

WORKING PAPERS IN ECONOMICS

No.10/10

RUNE JANSEN HAGEN

CERTIFIED OR BRANDED? A GAME- THEORETIC ANALYSIS OF THE IMF`S POLICY SUPPORT INSTRUMENT*



Department of Economics
UNIVERSITY OF BERGEN

Certified or Branded? A Game-Theoretic Analysis of the IMF's Policy Support Instrument*

Rune Jansen Hagen[†]

Abstract

While often considered a purely financial institution, the IMF has throughout its history performed non-financial services for its membership. The latest such example is the Policy Support Instrument (PSI), a certification mechanism established in 2005 for which only poor members are eligible. Based on a formal game-theoretic model, I argue that it is unlikely that the PSI will serve well its intended goal of facilitating capital market access for members requesting the service. Their low income, the lack of significant consequences for markets, the IMF's traditional reluctance to criticise members, as well as the need to promote the use of the new arrangement indicate that the Fund could emphasise participants' welfare over the interests of private lenders. The continued importance of foreign aid in eligible countries also puts the IMF in the role of gatekeeping such flows, which might conflict with sending clear signals to commercial actors. All these reasons imply that in many cases its seal of approval will be of little use to third-parties, despite the high standards to which PSI-countries are supposed to adhere. The best argument in favour of the PSI being a useful addition to the Fund's tool kit for low-income members is the fact that several countries have already signed a second one.

JEL: F33, F34, F35.

Keywords: IMF, signalling, international lending, foreign aid.

1 Introduction

The IMF serves many functions, but it seems fair to say that the main focus has been on the financial services it provides. While noting that surveillance activities account for 42% of the IMF's budget, Bordo and James (2000: 9) claim that “[t]he IMF is primarily a financial institution.” There is some merit in this view, but it might obscure the fact that the Fund has always provided

*I am happy to acknowledge the helpful comments of participants at a seminar at NTNU (Trondheim).

[†]Department of Economics, University of Bergen, Fosswinckels gate 14, 5007 Bergen, Norway. Phone/fax: +47 55589219 / 55589210. E-mail: Rune.Hagen@econ.uib.no.

many non-financial services to its members. Indeed, some argue that the need for multilateral surveillance is the very reason for the existence of the IMF (Guitián 1992: 12): “There is a well-defined common thread that binds together all the activities of the IMF: the promotion and safeguarding of an international code of conduct. [...] The IMF is primarily a surveillance institution, and its other activities derive their legitimacy from the surveillance mandate laid out in the Articles of Agreement.” Surveillance of members is carried out on a regular basis, usually yearly, in what is known as Article IV consultations. In the process, the IMF gathers an enormous amount of information about the economy of each member as well as the policies of the government. Similar processes take place in the context of negotiations of financial arrangements with members. In addition, the IMF continually monitors and analyses the economies of members. It therefore seems reasonable to assume that the IMF has an informational advantage vis-a-vis third-parties when it comes to the state they are in (Rodrik 1996, Hagen 2009).

It is also the case that throughout its history the IMF has deliberated on the impressions its actions convey to non-members. This includes signals sent in the context of standard financial arrangements (e.g. whether or not to grant a member’s request for access to resources beyond those semi-automatically available to all members) and precautionary facilities (where a member obtains an option to draw on the Fund only if specific events occur), but also in a long list of more or less ad-hoc non-financial mechanisms.¹ Most of the latter can be described as certification devices, where the IMF makes public claims about certain aspects of economic conditions and policies in member countries. These mechanisms have been considered problematic for various reasons, such as the (lack of) clarity as to what they signal or their low dimensionality. For example, simple endorsements of the policies of a member only tell third-parties whether the programme is on track or not according to a standard, not the extent to which it is on or off-track or in what areas. Moreover, the standards used have not always been explicit, creating confusion as to the value of the seal of approval.

The IMF’s latest mechanism of certification is called the Policy Support Instrument (PSI), and was approved by the Executive Board in October 2005.² The PSI is aimed at the poorer members, mostly low-income countries (LICs).³

¹See the excellent discussion of the pros and cons of various mechanisms for signalling the private information of the Fund to outsiders without committing financial resources, including those that are defunct or never made it past the proposal-stage, in IMF (2004).

²See IMF (2005a) as well as Policy Support Instrument - Framework, Decision No. 13561-(05/85), as amended. The PSI framework was slightly revised in connection with the revamping of the Fund’s concessional facilities in January 2010, c.f. A New Architecture of Facilities for Low-Income Countries and Reform of the Fund’s Concessional Financing Framework, Decision No. 14385-(09/79).

³More specifically, the board has stated that the PSI is open to all members eligible for assistance under the Poverty Reduction and Growth Trust, provided that they: “(a) have a policy framework focused on consolidating macroeconomic stability and debt sustainability, while deepening structural reforms in key areas in which growth and poverty reduction are constrained; and (b) seek to maintain a close policy dialogue with the Fund, through the Fund’s endorsement and assessment of their economic and financial policies [...]”

It is expected to be a service to so-called “mature stabilisers”, i.e., countries having achieved a modicum of macroeconomic stability allowing them the leeway to eschew Fund-financing. The Fund argues that even though these have in a sense graduated from its concessional credit facilities, they might still want its approval of their policies. While such countries are of course subject to regular Article IV surveillance, the PSI will provide an explicit endorsement as well as more frequent assessments of a member’s policies. In contrast to the compulsory nature of Article IV surveillance the PSI is supposed to be demand-driven. So far, six countries (see Table 1) - Cape Verde, Mozambique, Nigeria, Senegal, Tanzania, and Uganda - have some experience with a PSI, with the Fund claiming interest from other members as well.⁴ The current financial crisis might have dampened this interest somewhat. However, it is noteworthy that while three of the five countries with an ongoing PSI have found it necessary to access IMF money, Cape Verde and Uganda did not. Moreover, Mozambique, Senegal, and Tanzania are all back on the PSI only and Rwanda has recently become the seventh member to request and have a PSI approved. This indicates that the crisis has not viped out the demand for a non-financial programme of this type. One can therefore expect the PSI to continue into the near future at least.

[Table 1 about here]

A natural question to ask is why these LICs prefer a PSI programme to a funded one.⁵ The standards to which they are supposed to adhere in order to gain the Fund’s approval - upper tranche conditionality - are the same. And they still qualify for concessional funding. It is true that the subsidy in IMF concessional lending is small compared to both IDA (much longer repayment period) and much of the bilateral aid they receive (nowadays mostly 100% grants). But as many of the PSI-programme countries seek nonconcessional funding (see below) this cannot be the main argument for eschewing the opportunity to borrow from the Fund. It thus seems reasonable to venture that there must be a difference in the type of signal the IMF sends to third-parties after having evaluated the policies of a LIC member with a lending programme and one with a PSI. Indeed, in the few academic papers dealing with the PSI one finds two opposing views. Bevan (2009) and Taylor (2006) are of the opinion that non-funded programmes provide a stronger signal with respect to the quality of economic policies by clarifying who is responsible for them and eliminating a potential conflict of interest for the Fund, which in the event that a member country is already indebted to it would benefit from any catalytic effect of its

⁴According to Taylor (2006: 386): “[A] series of requests for this type of program from the finance ministers of HIPCs in Africa was what first put this idea on the reform agenda [...]” The IMF itself conducted surveys of both LIC-members as well as other stakeholders in connection with both the initial decision as well as the first review of the PSI (IMF 2005b, 2009a). These surveys provide some support for there being such a demand. However, the independent survey by Martin et al. (2009) paints a more sanguine picture.

⁵Cape Verde is currently classified as a lower middle-income country by the World Bank, but falls under the exception of “small island economies.” For the sake of simplicity I will sometimes speak of PSI-eligible IMF members as LICs, though there are potential and actual exceptions to this rule like Cape Verde.

seal of approval on financing from other sources.⁶ Building on an argument first made by Rodrik (1996), Lane (2009) argues to the contrary: that the IMF has a greater incentive to monitor policies when its own money is at stake. Being better informed in this case, its seal of approval should convey a stronger signal. In Hagen (2009) I investigated this issue and found that lending is not a necessary condition for informative communication by the IMF. However, putting its money where its mouth is enables the Fund to credibly reveal its private information to third-parties in cases where mere certification does not.

With the PSI, the question of when the IMF's signal has a greater effect on other financial flows can in principle be addressed by data. However, while the Fund has conducted its first review of experience with the PSI (IMF 2009a), there are still too few data points to allow firm conclusions to be drawn. So for the moment we have to do with related work on the impact of financial programmes. Bird and Rowlands (1997) contains a good discussion of the issues as well as a summary of earlier empirical studies of the catalytic effect of IMF lending. The more recent review of this literature by Cottarelli and Ginannini (2002) supports their conclusion that it is weak. It is noteworthy, though, that the average seems to be masking two opposing effects, a negative one on private commercial flows and a positive one on official flows.⁷ The latter is probably related to the "gatekeeping" role highlighted as problematic by the Fund's own Independent Evaluation Office in its first report (IEO 2002). An IMF programme has been a prerequisite for debt relief in the context of the Paris Club and the Heavily Indebted Poor Countries Initiative (HIPC). In addition, both bilateral and multilateral donors have frequently viewed them as providing the necessary quality control of the macroeconomic policies of aid recipients.⁸ Bird and Rowlands (2007) present recent econometric evidence to the effect that the IMF thereby actually increases aid flows to poor member countries. As argued by Radelet (2006) and Taylor (2006), for example, lending to perform this role has had unfortunate consequences such as tying up IMF resources that could have been better used in member countries with a real balance of payments need, increasing the debt levels of members only seeking the IMF's seal of approval, and too much focus on stabilisation where the macroeconomic situation has significantly improved. The PSI severs the connection between IMF money and certification, providing a signal to the aid donors of the mature stabilisers without these negative sideeffects.

