

Sovereign Debt: Default, Market Sanction, and Bailout

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Abstract

This paper explores the case of a sovereign indebted country facing a choice of economic policy today that will determine the country's ability to continue its debt servicing in the future. If the sovereign undertakes an unsound economic policy it will repudiate its debt with certainty; otherwise it will repudiate its debt with some positive probability. In our framework there is no court to enforce contracts. However, we assume the existence of a multilateral financial institution that could bailout the financially troubled sovereign country. Our focus is on the incentives created by the perspective of a bailout, as well as the punishment that the international financial markets could impose on the defaulting country, on today's economic policy. This essay provides a theoretical grounding for the IMF and other multilateral agencies intervention on the international financial markets showing that, unlike the idea that bailouts create both debtor and creditor moral hazard, it is sometimes a result of creditors' overreaction to the prospect of a liquidity crisis. The main result of the essay is that the multilateral will be better off bailing out the country regardless of the economic policy undertaken in order to avoid bigger losses from a generalized financial crisis.

1 Introduction

The recent debt problems in a number of developing nations, the potential of crisis "contagion", and the International Monetary Fund [IMF] led bailout raises, once again, several questions about the architecture of the international financial markets. As it is today, the international financial markets do not provide the necessary mechanisms to countries with unsustainable debts to promptly and orderly resolve them. The only tool available today requires the international community, the IMF, and other multilateral financial agencies, to bailout the private creditors. This chapter provides a basic analytic introduction to some of the effects that a bailout, or the expectation of one, has on

the behavior of international lenders and sovereign borrowers, especially moral hazard.

The not long past international finance history shows the extensive use of bailout to rescue financial distressed countries. After the \$30 billion bailout of Mexico in 1995, the occurrences of national-currency and financial crises in developing countries have scaled up, as the use of *Fund*-led bailout *solution* totaled more than \$250 billion.¹ The most recent events are the financial assistance to Brazil (2002), and to Uruguay (2002), both countries facing capital flow as a result, mainly, of contagion from the Argentina (2001-02) debt default. After these last bailout of sovereign economies the discussion of the effectiveness of the International Monetary Fund, the U. S. Treasury, and others multilateral financial agencies measures has climbed to the top of the agenda.

This article address the incentives, or lack of, an indebted country has to adopt sound economic policies - which, in turn, may allow it continue servicing its debt - if it expects to be bailed out by multilateral agencies once it declares itself unable to do so. Specifically, in an asymmetric information environment the indebted country may undertake unsound economic policies that will lead to liquidity problems later, and it is likely to get it since a defaulting country may *export* its financial turmoil to other LDCs through a disruption in investor's confidence.

The general situation of a sovereign government which repudiates its debts resumes to one of the following three options: default (or disorderly debt restructuring), orderly restructuring the debt by negotiating directly with its lenders, or seek bailout from international financial institutions.

A disorderly restructuring, or default, can block a countries' access to private capital for years [Cole et al. [3]], result in trade reductions [Rose [14]], and transfer of some of the debtor's current assets within the territory subject to the jurisdiction of the creditor's legal system [Eaton [8]] making a bad situation even worse. An orderly restructuring can also impose a severe cost in terms of output declining, and devastate the domestic financial system. As posted by Krueger [9] an orderly restructuring can take too long as a result of the large number syndicated banks involved, as well as the diversity of banks and bondholders involved and the variety of debt instruments and derivatives in use. An agreement could take forever to be reached, if reached at all, because each creditor has an incentive to free-ride in the debt restructuring, ensuring full recover, by letting the others reduce their claims. The third option, a bailout, involves the IMF, and other multilateral, rescuing the distressed economy by lending enough money to make that country able to continue servicing its debt in the short-run, *buying* time to implement economic adjustments, and restoring investor confidence without push another emerging indebted economies into financial crises as well.

