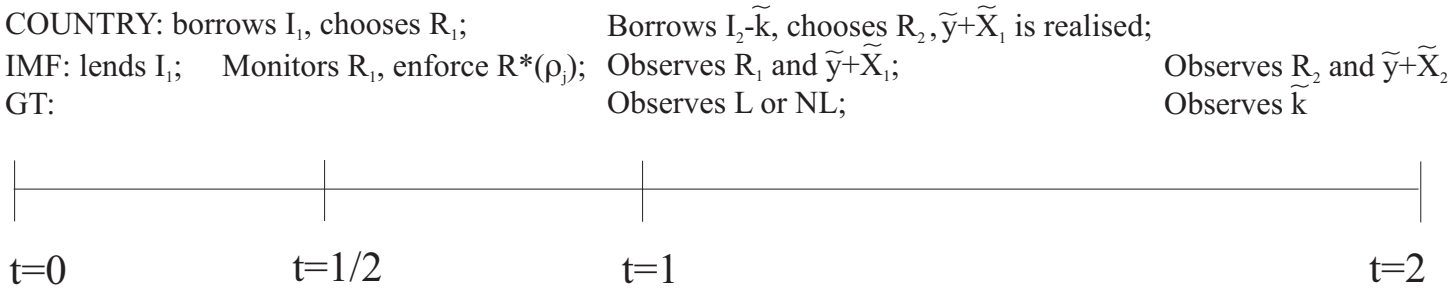

Figure 1

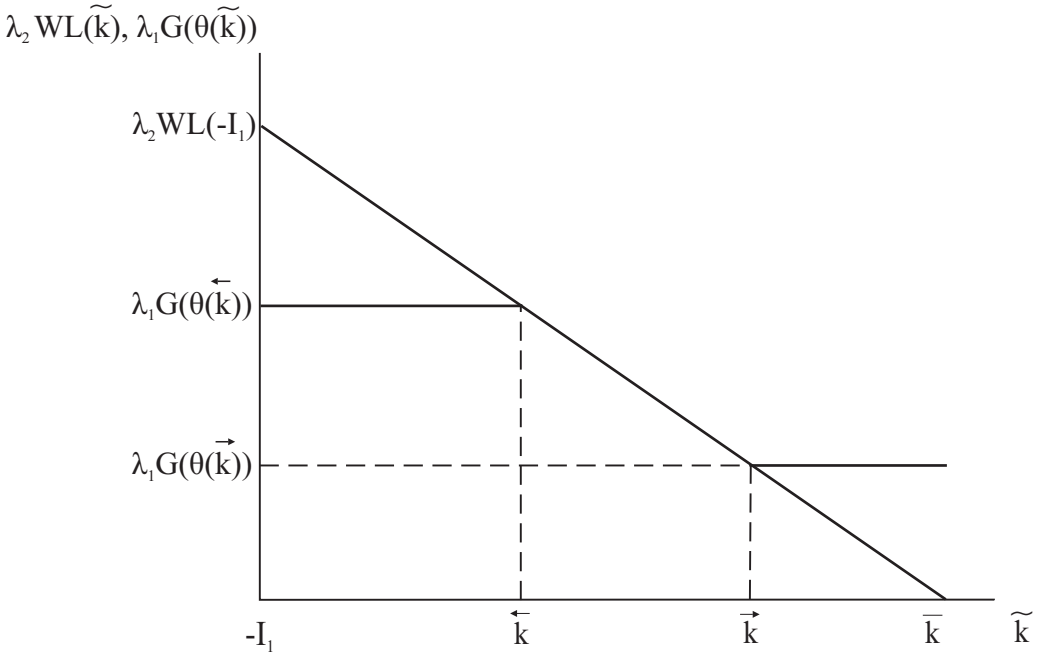

Figure 2

Figure 3: Long and short term debt shares

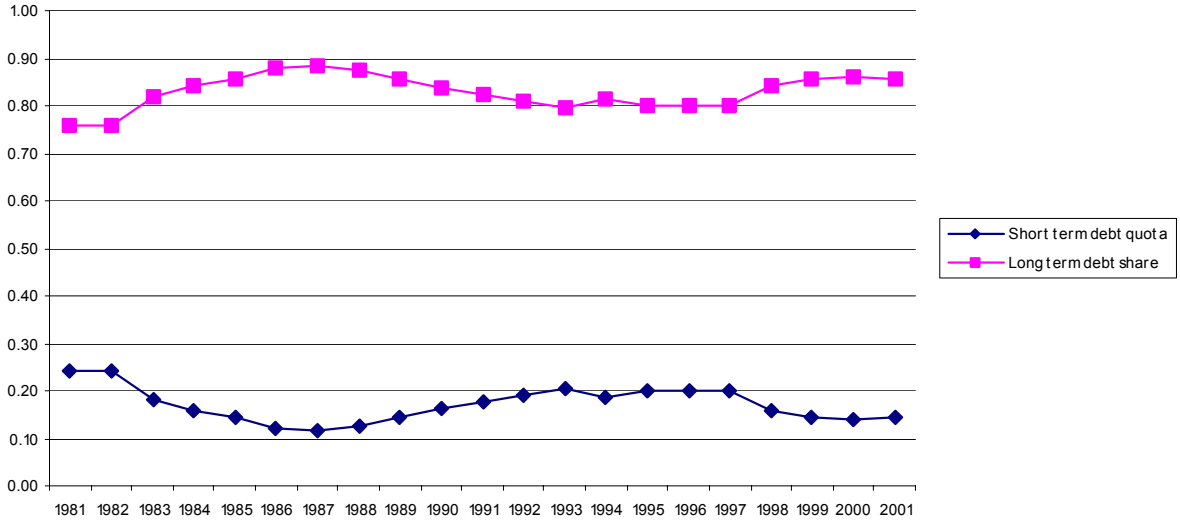

Figure 4: Disaggregated debt shares - middle income countries