When it comes to private flows, five of the seven countries that have signed

⁶This is a variation on the theme that aid donors in general engage in defensive lending (or granting) to avoid defaults by recipients on the debt they owe them. For more detail as well as some indicative empirical results, see Birdsall et al. (2003) and Marchesi and Missale (2007).

⁷Other studies look at these issues from somewhat different angles. Gelos et al. (2008) and Thomas (2009) analyse what factors give poor countries access to private capital markets. The former find no significant effect of IMF programmes once the quality of policies is controlled for, whereas the latter find that in contrast to IDA-eligible countries the market access of IDA graduates is positively affected by the time spent in IMF programmes.

⁸According to Fraser and Whitfield (2009: 86), this praxis persists.

a PSI so far are post-completion-point HIPCs.⁹ This means that their programmes have contained caps on non-concessional borrowing, as the creditors that have provided debt relief seek to guard against free-riding by other potential lenders and prevent a reemergence of debt distress. Even though the PSI-countries have been given some room to contract new debt on such terms, in contrast to most other HIPCs,¹⁰ the caps have been a continuous source of contention in their negotiations with the IMF. If their performance holds up, it is likely that they will be given even more space to court private commercial sources of financing, particularly for infrastructure projects. For example, the staff report for the new PSI for Uganda states that “[the programme] will continue to target investment spending to address Uganda’s large infrastructure gap while maintaining low inflation, a flexible exchange rate and a comfortable level of international reserves. In view of prospective declines in aid, financing will rely more on domestic revenue and additional external sources, including on less concessional terms.”¹¹ However, the literature on the catalytic effects of IMF lending indicates that being under the continued tutelage of the Fund could come at the cost of lower inflows of such capital, thus at least delaying the true graduation of these countries from aid dependence. Indeed, even the Fund itself is concerned that it might stigmatize its clients (c.f. Box 1 in IMF 2008). Thus, it is pertinent to ask whether the PSI certifies participants as commercially creditworthy or brands them as lemons that should still be confined to receiving concessional flows.

To evaluate the potentially contradictory effects of a non-funded IMF programme such as the PSI on financial flows from other sources, I extend and adapt the model in Hagen (2009). The model is extended by adding aid donors to evaluate the impact of gatekeeping and adapted to consider the implications for a specific programme of policy “certification”.¹² In section 2, I sketch the components of the model. The results are presented in section 3. Section 4 contains my concluding comments.

2 Building Stones for Modelling the PSI

2.1 Preliminaries

There are four kinds of agents that need to be modelled in order to analyse the PSI. Obviously, first of all there must be a poor member country that has made a request to have its policies scrutinised in the context of the PSI. Secondly, and equally obvious, the likely behaviour of the IMF must be investigated. Given the Fund’s privileged access to the authorities of the member country and the threat

⁹The exceptions are Cape Verde and Nigeria. The other five have benefitted from the Multilateral Debt Relief Initiative (MDRI) too.

¹⁰With the exception of Rwanda they also have the lowest concessionality requirements due to their low risk of debt distress, c.f. Table 1 in IMF (2009b).

¹¹P. 4, IMF Country Report 10/132.

¹²On the other hand the issue of the relative merits of multilateral lending and certification that is the main focus of that paper is not considered here.

of terminating a programme if the latter do not provide the information required, I assume that the former acquires an informational advantage with respect to the last two types of agents, private lenders and official donors. Through its statements about what it finds during reviews the IMF might seek to relinquish this advantage or to retain it.

Donors and commercial providers of finance need to be included in the model as their responses to the announcements of the IMF will influence the latter. As noted above, donors might use the “certificate” issued by the IMF to determine whether the country is more or less deserving of aid. This would only be a normal extension of the Fund’s gatekeeping role with respect to macroeconomic developments to a situation where it does not provide resources of its own. I also pointed out that the countries with a PSI are interested in attracting private foreign capital and that the Fund has indeed granted them more leeway with respect to non-financial borrowing than most other members that qualify for concessional lending. Private lenders might change their decisions with respect to lending to the country in question after digesting the IMF’s statement about the potential borrower’s policies. I thus study their behaviour and how it influences Fund decision-making as well. The timing of events is depicted in Figure 1.

[Figure 1 about here]

I first study the optimal behaviour of the member country, commercial lenders, and aid donors (in that order). These results are prerequisites for analysing what the IMF will do with the findings of its PSI reviews

2.2 The Member Country

To simplify the analysis as much as possible without leaving out anything of essence for the results I assume that the country may be either of only two types. Implicit in the PSI-approach is the notion that the Fund’s seal of approval should enable programme countries to tap private capital flows to a greater extent than they can on their own. To see whether and when this is indeed the case there needs to be some heterogeneity amongst countries that could request a PSI. Two types of countries, with only one having the requisite characteristics for being commercially creditworthy, are both necessary and sufficient for an interesting analysis.

The first archetype is a country that is not truly a “mature stabiliser”, i.e., its policies still leaves something to be desired, especially with respect to being commercially creditworthy. A country of this type should only receive aid, if anything. The other archetype, however, although still poor, has economic policies and an institutional framework in place that makes it safe for private lenders to lend if they are fully aware of its true characteristics. More specifically, the supposed difference between the types H and L is that the former has higher marginal returns to investment than the latter. This is a useful analytical shortcut as the returns to investing in a country realistically depend on many of the policies and institutional features that the IMF is supposed to assess in its reviews under the PSI.

The government of the borrower country chooses investment and international borrowing to maximise the utility of the representative consumer:

$$U^i = C_1^i + \varphi C_2^i, \quad (1)$$

where φ is the discount factor. The budget constraints are

$$C_1^i = Y_1 + A^i + B^i - I^i; \quad (2a)$$

$$C_2^i = \begin{cases} (1 + \kappa^i) I^i - (1 + r^i) B^i & \text{if no default;} \\ (1 - \lambda) (1 + \kappa^i) I^i & \text{if default.} \end{cases} \quad (2b)$$

That is, in period 1 the country has some exogenous income Y_1 and may augment period 1 consumption (C_1^i) through international borrowing (B^i) at an interest rate of r^i or aid (A^i) and period 2 consumption (C_2^i) through investment (I^i), with the values of these variables potentially depending on the kind of equilibrium emerging as well as country type. If type i fully services its debt the total returns to investment ($Y_2^i = (1 + \kappa^i) I$) are available for consumption in period 2. If it defaults by paying creditors anything less than principal plus interest it incurs the loss of a fraction of period 2 income $\lambda \in (0, 1)$.¹³ As already noted I assume $\kappa^H > \kappa^L$. This means that H have a higher capability of servicing its debt than L other things being equal.

Given the linearity of the borrower's objective function there are potentially a large number of cases to consider. To focus on the most interesting and realistic ones, I therefore make some assumptions on the main parameters such as the rates of return, the discount rate of the government, and the penalty rate.¹⁴ The assumptions first of all imply $\kappa^H > \rho > \kappa^L$, i.e., that it is efficient that only the H -type invests if it is charged the risk-free interest rate ρ . They also imply that the time-preferences of the sovereign are such that in fact only the H -type invests, given no default. Moreover, given the linearity of the objective function it invests all funds available: $I^H = Y_1 + A + B$. On the other hand, L might be thought of as "truly" not creditworthy as it will not invest even in the best of circumstances, and instead, perhaps, as being a natural candidate for receiving aid only. In sum the assumptions thus imply $U^L = C_1^L$ and $U^H = \varphi C_2^H$.

2.3 Private lenders

In the market for sovereign debt depicted here, there are two types of market failure. The first one is moral hazard. Ex post, a sovereign cannot be forced to respect its obligations by legal means as there are no international courts in which it can be sued. And despite legal changes over recent decades that have done away with absolute sovereignty in the major creditor country courts, the fact remains that it is hard to enforce verdicts favouring lenders, especially

¹³This assumption is common in the literature on sovereign debt, c.f. the review by Eaton and Fernandez (1995).

¹⁴These assumptions are stated in the appendix together with the rest of the technicalities behind the results derived here.

when the sovereign is a poor one. Developing country governments rarely have sufficiently valuable assets abroad that can be seized in such an event.¹⁵ The result is credit rationing in equilibrium.

Secondly, here there is adverse selection. The bad type country should not be given credit. It does not invest and so has no repayment capacity come period 2. As we shall see the good type is able and willing to honour some debt contracts. However, if the IMF does not provide reliable information beyond that already possessed by private lenders the amount of credit and the terms given will in equilibrium reflect the risk that the borrower is a lemon.

The ex ante probability that lenders attach to $i = L$ is $p \in (0, 1)$. The amount invested by the country is assumed to be unobservable to lenders. In combination with the linearity of the objective function of the authorities, this precludes the country from being a strategic player in the game and makes the information provided by the IMF about its type crucial to the decisions of private lenders.¹⁶ There are only pure-strategy equilibria in the game analysed here. This means that either borrower type is revealed to lenders (in a separating equilibrium) or they learn nothing and must go by their priors (in a pooling equilibrium). In making their decisions they play Nash against donors, i.e., they take the level of aid the country receives as given.