Many scholars have discussed the case for IMF loans to rescue troubled economies, defend exchange rates, and restore financial markets confidence. The analysis of financial rescue of developing economies when default and bailouts are possible strategies poses difficult theoretical questions. The most

¹The Mexico (1994-95) crises was followed by the collapse of Asian financial systems (1997), and Russia (1998).

discussed are the distortion of incentives to sovereigns that will follow loose economic policies that could eventually cause economic and financial problems, and the excessive risk taken by international lenders if they expect the IMF to bailout an indebted country in case of a financial crisis.² The main argument suggesting that IMF-led bailout is a bad idea is based on the following: (i) it creates debtor moral hazard; (ii) it distorts the market incentives; and, finally, (iii) it undermines superior less-expensive solutions. The arguments may be summarized as follows:

Debtor Moral Hazard: the more a multilateral bails out countries the more one should expect countries to slip into crises in the future. The expectations of multilateral support and financial assistance would reduce incentives of a debtor country to follow sound policies in the first place, affecting its incentives regarding payments on its external liabilities to the foreign external lenders. Roubini [15] identify another type of debtor moral hazard related to domestic private agents that borrow excessively from foreign creditors, and make distorted investment decisions as a result of governmental guarantees.

Distortion of market incentives, or creditor moral hazard: if the lenders expect that the multilateral will bail out a sovereign indebted economy, their lending decisions will be distorted. Since the investor losses in case of a default are not realized as the sovereign is rescued, the investors will undermine the credit/repayments risk, behaving more risky;

Undermine less-expensive solution: the parties involved in a sovereign financial crisis must engage either in debt restructuring/reduction or litigation. Both alternatives involve losses such as profit reduction, credibility loss, and court fees, etc. However, those costs are less expensive than the financial markets inefficiency resulting of doing nothing. The IMF intervention discourages direct negotiations if it lends to the insolvent sovereign borrower, thus allowing it to repay its debts and making null creditors' risks. Without the risk of a complete loss both creditors and debtor will not be compelled to offering concessions.

On the other hand, authors like Summers [19], and Rubini [15] do not believe that the moral hazard distortion is that important. Accordingly, they believe it is too simplistic the idea that a sovereign government would follow loose economic policies in order to receive IMF assistance because it does not take into account those policies high costs in terms of inflation, output, and unemployment, etc. Secondly, they argue that the public in less developing countries resist to IMF support as it is seen as loss because the conditional adjustment usually pushes tough economic policies and it is seen as a loss of sovereignty.

Another argument in favor of bailouts is the credibility crises and contagion: if a country experiences financial problems and the IMF support is not given, banks and other investors would flee from other emerging financial markets. When the lenders have not confidence about being repaid they tend to move as

²The practical importance of those distortions in international capital flow is stressed, among others, by Calomiris [2], Schwartz and Dooley [4], Dooley [4], and Meltzer [12] (2000).

quickly as they can to protect their positions. They may sell the loans before maturity, they can decline to roll over, or extend, loans that have matured. The contagion effect is such that even the creditors willing to roll over their loans at a higher interest rate may not do so for fear of being caught in a payment crisis.³

We develop the idea that the pattern of default/bailout associated with debt crises arises as part of the optimal pattern of punishment when bailouts among financial distressed countries are constrained by two market imperfections: moral hazard, and risk of debt service default. To generate the moral hazard problem into the model we show that it is not time-consistent for the IMF to allow an illiquid country go bankrupt. To introduce risk of default we assume that sovereign borrowers can at any time stop servicing their debts.⁴

We show through the model that potentially liquid indebted countries will take unsound economic policies that will make them unable-to-service, or repudiate, their debts in the future, as the IMF will ex-post bail them out to avoid the dead-weight loss associated with the disruption on the financial markets stability and overall reduction on international trade. Simply put, the IMF bailout will give incentive to sovereigns' governments to renege fiscal sobriety and responsible monetary policies. The next step is to solve the moral hazard problem by repeating the one-shot default-bailout game. Specifically, we examine the optimal bailout strategy in an environment in which there are many indebted countries choosing sequentially between servicing their debts and repudiating them. If a country repudiates its debt it is punished with loss of credibility and consequently exclusion from international markets. In this framework, the IMF has now to weight the cost of letting a country into bankruptcy and the benefit it generates in the form of deterring future debt repudiations. The cost of bankruptcy is the same as in the one-shot game, e.g., reduction of international trade, court fees, and contagion. The benefit now is the debt repudiation deterred in the future, as other indebted countries won't repudiate their debt to avoid the punishment it may face. The optimal bailout pattern for the IMF in this environment is to follow an discretionary strategy under which each country who repudiate its debt is not IMF rescued with a positive probability, and thus being *punished* through denial of access to credit markets and trade sanctions.

1.1 The Literature on Sovereign Debt

The theoretical literature on sovereign debt is divided into two basic subsets. The first subset deals with problems of short-run liquidity problems, and long-run country insolvency and policy prescription. The second one deals with issues raised by the willingness-to-pay, notably incentives and reputation. The

³The difficulty that some indebted governments faced in rolling over maturing debt played, according Samuelson [17], an important role in recent Mexico, Russia and Brazil debt crises.

⁴We distinguish ability-to-service from willingness-to-service the debt. A country is said to be able-to-service if it has enough cash reserves to continue servicing its debt. Alternatively, a country is willing-to-service if it has the cash reserves and, at the same time, wants to continue servicing its debt. In the model we assume that if a sovereign's government takes unsound policies ex-ante it will imply its inability-to-service the debts in the future. Therefore, unwillingness imply inability.

later literature, to which belong our study, is summarized by Eaton [8]. Other comprehensive surveys can be found in Eaton et al. [7], Eaton and Fernandez [5], and Obstfeld and Rogoff [13], chapter 6.

Typically, the reputation approach to sovereign debt takes the lenders as atomistic while the borrower country behaves strategically to influence the lenders' expectations regarding debt repayment or repudiation. The sovereign's debt repayment decision is looked at as an assessment of the costs and benefits of debt repudiation. The costs are the denial of future access to credit markets, reduction on trade, and seizure of the country's assets in the creditor legal system. The benefits of repudiation is the real value of the outstanding debt. As noted first by Eaton and Gersovitz [6], the primary consideration in lending to a sovereign entity should not be the liquidation of the borrower assets in case of default, as in the case of private bankruptcy, but the expectation that the borrower will bind the contract by devoting enough share of its future revenues. In this sense, the literature also differentiate between country and government debts. In the first case, studied by Krugman ([10], [11]) the country solvency depends on the size of its outstanding debt in comparison with the net present value of the country's net income stream. In this case, a country whose debt obligations are below its annual GDP is said to be solvent. On the other hand, if most of the country's is owed by its government, it is the government's budget constraint that must be considered [Sachs [16]]. Even if the country is solvent, it might face problems to service its debt if the government does not have access to a sufficient large fraction of the GDP.⁵

Reputational analysis considers a sovereign government issuing debt in a way of sharing the risk associated with adverse shocks to its lenders.⁶ On the other hand, it considers the lenders atomistic in the sense that each lender's actions are taken independently, and the only cost that the lenders can inflict to the sovereign is to deny future access to capital markets. A sovereign reputation is its past history of debt issuing and repayment used to influence lenders' expectations regarding future debt servicing behavior. The borrowing country loses its reputation if it repudiates its debt even if an adverse shock is not observed, and in this case the cost of being cut off the international financial markets will be imposed. The threat of credit denial, or financial autarky, is seen in the literature [e.g. Eaton and Gersovitz [6], and Cole et al. [3]] as an incentive for borrowers to validate lenders' expectations for repayment and so to maintain a creditworthy reputation. Also, the credit denial may also affect the sovereign by reduction of trade as a result of reduction of commercial credit lines to embattled domestic exporting companies. The main result in this literature is that the sovereign borrower will preserve its reputation, and validate the lender's expectations, because the cost of being not creditworthy exceeds the benefits.