With a strictly positive penalty rate, the critical value of debt at which the borrower is indifferent between servicing it and incurring the loss implied by default is found by equating period 2 consumption levels with and without default:

$$B = \frac{\lambda Y_2^i}{1+r} \equiv \bar{B}^i. \quad (3)$$

Of course, it is never optimal for lenders to lend more than \bar{B}^i if the country's type is known. Therefore, in general the volume of lending is supply-determined in this model. Lenders are risk-neutral and maximise expected profits, with the risk-free rate of interest on the world market being their opportunity cost. I make the standard assumption of a competitive market in the sense of no profits in expectation. I also simplify by assuming that although losses are inflicted on the borrower if it defaults lenders receive nothing. Denoting the probability of default by δ , the no-expected-profits condition is then

$$(1 - \delta)(1 + r)B = (1 + \rho)B \Leftrightarrow r = \frac{1 + \rho}{1 - \delta} - 1. \quad (4)$$

If the IMF's intervention does not reveal new information to lenders, the posterior probability that $i = L$ equals p too. In a pooling equilibrium, lenders are not able to distinguish the two types. Even though the H -type might be willing to pay an interest rate higher than ρ in order to get more credit, so is

¹⁵For more on the legal issues of sovereign debt, see e.g. Roubini and Setser (2004) and Panizza et al. (2009).

¹⁶Acharya and Diwan (1993) have shown that a debtor buying back its debt might signal its willingness to invest to creditors. To concentrate on the IMF's strategic role I therefore assume that the country's initial debt is zero.

L , which never invests and thus always defaults on any $B > 0$. Therefore the two types can neither be screened nor signal their type. Hence, in a pooling equilibrium lenders are confined to offering terms that are not type-contingent. B obviously will not be so high that both types prefer to default. On the other hand, lending nothing would leave potential profits on the table since there is a strictly positive probability that the country is of type H and thus will repay some levels of debt given some risk-adjusted interest rates. This means that the pooling equilibrium credit limit \bar{B}^P must be such that with certainty L defaults and H repays the loan with interest. As thus $\delta = p$, $r^P = \frac{1+p}{1-p} - 1 > \rho$.

In a separating equilibrium, the IMF reveals the country's type to the market. Then lending no more than \bar{B}^i is risk-free, i.e., $\delta = 0$. Due to competition among lenders, $r^H = r^L = \rho$ and the country will be able to borrow \bar{B}^i . $\bar{B}^L = 0$ because $I^L = 0$; if the country has low returns to investment it will be shut off from private credit. Given a plausible restriction on parameter values, $\bar{B}^H(A)$ and $\bar{B}^P(A)$ can be derived from (3) using $I^H = Y_1 + A + B$, r^H , and r^P . Note that both $\bar{B}^H(A)$ and $\bar{B}^P(A)$ are increasing in the amount of aid a good type receives in the two equilibria. As all aid is invested it increases the repayment capacity of H and thus the credit limits it faces.¹⁷

In sum, lenders have only three responses in pure strategy equilibria: they offer the borrower terms corresponding to it being L or H or, if nothing is learnt, $\{\bar{B}^P, r^P\}$. These contracts, which are indexed by j , are illustrated in Figure 2.

[Figure 2 about here]

Let

$$\Pi^{ij} = \begin{cases} -\bar{B}^j(A), & \text{if } i = L, \\ \frac{(1+r^j)B^j(A) - (1+\rho)B^j(A)}{1+\rho}, & \text{if } i = H, \end{cases} \quad (5)$$

be ex post profits discounted by ρ if the country of type i is given the contract D^j , taking into account the fact that an L -type (H -type) always (never) defaults. In combination with the linearity of the borrower's objective function, discounting profits by the lenders' own opportunity cost makes it commensurate with consumption in the capital-importing countries in the following sense: if a unit of funds is borrowed but not repaid, borrower consumption increases by one unit in period 1 without any reduction in period 2; while the period 2 decrease in the consumption of lenders is $-(1+\rho)$, which is equal to -1 in terms of period 1 consumption. Hence, in this way borrowers and lenders are treated symmetrically in the model. This simplifies the analysis that follows.

2.4 Donors

Aid donors are assumed to care about consumption levels in the recipient country. However, their intertemporal preferences are not necessarily the same as

¹⁷For an analysis of the impact of aid on commercial credit from a different perspective, see Pedersen (2003).

those of the authorities there. Moreover, giving aid is assumed to be costly. Thus, the objective function of donors is

$$V = C_1^i + \beta C_2^i - \frac{1}{2}\theta A^2, \quad (6)$$

where $\theta > 0$ is the marginal cost of aid. Donors are assumed to have the same priors over country type as private lenders. They will then also attach the same posterior probability to the possibility that country type is L after having heard the IMF's speech as the latter do. Recalling that donors play Nash against lenders, it is straightforward to find the optimal levels of grant-aid by differentiaion of (6):

$$A^L = \frac{1}{\theta}; \quad (7a)$$

$$A^H = \frac{\beta(1 + \kappa^H)}{\theta}; \quad (7b)$$

$$A^P = \frac{p + (1 - p)\beta(1 + \kappa^H)}{\theta}. \quad (7c)$$

Note that the level of private lending does not affect the amount of aid given. This is due to donors' objective function being linear in consumption levels in the developing country. In a more general fomulation, more private credit would lead to a smaller grant. However, as this has no bearing on the results derived here I prefer the simpler specification in (6).

It is easy to see that there is a critical value of donors' discount factor that result in $A^L = A^P = A^H$. I will label it β^* . For lower discount factors, a member country that is not commercially creditworthy gets more aid than one that have access international credit markets, contingent on types being known. On the other hand, if donors put more weight on future outcomes than β^* the type with low returns to investment gets less aid than the one with high returns.

$\beta < \beta^*$ might seem like the most reasonable assumption to make. For one thing, it generates a "natural" division of labour between donors and lenders - the former compensate the lemons for the lack of lending by the latter by giving them more aid - that to some extent mimicks what we actually observe. Moreover, both theoretical and empirical studies strongly suggest that aid policies are prone to being dynamically inconsistent due to various bureaucratic and political failures.¹⁸ Ex ante donors might try to impose certain conditionalities to be fulfilled in order to receive aid, but ex post it often turns out to be the case that these threats are not credible. For example, aid agencies are no different than other public agencies when it comes to disbursement pressures. Because unused funds is often interpreted by bureauractic and political principals as a

¹⁸For theoretical analyses, see Hagen (2006), Martens et al. (2002). Pedersen (1996, 2001), and Svensson (2000). On the record of multilateral conditionality, see e.g. Mosley et al. (1991), Killick (1998), Dollar and Svensson (1998), Ivanova et al. (2003), and Easterly (2005).

lack of “need”, agencies usually spend all funds available in a budget year.¹⁹ Thus, threatening a recalcitrant recipient government with withholding aid is rarely credible.

The problem is often aggravated by political failure. An altruistic donor will have a hard time ignoring need even if the magnitude of need is at least partly due to recipients not having fulfilled preconditions to which it has agreed. Thus, this Samaritan’s Dilemma is another reason why, for example, empirical studies find rates of implementation of aid conditionalities to be rather poor. In the current context, this literature can be broadly summarised as predicting that “lemons” will be rewarded due to greater need, which is what the assumption $\beta < \beta^*$ implies.

However, over the last decade or so there has been much talk about improving aid by measures such as fostering ownership on the part of recipients and allocating aid selectively to good performers. This rhetoric can be interpreted as implying that donors will take a more long-term view and focus on supporting those recipients that pursue policies conducive to developing their economies. Indeed, there is some evidence that donors have become more selective.²⁰ In the model analysed here this can be captured by assuming $\beta > \beta^*$ so that $A^H > A^P > A^L$. Below, I study the consequences of both assumptions.

2.5 Resource Flows, Profits, and Welfare

It is time to summarise the analysis so far by calculating resource flows to the developing country in different equilibria as these determine the payoffs to the other actors, which in turn feeds into the IMF’s objectives (considered in the next section). The first step is to use the results on aid to calculate the level of credit that the developing country will receive. Recalling that $\bar{B}^L(A) = 0$ and that donors and lenders will have the same posterior beliefs, this simply amounts to inserting A^H in $\bar{B}^H(A)$ and A^P in $\bar{B}^P(A)$.

Now we are in a position to investigate total period 1 resource flows $F_1^j = A^j + \bar{B}^j$. In the absence of aid, the good type receives higher inflows than the bad type, with the pooling equilibrium level being in between. This reflects the fact that lenders are willing to lend to H -types but not to L -types. Naturally, this ranking is preserved when $A^H > A^P > A^L$ as well as for β close to β^* . However, for $\beta \ll \beta^*$ the lemon receives higher total flows in period 1 than the good type for low enough values of the marginal cost of aid. In other words, if aid flows are large enough and heavily skewed towards the most needy type we have $F_1^H < F_1^P < F_1^L$.

Next, consider the levels of country welfare implied by the reactions of donors and lenders to the news that the IMF provides. I denote the welfare of a

¹⁹If anything, the problem is magnified in the sphere of aid by the broken feed-back loop from ultimate beneficiaries (the poor in developing countries) to the ultimate donors (taxpayers in rich countries), which tend to make outputs such as the amount spent the measuring rod for performance instead of outcomes on the ground.

²⁰See e.g. Dollar and Levin (2006) and Claessens et al. (2009).

type i developing country that has been given contract a contract of type j by commercial lenders and corresponding amounts of aid by U^{ij} . A necessary and sufficient condition for an L -type country at least weakly preferring separation to being mistaken for the other type is $F_1^L \geq F_1^H$. The logic is that as the bad type does not invest it prefers to have foreign resource flows maximised. The composition does not matter for L ; loans are equivalent to grants because it will not repay and, what is more, suffers no costs from defaulting. On the other hand, the good type is not indifferent between F_1' and F_1'' when $F_1' = F_1''$ if these are not also identical with respect to their components. The H -type will prefer to have a smaller loan and more aid as it knows that it will find it optimal to repay the loan with interest in period 2.

What about lenders? If the borrower is creditworthy, they prefer that the IMF does not provide them with additional information. The logic behind this somewhat surprising result is that when there is full information any pure profits are competed away. On the other hand, if the IMF's statement leaves lenders no wiser than they were at the outset they will charge a risk-premium reflecting the possibility of the country not being creditworthy. Ex ante the premium is such that expected profits are zero, but ex post lenders will either make pure profits (if the country turns out to be of the good type) or lose money (if it is actually a lemon). In a sense, the Fund can help lenders "collude" if surveillance has revealed $i = H$ by keeping this knowledge secret, but it can also induce transfers from them to the developing country by keeping them in the dark about the fact that it is not creditworthy. If the country is a lemon, lenders' ex post profits are obviously maximised if the IMF reveals this fact.

2.6 The IMF

As noted I assume that before the borrower interact with lenders and donors country type is revealed to the IMF. This may be thought of as the IMF conducting a review that is completely accurate with respect to the value of κ^i .²¹ Of course, if this is a permanent feature of the country one would expect interested third-parties to learn its type as time goes by. However, circumstances and policies change over time, so it is more fruitful to picture this parameter as expressing the "current" state of the member country.²²

Upon concluding a PSI review the IMF makes a statement about its findings that may signal what is then its private information to lenders. It chooses its communication strategy to maximise a weighted average of the other agents' objective functions:

$$W^{ij} = \omega U^{ij} + \nu \Pi^{ij} + (1 - \omega - \nu) V^{ij}, \quad i = L, H; j = L, H, P; \quad (8)$$

²¹It is of course unrealistic to assume that the IMF becomes as knowledgeable as the country's authorities, but it is a useful simplification at this stage. Moreover, the results should continue to hold as long as the IMF has an informational advantage over private lenders and donors. Including information costs is left for future research.

²²Admittedly, this formulation is somewhat awkward in a two-period model. However, the important point is that the model is static, and considering the dynamics of this state variable would take us too far afield.

where U^{ij} , Π^{ij} , and V^{ij} reflect the results derived above, $\omega, \nu \in (0, 1)$, and $\omega + \nu \leq 1$. This objective function may be rationalised in the following way. The interests of all other agents in the model are to some extent important to the IMF. The purposes of the organisation set forth in its Articles of Agreement reflect the overarching objective of contributing to the welfare of its members. Thus, U is a relevant argument of W . The importance of Π to the IMF might be argued in several ways. For example, profits from commercial lending obviously accrue to institutions in some member countries, contributing to their national income. Also, the Fund is charged with maintaining the international financial system. This means that it has to look after the interests of both sides of the market. Similarly, in a dynamic perspective, the IMF must keep one eye on how its actions impact on the bottom line of capital providers to retain credibility with markets and thus being able to influence them.

The fulfillment of donor objectives could also be seen as reflective of the pursuance of members' interests. Moreover, in most poor countries the IMF interact with bilateral aid agencies year in, year out. To maintain a working relationship with them and preserve its problematic but status-conferring role as gatekeeper with respect to accessing aid budgets, it needs to factor in the goals of these actors when presenting its assessments of the macroeconomic situation in a recipient.²³ If the country in question is a client of an important shareholder such as the US, this issue could take on added importance. However, beyond certain hotspots like Iraq and Afghanistan geopolitics is generally of lesser importance for aid allocation in the post Cold War era. This would probably be an accurate description with respect to the current PSI countries at least. In any case, the framework is flexible enough to allow us to ignore the donors' goals (by setting $\omega + \nu = 1$), which is what I will actually do below

PSIs have a three-year duration. Reviews are to be conducted on a semi-annual basis, and a PSI will automatically lapse if two consecutive reviews are not completed. That is, if Fund staff two times in a row find reasons for not granting the seal of approval, whether because policies are not up to the standard (upper tranche conditionality) or because not enough high-quality information has been provided by the authorities, the PSI will be terminated. This implies that over the course of such a review cycle the Fund can send four sequences of messages. It can give the thumbs up twice in a row, in principle signalling that this is a country with a sound policy framework. Or it can withdraw its endorsement both times, thus certainly leaving the impression that the member's policies are seriously lacking in quality. Finally, it can mix yes and no, in both cases sending no clear message to outside parties about the member.

²³Both the latter argument as well as the argument about the need for maintaining a reputation with capital market participants are really arguments about the Fund's long-term incentives. In a static model like the current one, however, they can be usefully be taken as arguments for including the objectives of these actors amongst those that are more narrowly the IMF's own goals.

3 Equilibrium Reviews of a PSI

3.1 Cheap Talk Equilibria

The PSI can be thought of as giving rise to a game of “cheap-talk” between the IMF and donors and lenders, where the latter update their beliefs about a participating country after thinking through the Fund’s incentives to make truthful statements. By definition, cheap-talk does not directly affect pay-offs. In the current context the only way in which certification by the IMF can have an impact is by changing the beliefs of third-parties about country type, thereby inducing them to change their offers.

The applicable equilibrium concept for this type of game is Perfect Bayesian Equilibrium (PBE). In a PBE behaviour is rational given beliefs, with Bayes’ Rule determining beliefs along the equilibrium path. As is well-known, there are usually more than one PBE. I adopt the approach to refining the equilibrium set of messages advocated by Farrell (1993). That is, I assume i) all agents share a common language and ii) this language is “rich”. The common language assumption implies that the literal meaning of any message is clear, so that incentives to deceive are the only barriers to communication. The rich language assumption does two things. It rules out the so-called “babbling” equilibrium in which donors and lenders treat all statements as containing no information and therefore go by their priors, in turn making it equilibrium behaviour for the Fund to send all possible messages with the same positive probability. As there are no unused messages, there is no way we can check the plausibility of this equilibrium by studying what would happen if something that goes unsaid in equilibrium suddenly was stated (an out-of equilibrium message was sent), which is the standard way of refining PBE. But Farrell (1993: 518) notes that the babbling equilibrium is not very plausible: “It requires [the sender] to randomize extensively, saying some very unnatural things, not for his own sake but for the sake of equilibrium.”²⁴ The rich language assumption does away with this uninteresting candidate equilibrium by always allowing for some other way of saying anything.

This opens for a certain way of refining the set of equilibria. More specifically, I apply Farrell’s (1993) concept of neologism-proofness when this is necessary to sharpen the predictions. This works as follows. Suppose there is an out-of-equilibrium message (a neologism) with the literal meaning, say, “the country is of type H ”. This neologism is “self-signalling” if and only if the IMF would like donors and lenders to believe this statement only when it is true. Then, an equilibrium in which this statement is not made is not neologism-proof if the IMF has an incentive to use it (i.e., is better off than in the purported equilibrium if the message is sent and believed).

With this prerequisite in place, there are essentially only three meanings that the IMF can communicate to third-parties in a pure-strategy PBE, to which I without loss of generality confine attention. Besides “the country is L ” and “the country is H ”, the IMF may not convince lenders and donors that either is true,

²⁴A similar criticism is voiced in Farrell and Rabin (1996).

leaving them to go by their priors. The last case is equivalent to making the statement “(N)o comment.” This message may be seen as shorthand for all kinds of uninformative statements. I therefore assume that the possible messages are L , H , and N and that in all pooling PBE the IMF says N . The latter assumption implies that there are always neologisms available even though I restrict the size of the message space.²⁵ These three messages H , L , and N correspond fairly closely to the meaning conveyed by two consecutive PSI reviews: H is equivalent to two successful reviews, L to two times non-completion, and N to one reviewed being concluded and the other not.

3.2 Two Benchmarks

To limit the length of the paper I assume $\omega + \nu = 1$ in the following. The IMF’s objective function (8) then reduces to $W^{ij} = \omega U^{ij} + (1 - \omega) \Pi^{ij}$. After a review revealing $i = L$ we thus have

$$W^{LL} = \omega U^{LL} + (1 - \omega) \Pi^{LL} = \omega (Y_1 + F_1^L); \quad (9a)$$

$$W^{LH} = \omega U^{LH} + (1 - \omega) \Pi^{LH} = \omega (Y_1 + F_1^H) - (1 - \omega) \bar{B}^H; \quad (9b)$$

$$W^{LP} = \omega U^{LP} + (1 - \omega) \Pi^{LP} = \omega (Y_1 + F_1^P) - (1 - \omega) \bar{B}^P. \quad (9c)$$

After a review revealing to the IMF that $i = H$ its potential pay-offs are

$$W^{HL} = \omega \varphi (1 + \kappa^H) (Y_1 + F_1^L); \quad (10a)$$

$$W^{HH} = \omega \varphi \left[(1 + \kappa^H) (Y_1 + F_1^H) - (1 + \rho) \bar{B}^H \right]; \quad (10b)$$

$$W^{HP} = \omega \varphi \left[(1 + \kappa^H) (Y_1 + F_1^P) - (1 + r^P) \bar{B}^P \right] \\ + (1 - \omega) \left(\frac{r^P - \rho}{1 + \rho} \right) \bar{B}^P. \quad (10c)$$

One angle on the results derived below follows from assuming that the counterfactual is no IMF programme. This is the benchmark used in Hagen (2009). Third-parties then have to go by their priors and first period capital flows will be $F_1^P = A^P + \bar{B}^P$. The country repays its debt with interest if it is truly commercially creditworthy and reneges on the contract otherwise. Hence, lenders lose money if the IMF member is a lemon. On the other hand, they earn pure profits if the country is of the good type.