⁵Although our article deals with the case where most of the country's debt is owed by the government, its conclusions can be easily extended to the reverse case.

⁶One interpretation is the government issuing debt to smooth consumption in the long-run. It issues debt to sustain the level of national consumption in periods of recession, for instance, repaying the debt in periods of high economic growth.

1.2 Article's relation with the literature and Outline

The literature on bailout of financial distressed countries is relatively scarce. Besides the fast development of a literature on sovereign debt that deals with the issues of a country's ability and willingness-to-pay, as well as the policy responses to the debt crisis of the 1980s, only a few papers were devoted to analyze the role of the IMF as rewarding an illiquid country that had taken *sound* economic policies and letting countries that had taken *unsound* ones to be punished by the international financial markets. Those papers, along with their main ideas were discussed in the introduction. In this article we try to offer a formal analysis of the IMF bailout decision and the implications it might have in the actions played by the international financial market players, notably a borrowing country and its international lenders.

To proceed the analyze we structured the remaining of this article as follows: section 2 contains the setup of the general one-shot default-bailout game, and the benchmark one-sovereign one-lender game; section 3 describes the The imperfect information, many borrowers-many lenders game; section 4 analyzes the best strategies assuming the IMF can commit to an action announced ex-ante, and formalizes the credible threat problem; section 5 describes the time-consistent equilibrium; section 6 concludes the study.

2 The Model

2.1 General Setup

There are N risk-neutral countries, or sovereigns, who had borrowed money in the international financial markets. Each of those countries has an initial endowment e , and has a future surplus whose value is y . The endowment may be seen as the country's foreign reserves, or even its stock of physical assets, at the moment it contracts the debt. A country's action space has two elements. It may choose to undertake *sound* economic policies, or *unsound* ones. If a country chooses unsound economic policies it will be unable to service its debt;⁷ otherwise, it may or may not be able to service its. On other words, if a country undertakes sound economic policies it will service its debt with probability $Pr\{y + e \geq D\} = p$. On the other hand, if a country chooses unsound economic policies it will repudiate its debt with certainty. A country's economic policy is private information to that country, as its ability (or inability) to pay is publicly observed.⁸

A multilateral international financial agency, or the IMF, may act mitigating the payment burden from countries which had announced liquidity problems on one hand, and on the other it may act as representative of creditors. In the first case, the IMF can concede a bailout and, on the other, it may use its strong-conditionality clause to impose that country the adoption of strict fiscal and

⁷A country is said to be able-to-service its debt, or to be liquid, if its surplus plus reserves exceeds the maturing debt service, $y + e \geq D$.

⁸For simplicity we do not make distinction between short and long-term debt. Without loss of generality we consider all debt as maturing in the short-term because a financial crisis, or loss credibility in servicing the debt in the short-term may lead to long-term default too.

monetary policies that may generate sufficient surplus to ensure the payment capacity in the near future at expense of welfare to that country's inhabitants. Therefore, the Fund acts as an utilitarian player, which takes into account the costs and benefits of its bailout decision for the international financial markets as a whole.

The bailout of a debt-repudiating country may be of an amount $b \gg 0$ and, by doing so, the Fund gives that country funds so that it might keep servicing its debt. This *buys* some market confidence regarding the debtor's ability-to-pay and thus reduces the creditors' fears on a mass default. In case of confidence crisis, the investors would flee from that country, declining from rolling over, or extending, the maturing debt. This could make a country illiquid and subject to self-fulfilling speculative runs and panic. The Fund's financial assistance and policy conditions are linked to this self-fulfilling runs and panic through a confidence function $q = q(b)$ which satisfies the following properties: $q' > 0$, $q'' < 0$, $\lim_{b \rightarrow D} q(b) = 1$, and has a value $q(b) \in (0, 1)$, for $\forall b \geq 0$. Second to later property says that the confidence on the country's ability-to-service is not fully restored even if the bailout covers the entire country's maturing debt, and the latter property implies that there may not be crisis contagion if zero bailout is granted.