No IMF programme is perhaps the counterfactual that puts the effects of the PSI in starkest relief. However, it is not the only one. A second useful benchmark for the analysis that follows is the case of no aid, which was investigated

²⁵If pooling at L or H was allowed for, I would have to change the message space when investigating whether such PBE are neologism-proof to maintain the possibility of the IMF literally stating, say, that the review revealed $i = H$ (as a pooling equilibrium statement H would then convey the meaning “no comment”). As noted, Farrell (1993) also assumes that neologisms are always available.

in Hagen (2009). There is then a critical value of ω equal to 0.5 such that for lower (higher) values of the weight on country welfare in the IMF's objective function the unique neologism-proof PBE is separating (pooling).²⁶ This is in the spirit of cheap-talk games as it shows that in order for the equilibrium to be informative the interests of senders and receivers of messages need to be sufficiently aligned. In this particular case, the sender is the IMF and lenders are the receivers. Thus, lenders only believe the Fund's statement about borrower country type if they know that it places a sufficiently high weight on their interests, i.e., profits. The intuition behind the critical value being 0.5 is that as the bad type neither invests nor repays debts, a loan is a pure transfer in this event. Given the linearity of its objective function, the Fund is only indifferent to a transfer from creditors to debtors being made if it places equal weight on country welfare and lenders' profits.²⁷ If the IMF cares less (more) about the borrower than its creditors it will (not) make a truthful statement after having learned that $i = L$.

There is also a pooling PBE for $\omega < 0.5$, but it is not neologism-proof as the IMF wants to tell the truth if the country is a lemon and does not want to make lenders believe it is not creditworthy if it is in fact so. Thus, if the out-of-equilibrium message L is made, lenders should realise that it is true.²⁸ And if they do, the IMF will speak the truth when the country is not creditworthy. This breaks the pooling equilibrium.

In other words, the necessary and sufficient conditions for the equilibrium to be informative is that regardless of what the review reveals the IMF does not want to fool third-parties:

$$W^{LL} \geq W^{LH}; \tag{11a}$$

$$W^{HH} \geq W^{HL}. \tag{11b}$$

If these conditions do not hold, the equilibrium cannot be separating and lenders as well as donors will learn nothing from when the result of the review is made public. Their decisions will then be guided by their priors.

3.3 Results

If aid levels are very high and heavily skewed in favour of the type of country that is not creditworthy, the equilibrium statement made by the IMF cannot be informative. The IMF will not be able to make a truthful statement and have it believed as both lenders and donors know that it has an incentive to portray the member country in the way that maximises aid flows. This holds regardless

²⁶C.f. Proposition 2.

²⁷The normalisation in (5) contributes to the cleanliness of the result, but obviously does not affect it qualitatively.

²⁸That is, as $W^{LL} > W^{LP}$ and $W^{HL} < W^{HP}$ for such low values of ω , the neologism L is self-signalling.

of the relative weighting of country welfare and profits in the institution's objective function. In such a case, the PSI is not working according to intention. Outcomes are the same whether an eligible member is in the programme or not.

The second benchmark provides a perspective on how a non-financial programme like the PSI works in an aid-dependent country when donors are heavily focused on needs. It then becomes apparent that the IMF's seal of approval can be rendered worthless in such circumstances. Without aid, the Fund's statement will be informative as long as it puts no more relative weight on country welfare than 50%. When much larger amounts of aid go to countries that are not commercially creditworthy, the IMF will be tempted to play down the possibilities for tapping commercial finance for members that actually have them so as to avoid a disproportionate drop in concessional flows. Hence, in this case one could by extension argue that the PSI works perversely by reducing commercial flows and leaving creditworthy members dependent on the aid flows that are currently the main component of inward capital flows for them. While this is in their short-run interest, it is most likely not the best development strategy in the longer run. Moreover, as lenders will get their fingers burnt by lending positive amounts to lemons when aid clouds the picture there is a possibility that the mature stabilisers' graduation from aid dependence could also be delayed by the supply-side's unwillingness to engage with such countries.

For less generous aid flows that satisfy $A^H < A^L$, there exists a critical value of ω such that the equilibrium is separating for lower values of this parameter and there is pooling for higher values. In other words, in this region we obtain qualitatively the same results as in Hagen (2009). Compared to a situation with no IMF programme, the PSI thus potentially enables mature stabilisers to access international credit markets. This goal is achieved if the objectives governing the review process do not favour poor member countries too much. Furthermore, quantitatively the critical value ω^* is higher than in the second benchmark: with modest aid flows targeted at low-productivity economies, $\omega^* > 0.5$. That is, the space for separation is enlarged and the space for pooling is reduced compared to the effects of IMF certification in a member not receiving aid. This is due to aid flows weakening the incentive to mimick when $i = L$ without generating one for $i = H$. At first glance it seems that in these circumstances gatekeeping works as well as it can. However, the welfare effects are not necessarily straightforward as the bad type loses when the good member country gains.

When $\beta > \beta^*$ it is only the preferences of the IMF that matters for the degree of informativeness of the equilibrium. However, then $\omega^* < 0.5$. The intuition for this result is perhaps best illustrated by considering the special case of $\beta = \beta^*$. Then the same amount of aid is given whether the equilibrium is separating or pooling and regardless of country type, and $F_1^H - F_1^L = \bar{B}^H$. Because only relative pay-offs matter this implies that $\omega^* = 0.5$, as is apparent from (9a) and (9b). When the review is of no consequence for the amount of aid provided, the trade-off is the same as in the case without aid. Hiding the fact that the country is not commercially creditworthy by stating the opposite would if the strategy was successful saddle lenders with a loss of -1 in period 1 terms

for a gain of one unit of period 1 consumption for the country. As noted above, the Fund can only be indifferent to effecting such a transfer if $\omega^* = 0.5$. It is then easily seen that once donors give more aid to more productive recipients, the IMF would have an incentive to conceal the true results of a review showing $i = L$ even if it weighs country welfare and profits equally. Thus, ω^* must be lower than 0.5 in this case. The comparison with the first benchmark is unperturbed in the sense that there are values of ω^* such that the equilibrium is separating, highlighting the potential of a PSI to be informative of country characteristics of relevance to both donors and lenders. However, compared to the second benchmark we see that now the gatekeeping role of the IMF actually reduces the possibility that its seal of approval is valuable to third-parties.

3.4 Discussion

In sum, the consequences of the IMF signalling to two distinct audiences - commercial lenders and aid donors - produce complex effects. In the worst-case scenario, the gatekeeping role eliminates the IMF's potential for helping lenders distinguish creditworthy countries from lemons. Then credit-market access is hindered and aid-dependency perpetuated. In the best case, aid supports signalling to credit markets by compensating member countries that are not commercially creditworthy. By enlarging the space for separating the good and the bad, donors increase the likelihood that the IMF facilitates the provision of private finance to mature stabilisers. In the intermediate case, selective aid paradoxically weakens the prospects of achieving this goal by aggravating the consequences of being branded a lemon. While still potentially better than no arrangement with the Fund, in this scenario PSI participants do worse than a member country in a corresponding certification process receiving no aid.

Both in the intermediate case and in the best-case scenario the ultimate determinant of outcomes is the IMF's relative weighting of country welfare and profits. There are four reasons why one can expect the IMF to put great emphasis on the welfare of the country having requested a PSI (i.e., ω being fairly large). First of all, eligible members are poor. From a normative perspective it is thus justifiable that the consequences of the IMF's actions on their welfare are given due weight. The Fund has also put considerable effort into revamping its facilities for low-income countries, suggesting that it certainly take its role in this part of the membership seriously.

Secondly, the systemic consequences of neglecting the impact on providers of capital are small. Given the poverty of the potential borrowers, the sums lent will in any case be small. Hence, the IMF do not have to worry whether any losses to lenders will have wider repercussions on the global economy. This probably also implies that the usual political pressures from major shareholders on Fund decision-making does not apply.²⁹

Thirdly, although not without precursors (albeit more informal), this is a new arrangement. While the IMF could apply strict rules to signal that the

²⁹For recent reviews of the political economy of the IMF, see Bird (2007) and Steinwand and Stone (2008).

PSI is supposed to be a mechanism for establishing beyond doubt the high quality of policies and institutions in participating members, it would seem more reasonable to expect some initial slacking of standards to increase demand. The institution's history is replete with examples of facilities being created and abolished after hardly having been used, the Contingent Credit Line being only the most recent one. The Fund would be embarrassed if it turned out that it has spent resources developing yet another service for which there are no customers, even if its own financial position right now is less precarious than it has been in recent years.

Finally, the organisation is in general reluctant to explicitly criticise its members, which after all are the principals of the international bureaucrats staffing it. As noted in IMF (2004: 34-35), there are two main reasons why the Fund tends to avoid criticism: "First, the Fund fears that negative signals would undermine the frankness of its dialogue with the authorities. Second, the Fund is concerned that negative signals could bring serious negative consequences for the member: in a country with access to capital markets, they could trigger the very crisis the Fund would be seeking to avert; and in an aid-recipient country, they could lead to a sharp reduction in foreign financing." This could be construed as a revealed preference for sending muddled signals. The formal analysis in this paper then demonstrates that the admirable goal of facilitating access for PSI participants to international capital markets might not be attainable without changing the Fund's own incentive structures. It also highlights how the institution's operations are inexorably linked with the behaviour of aid donors in the countries in question. The Fund has been under considerable pressure in recent years to allow the "scaling-up" of aid to help achieve the Millennium Development Goals. At the same time a somewhat greater proportion of bilateral aid is being given in the form of budget-support, which is potentially sensitive to the IMF's portrayal of members' policies. To evaluate the impact of the gatekeeping role on the signal sent to commercial lenders - and thus the prospects of any particular PSI arrangement - is admittedly not an easy task. But especially at a time of financial crisis it is easy to believe that the IMF is tempted to put the gloss on its reviews in order to keep aid flowing even if this might come at the cost of worsened prospects for attracting commercial finance to PSI participants.

The only indication in favour of the best case being the relevant one that I can see is the fact that most countries that have already had a PSI have signed a second agreement, the special case of Nigeria being the only exception. Mozambique, Senegal, and Tanzania even did so after having been temporarily back in financial arrangements (with programmatic contents determined by their PSIs). It could thus be that these so-called mature stabilisers see the PSI as a useful half-way house on their way to graduation from aid, allowing the IMF to keep aid flowing while at the same time signalling to commercial actors that they are not basket cases in need of its subsidised credits anymore. However, why rejecting cheap loans while accepting grants should signal commercial creditworthiness remains unclear, especially as Hagen (2009) shows that subsidised IMF credit achieves more separation than mere certification. And even if accessing

the Fund’s concessional facilities is stigmatizing in some other way, it is unclear why it is the money that stains and not the conditionality, which is the same as for the PSI. Indeed, the discussion of stigma in IMF (2008) only lists possible reasons for not approaching the Fund, not why some of its services or products might be more stigmatizing than others.

4 Conclusion: Certified or Branded?

The question motivating this paper is whether a certification mechanism such as the PSI can work in countries still highly dependent on aid or will only serve to brand them as not yet ready to enter commercial credit markets. The theoretical model does not present a clear-cut answer. It shows that there are instances where the scale and profile of aid allocations combine with the IMF’s objectives to both allow more information to be transmitted to third-parties compared to no arrangement at all and to raise the potential for IMF communication to be more informative than in a hypothetical case where participants receive no aid. However, I would argue that the odds are stacked against such outcomes being realised. There are organisational imperatives that work at cross-purposes with the aim of facilitating access to non-concessional finance for the mature stabilisers the mechanism is aimed at: promoting the new service as well as the “do-no-harm” culture censoring negative signals. The systemic consequences are small as well: here we are talking about Tanzania, not Thailand, Mozambique, not Mexico. Finally, eligible members have low incomes and remain dependent on aid. Given the conventional behaviour of donors, this is likely to imply that each signal has both positive and negative consequences. Being branded a lemon could mean being certified as needy; conversely, being certified as creditworthy could mean being branded as unworthy of receiving aid. It is then entirely plausible that giving due weight to the short- to medium-term interests of PSI-countries the IMF should make sure concessional funds keep flowing, even if this results in the commercial credit that its richer members rely on remaining unavailable. The case for the PSI rests on the continued demand for the service by those that have experience with it, as well as indications of demand from other countries in a similar position. This is not fool-proof evidence for the theoretical best case being the applicable one, as participants could merely be trying to escape a perceived stigma of accessing the IMF’s concessional facilities. But the defence could use it to argue that the jury is still out on the weaker proposition that the PSI is a useful addition to the Fund’s tool kit for low-income members.

5 Appendix

The assumptions made on the main parameters are

Parameter assumptions

$$I) \frac{1+\kappa^L}{1+\rho} < 1 < \frac{1+\kappa^H}{1+\rho} < \frac{1}{\lambda};$$

$$\text{II) } \frac{1}{1+\kappa^H} \leq \varphi \leq \frac{1-p}{1+\rho}.$$

In equilibrium, there will be no default in period 2. Inserting (2a) and the correct version of (2b) into (1), the derivatives of the borrowing country's authorities with respect to investment and borrowing are

$$\frac{\partial U^i}{\partial I^i} = -1 + \varphi(1 + \kappa^i); \quad (\text{A1a})$$

$$\frac{\partial U^i}{\partial B^i} = 1 - \varphi(1 + r^i). \quad (\text{A1b})$$

The assumptions made imply $\varphi(1 + \kappa^L) < 1 < \varphi(1 + \kappa^H)$. Hence, type H invest as much as possible ($I^H = Y_1 + A + B$) whereas $I^L = 0$. It follows that L will not invest if it defaults, as it then suffers a penalty that lowers its returns to investment. Moreover, as $Y_2^L = 0$ private lenders will never knowingly give it credit: $\bar{B}^L = 0$. When its type is known lenders will not allow H so much credit that it defaults either. Then competition results in $r^L = r^H = \phi$. Moreover, by assumption I) $\frac{\partial U^H}{\partial B^H} = 1 - \varphi(1 + \phi) > 0$, and so H borrows \bar{B}^H . I also assume $\varphi(1 + r^i) \leq 1$. Otherwise, the good type would not borrow in the pooling equilibrium.

\bar{B}^H is derived from $(1 + \phi)\bar{B}^H \equiv \lambda Y_2^H = \lambda(1 + \kappa^H)(Y_1 + A + \bar{B}^H)$. The necessity of assuming $1 + \phi > \lambda(1 + \kappa^H)$ is then clear: one more unit of borrowing increases the left-hand side of the condition for indifference with respect to default by $1 + \phi$ and the right-hand side by $\lambda(1 + \kappa^H)$. If the latter exceeded the former lenders could lend an infinite amount without ever risking default. \bar{B}^P is found in corresponding fashion. Thus,

$$\bar{B}^L(A) = 0; \quad (\text{A2a})$$

$$\bar{B}^H(A) = \frac{\lambda(1 + \kappa^H)(Y_1 + A)}{1 + \rho - \lambda(1 + \kappa^H)} > 0; \quad (\text{A2b})$$

$$\bar{B}^P(A) = \frac{\lambda(1 + \kappa^H)(Y_1 + A)}{1 + r^P - \lambda(1 + \kappa^H)} > 0. \quad (\text{A2c})$$

To find optimal aid policies, recall that $C_1^L = Y_1 + A + B$, $C_2^L = C_1^H = 0$, and $C_2^H = (1 + \kappa^H)(Y_1 + A + B) - (1 + r)B$. Taking B as given, the first-order conditions are thus

$$\frac{\partial V^L}{\partial A} = 1 - \theta A = 0; \quad (\text{A3a})$$

$$\frac{\partial V^H}{\partial A} = \beta(1 + \kappa^H) - \theta A = 0; \quad (\text{A3b})$$

$$\frac{\partial V^P}{\partial A} = p + (1 - p)\beta(1 + \kappa^H) - \theta A = 0. \quad (\text{A3c})$$

The results stated in equations (7a – c) in the main text thus follows. As $-\theta < 0$, the second-order conditions are satisfied in all three cases. The relative volumes of aid depend on $\beta \gtrless \beta^*$, where the critical value is defined by $\beta^* (1 + \kappa^H) \equiv 1$, with $A^L > A^P > A^H$ for $\beta < \beta^*$ and $A^L < A^P < A^H$ for $\beta > \beta^*$.

To derive equilibrium credit levels, first recall that if lenders believe the country is of type L , $\bar{B}^L(A) = 0 \forall A$. Inserting A^H in $\bar{B}^H(A)$ and A^P in $\bar{B}^P(A)$, one finds \bar{B}^H and \bar{B}^P , respectively. Now we are in a position to derive total first-period resource flows $F_1^j = A^j + B^j$:

$$F_1^L = A^L + \bar{B}^L = \frac{1}{\theta}; \quad (\text{A4a})$$

$$F_1^H = A^H + \bar{B}^H = \frac{\theta \lambda (1 + \kappa^H) Y_1 + (1 + \rho) \beta (1 + \kappa^H)}{\theta [(1 + \rho) - \lambda (1 + \kappa^H)]}; \quad (\text{A4b})$$

$$F_1^P = A^P + \bar{B}^P = \frac{\theta \lambda (1 + \kappa^H) Y_1 + (1 + r^P) [p + (1 - p) \beta (1 + \kappa^H)]}{\theta [(1 + r^P) - \lambda (1 + \kappa^H)]} \quad (\text{A4c})$$

The following results can then be deduced:

Lemma A1

- i) Suppose $0 < \beta < \hat{\beta}$. Then $\exists \hat{\theta} > 0$ such that a) $0 < \theta < \hat{\theta}$, $F_1^H < F_1^P < F_1^L$;
- b) $\theta = \hat{\theta}$, $F_1^H = F_1^P = F_1^L$; c) $\theta > \hat{\theta}$, $F_1^H > F_1^P > F_1^L$.
- ii) Suppose $\hat{\beta} \leq \beta$. Then $F_1^H > F_1^P > F_1^L$.

Proof of Lemma A1:

Straightforward calculation reveals that

$$\hat{\theta} = \frac{(1 + \rho) [1 - \beta (1 + \kappa^H)] - \lambda (1 + \kappa^H)}{\lambda (1 + \kappa^H) Y_1}$$

This expression is negative at $\beta = \beta^*$. Given the maintained assumptions on parameter values it is positive for $\beta = 0$. Moreover, $\hat{\theta}$ can be seen to be monotonically declining in β . Hence $\exists \hat{\beta} \in (0, \beta^*)$, such that $\hat{\theta} \gtrless 0 \Leftrightarrow \beta \lesseqgtr \hat{\beta}$. Since the marginal cost of aid is positive, $F_1^H > F_1^P > F_1^L$ for all $\hat{\beta} \leq \beta$. For $\beta < \hat{\beta}$, it is easily verified that $0 > \frac{\partial F_1^H}{\partial \theta} > \frac{\partial F_1^P}{\partial \theta} > \frac{\partial F_1^L}{\partial \theta}$. QED.

Lemma A2

- i) A necessary and sufficient condition for an L -type country at least weakly preferring separation to being mistaken for the other type is $F_1^L \geq F_1^H$.

- ii) A necessary but not sufficient condition for an H -type country at least weakly preferring separation to being mistaken for the other type is $F_1^L \leq F_1^H$.

Proof of Lemma A2:

Part i): $U^{LL} = Y_1 + F_1^L$ and $U^{LH} = Y_1 + F_1^H$. Hence, $U^{LL} \geq U^{LH} \Leftrightarrow F_1^L \geq F_1^H$. Part ii): $U^{HH} = \varphi [(1 + \kappa^H) (Y_1 + F_1^H) - (1 + \rho) \bar{B}^H]$ and $U^{HL} = \varphi (1 + \kappa^H) (Y_1 + F_1^L)$. Thus, $U^{HL} \leq U^{HH} \Leftrightarrow (1 + \rho) \bar{B}^H \leq F_1^H - F_1^L$. QED.

Corollary A1

For $\beta < \widehat{\beta}$, where $\widehat{\beta} \in (\widehat{\beta}, \beta^*)$, there exists $\widehat{\theta} > \widehat{\theta}$ such that $\theta \geq \widehat{\theta} \Leftrightarrow U^{HL} \leq U^{HH}$. For $\beta \geq \widehat{\beta}$, $U^{HL} \leq U^{HH}$.

Proof of Corollary A1:

Rewrite $U^{HL} \equiv U^{HH}$ as $(A^L - A^H) / \overline{B}^H \equiv 1 - [(1 + \rho) / (1 + \kappa^H)]$. Given Parameter Assumption I, the right-hand side is a constant in $(0, 1)$. The left-hand side goes to zero as θ goes to ∞ . When θ goes to zero, the left-hand side becomes

$$\frac{[(1 + \rho) - \lambda(1 + \kappa^H)] [1 - \beta(1 + \kappa^H)]}{\lambda(1 + \kappa^H) \beta(1 + \kappa^H)}$$

$\widehat{\beta}$ is defined by equating this expression with the right-hand side. As the limit is non-positive for $\beta \geq \beta^*$, $\widehat{\beta} < \beta^*$. It is also easily checked that $\widehat{\beta} > \widehat{\beta}$. Moreover, since this limit of the left-hand side is monotonically decreasing in β the result follows. Intuitively, $\widehat{\theta} > \widehat{\theta}$ as aid flows must be smaller to render the good type indifferent between being labelled L or H due to the costs associated with commercial borrowing. This can also be verified by deriving explicitly the expression for $\widehat{\theta}$. QED.

Lemma A3

If the borrower is creditworthy, lenders prefer that the IMF does not provide them with additional information. However, if the country is a lemon, lenders' ex post profits are maximised if the IMF reveals this fact.

Proof of Lemma A3:

If $i = H$, but lenders do not know it, (5) in the main text show that discounted ex post profits are positive due to the risk-premium charged. If type is revealed competition leads to zero profits as $r^H = \rho$. On the other hand, if $i = L$, but lenders are unaware of this fact they will also charge $r^H > \rho$. However, as the bad type repays nothing, lenders will lose money ex post. This contrasts with the zero expected and actual profits realised when they know the country is a lemon and thus lends nothing. QED.

Proposition A1

There exists a set of parameters $(\widehat{\theta}, \widehat{\beta}, \omega^*)$ such that

- i) $\beta \in (0, \widehat{\beta})$, a) $\theta < \widehat{\theta}$, the equilibrium is pooling; b) $\theta \geq \widehat{\theta}$, the equilibrium is separating for $\omega \leq \omega^*$ and pooling for $\omega > \omega^*$;
- ii) $\beta \geq \widehat{\beta}$, the equilibrium is separating for $\omega \leq \omega^*$ and pooling for $\omega > \omega^*$.

Proof of Proposition A1:

When the country is commercially creditworthy, lenders will never lose money. The IMF's optimal message is then the one that maximises country welfare. By Corollary A1, for $\beta < \widehat{\beta}$ and $\theta < \widehat{\theta}$ the IMF wants to deceive lenders when $i = H$. Thus, its statement cannot be informative in equilibrium. This proves part ia). To prove parts ib) and ii), we must consider the IMF's incentives when

$i = L$. Then lenders will lose money if borrower country type is not revealed to them, whereas the lemon will gain (C.f. Lemma A3). Comparing (9a) and (9b) in the main text, one can derive the critical value ω^* from $W^{LL} \equiv W^{LH}$. If $\omega > \omega^*$ ($\omega < \omega^*$), the IMF would (not) like the country to gain at the expense of lenders. Thus, the Fund will optimally tell the truth for both $i = L$ and $i = H$ when $\theta \geq \hat{\theta}$ and $\omega \leq \omega^*$. QED.

Corollary A2

$\beta \in (0, \beta^*)$, $\omega^* \in (\frac{1}{2}, 1)$; $\beta = \beta^*$, $\omega^* = \frac{1}{2}$; $\beta > \beta^*$, $\omega^* \in (0, \frac{1}{2})$.

Proof of Corollary A2:

From the definition, ω^* can be written as

$$\omega^* = \frac{\bar{B}^H}{\bar{B}^H + F_1^H - F_1^L} = \frac{\bar{B}^H}{2\bar{B}^H + A^H - A^L}.$$

By Corollary A1, $\hat{\theta} > \hat{\theta}$. Thus, by Lemma A1 $F_1^H > F_1^L$ for $\theta \geq \hat{\theta}$ and so $\omega^* < 1$. From the same results it also follows that $F_1^H > F_1^L$ for $\beta \geq \hat{\beta}$. We know from the discussion of equations (A3a – c) that $A^L \gtrless A^H \Leftrightarrow \beta \gtrless \beta^*$. QED.

References

- [1] Acharya, S. and I. Diwan (1993): “Debt Buy-Backs Signal Sovereign Countries’ Creditworthiness: Theory and Tests.” *International Economic Review* 34: 795-817.
- [2] Bevan, D. (2009). The IMF’s Approach to Macroeconomic Policy in Low-Income Countries. In J.M. Boughton and D. Lombardi (eds.): *Finance, Development, and the IMF*. Oxford University Press.
- [3] Bird, G. (2007). “The IMF: a Bird’s Eye View of its Role and Operations.” *Journal of Economic Surveys* 21: 683-745.
- [4] Bird, G. and D. Rowlands (1997). “The Catalytic Effect of Lending by the International Financial Institutions.” *World Economy* 20: 967-91.
- [5] Bird, G. and D. Rowlands (2007). “The IMF and the Mobilisation of Foreign Aid.” *Journal of Development Studies* 43: 856-870.
- [6] Birdsall, N. et al. (2003). “Policy Selectivity Foregone: Debt and Donor behavior in Africa.” *World Bank Economic Review* 17: 409-435.
- [7] Bordo, M.D. and H. James (2000): The International Monetary Fund: Its present Role in Historical Perspective. National Bureau of Economic Research Working Paper 7724.
- [8] Claessens, S. et al. (2009). “Evidence on Changes in Aid Allocation Criteria.” *World Bank Economic Review* 23: 185-208.

- [9] Cottarelli, C. and C. Ginannini (2002). Bedfellows, Hostages, or Perfect Strangers? Global Capital Markets and the Catalytic Effect of IMF Crisis Lending, IMF Working Paper 02/193.
- [10] Dollar, D. and V. Levin (2006): “The Increasing Selectivity of Foreign Aid, 1984–2003.” *World Development* 34: 2034-2046.
- [11] Dollar, D. and J. Svensson (1998). “What Explains the Success or Failure of Structural Adjustment Programs?” *Economic Journal* 110: 894-917.
- [12] 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.
- [13] Eaton, J. and R. Fernandez (1995): Sovereign Debt. In G. Grossman and K. Rogoff (eds.): *Handbook of International Economics, volume III*. Elsevier Science.
- [14] Farrell, J. (1993): “Meaning and Credibility in Cheap-Talk Games.” *Games and Economic Behavior* 5: 514-531.
- [15] Farrell, J. and M. Rabin (1996): “Cheap Talk.” *Journal of Economic Perspectives* 10: 103-118.
- [16] Fraser, A. and L. Whitfield (2009). Understanding Contemporary Aid Relationships. In L. Whitfield (ed.): *The Politics of Aid. African Strategies for Dealing with Donors*. Oxford University Press.
- [17] Gelos, R. et al. (2008). Sovereign Borrowing by Developing Countries: What Determines Market Access? Documento de Trabajo 02/2008, Centro de Investigación en Finanzas, Escuela de Negocios, Universidad Torcuato Di Tella.
- [18] Guitián, M. (1992): The Unique Nature of the Responsibilities of the International Monetary Fund. IMF Pamphlet Series 46.
- [19] Hagen, R.J. (2006). “Samaritan Agents? On the Delegation of Aid Policy.” *Journal of Development Economics* 79: 249-263.
- [20] Hagen, R.J. (2009). “Basic Analytics of Multilateral Lending and Surveillance.” *Journal of International Economics* 79: 126-136.
- [21] IEO (2002). Evaluation of Prolonged Use of IMF Resources. IMF.
- [22] IMF (2004). Signaling by the Fund - A Historical Review. Prepared by the Policy Development and Review Department, IMF.
- [23] IMF (2005a). Implementation of the Policy Support Instrument. Prepared by the Policy Development and Review and Legal Departments, IMF.

- [24] IMF (2005b). Policy Support and Signaling in Low-Income Countries. Prepared by the Policy Development and Review Department, IMF.
- [25] IMF (2008). Review of the Fund's Financing Role in Member Countries. Prepared by the Policy Development and Review Department, IMF.
- [26] IMF (2009a). Review of the Experience with the Policy Support Instrument. Prepared by the Strategy, Policy and Review Department, IMF.
- [27] IMF (2009b). Changing Patterns in Low-Income Country Financing and Implications for Fund Policies on External Financing and Debt. Prepared by the Strategy, Policy and Review Department, IMF.
- [28] Ivanova, A. et al. (2003). What Determines the Implementation of IMF-Supported Programs? IMF Working Paper 03/8.
- [29] Killick, T. with R. Gunatilaka and A. Marr (1998). *Aid and the Political Economy of Policy Change*. Routledge.
- [30] Lane, T. (2009). Signaling, Aid, and IMF Financial Arrangements for Low-Income Countries. In J.M. Boughton and D. Lombardi (eds.): *Finance, Development, and the IMF*. Oxford University Press.
- [31] Marchesi, S. and A. Missale (2007). How Defensive Were Lending and Aid to HIPC? University of Milan - Bicocca Working Paper 115.
- [32] Martens, B. et al. (2002): *The Institutional Economics of Foreign Aid*. Cambridge University Press.
- [33] Martin, M. et al. (2009). What Is the Point of the PSI? The Views of African Policymakers. Development Finance International.
- [34] Mosley, P. et al. (1991). *Aid and Power. The World Bank and Policy-Based Lending*. Routledge.
- [35] Pedersen, K.R. (1996). "Aid, Investment and Incentives." *Scandinavian Journal of Economics* 98: 423-38.
- [36] Panizza, U. et al. (2009). "The Economics and Law of Sovereign Debt." *Journal of Economic Literature* 47: 651-698.
- [37] Pedersen, K.R. (2001). "The Samaritan's Dilemma and the Effectiveness of Foreign Aid." *International Tax and Public Finance* 8: 693-703.
- [38] Pedersen, K.R. (2003). Foreign Aid and Incentives in Commercial Credit Markets. Working Paper 67/03, Institute for Research in Economics and Business Administration.
- [39] Radelet, S. (2006). IMF Facilities for Poststabilization Low-Income Countries. In E.M. Truman (ed.): *Reforming the IMF for the 21st Century*. Special Report 19, Institute for International Economics.

- [40] Rodrik, D. (1996). Why Is there Multilateral Lending? In Bruno, M., Pleskovic, B. (Eds.), Annual World Bank Conference on Development Economics 1995, the World Bank, Washington, DC.
- [41] Roubini, N. and B. Setser (2004). *Bailouts or Bail-Ins? Responding to Financial Crises in Emerging Market Economies*. Institute for International Economics.
- [42] Steinwand, M.C. and R.W. Stone (2008). "The International Monetary Fund: a Review of the recent Evidence." *Review of International Organizations* 3: 123-149.
- [43] Svensson, J. (2000). "When Is Foreign Aid Policy Credible? Aid Dependence and Conditionality." *Journal of Development Economics* 61: 61-84.
- [44] Taylor, J.B. (2006). The Policy Support Instrument: A Key Component of the Recent IMF Reform Movement. In E.M. Truman (ed.): *Reforming the IMF for the 21st Century*. Special Report 19, Institute for International Economics.
- [45] Thomas, A. (2009). Access to Market Financing for IDA-Eligible Countries - the Role of External Debt and IMF-Supported Programs. IMF Working Paper 09/217.

Table 1: Current status of countries having entered a PSI-programme

Country	Date of approval	Current status
Cape Verde	July 31, 2006	8 th review completed. 1-year extension in preparation for 2 nd 3-year programme granted June 19, 2009. Second PSI (15 months) approved November 22, 2010
Mozambique	June 18, 2007	Entered 1-year ESF-arrangement June 30, 2009. Second PSI approved June 14, 2010, 1 st review completed.
Nigeria	October 17, 2005	4 th and final review completed
Rwanda	June 16, 2010	No reviews completed yet
Senegal	November 2, 2007	6 th review completed. Entered ESF-arrangement December 19, 2008 (extended from 12 to 18 months). Second PSI approved December 3, 2010.
Tanzania	February 16, 2007	First PSI extended when entering 1-year ESF-arrangement May 29, 2009. Second PSI approved June 4, 2010, 1 st review completed.
Uganda	December 15, 2006	7 th review completed. 1-year extension in preparation for 2 nd 3-year programme granted December 21, 2009. Second PSI approved May 12, 2010.

Note: The Exogenous Shock Facility (ESF) was renamed the Standby Credit Facility in January 2010 as part of the IMF's revamping of its menu of programmes for LICs. However, ongoing ESF programmes will continue until they expire or are otherwise terminated.

Source: IMF country reports and press releases.

Figure 1: Timing

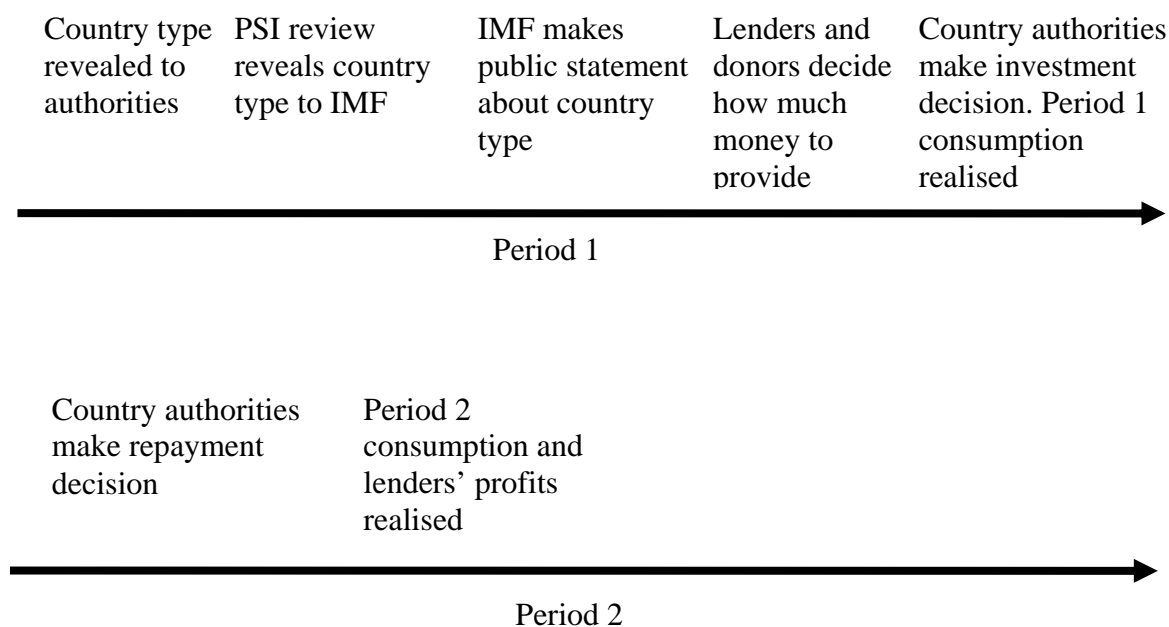
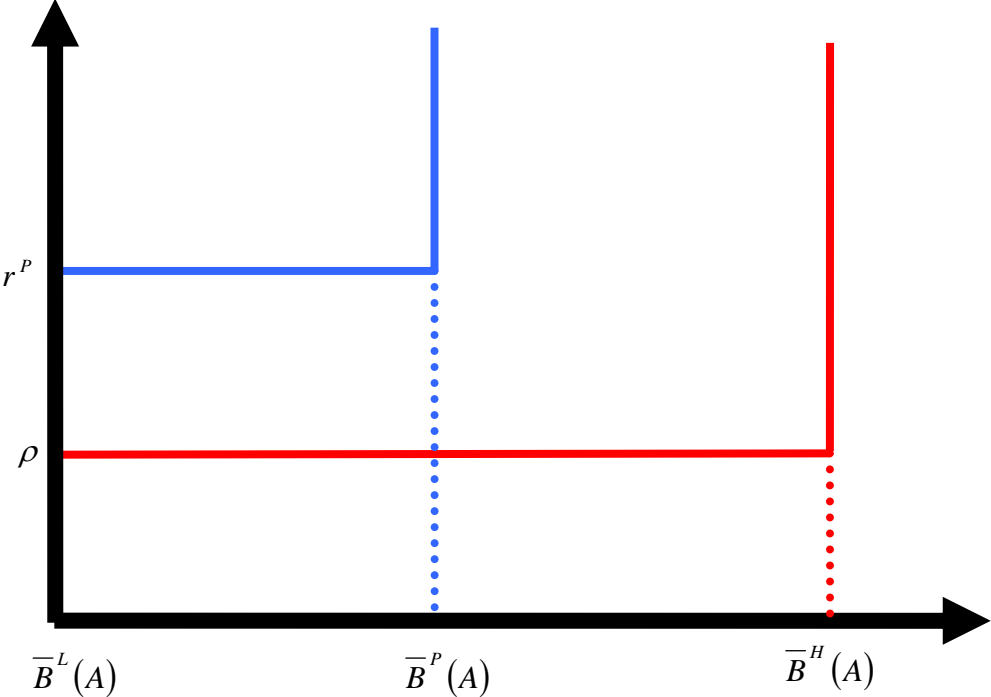


Figure 2: Equilibrium Credit Limits for a given Level of Aid



Department of Economics
University of Bergen
Fosswinckels gate 6
N-5007 Bergen, Norway
Phone: +47 55 58 92 00
Telefax: +47 55 58 92 10
<http://www.svf.uib.no/econ>