The bailout is a transfer of resources from the Fund to a troubled country for a relatively short period at an specified interest rate. The Fund cannot print money so that its resources are limited to part of the quotas paid in by its members and the borrowing agreements it has in place with a number of nations. In an informal way its lending is also limited by the reluctance of the members to see large sums of money used to bail out private creditors of that troubled nation. Nonetheless, even so it could be the case the Fund has not resources to bailout every troubled country at the same time, we assume that it is able to rescue one country at a time using the repayments it receives from a country it had rescued before. Said that, we write the IMF's budget constraint as $b = N.D.$

The international financial markets may punish countries that renege on their debt service by cutting them off from capital flows in the future. Also, defaulting countries may suffer reduced benefits of international trade by facing the drying up of credit lines for domestic exporting companies, or even the concealment of exporting contracts previously negotiated.⁹ If we consider the international lenders competitive, so that each one occupies a smaller share of the market - as sustained by Krueger [9] - than the threat of credit withdrawal is a costless and credible sanction. Denote the size of the sanction by s .

The timing of the game is as follows:

STAGE 1: The indebted country privately decides between *sound* and *unsound* economic policies. If the country undertakes sound economic policies it will default with probability p ; otherwise it will default with certainty.

⁹The importance of future exclusion from capital markets, disputed by Bulow and Rogoff [1], is consistent with Eaton and Gersovitz [6], and Cole et al. [3]). The later summarizes the historical evidence on settlements. Rose (2001) finds evidence that sovereign default is associated with a decline in bilateral trade.

STAGE 2: The country publicly announces its ability (or inability) to service its debt;

STAGE 3: The IMF publicly announce a bailout size $b \in [0, D]$, where $b = 0$ means it has choose not to bailout an unable-to-pay country;

STAGE 4: The lenders in the international financial market apply a sanction $s \in [\underline{s}, \bar{s}]$ to any defaulting country;

STAGE 5: Payoff and Outcome are realized.

Before we proceed the analyze of the game above we establish a benchmark model assuming the existence of only one country whose economic policy character is publicly observed, and only one lender.

2.2 The benchmark public information, one borrower-one lender game

Consider the case where a country has only one foreign lender which can impose a sanction to the defaulting country. Assume by sake of argument that this sanction will be collected with certainty. Assume also that the sanction cannot be higher than the outstanding debt, or $s \in \{0, D - y - e - b\}$. In a perfect information framework, the benchmark-game timing is as follows:

STAGE 1: The indebted country decides between sound and unsound economic policies. If the country undertakes sound economic policies it will default with probability p ; otherwise it will default with certainty;

STAGE 2: The IMF chooses to bailout or not a defaulting country, and the bailout size $b \in [0, D]$;

STAGE 3: The lender imposes a sanction $s \in [0, D - y - e - b]$ to the defaulting country;

In the third stage of the game, the lender will choose the highest sanction possible $s^* = D - y - e - b$, independent of the country's choice of economic policy, and the IMF's bailout choice.

In the second stage, the IMF chooses the bailout size to maximize his payoff after observe the country's default, and taking as given the lender sanction. If the country has defaulted, it doesn't matter which economic policy it had undertaken, the IMF's bailout will be on the size of the outstanding debt $b^* = D - y - e$.

In the first stage of the game, the indebted country must choose its economic policy. Knowing it will be bailout by the IMF if it is illiquid, the country will decide between sound and unsound policies based on its expectations p , and $q(D - y - e)$. If $p > q(D - y - e)$, then sound policies will be undertaken; otherwise, if $p < q(D - y - e)$ than loose economic policies will be on the agenda.

Finally, note that since $q' > 0$, higher the bailout is, higher is the lender's confidence. Since a more confident lender will be less likely to punish the contract breaching country, by increasing the bailout size the IMF makes the country willing to follow loose economic policies. The following proposition summarizes the result:

Proposition 1 (Debtor Moral Hazard) *Let $s = D - y - e$, $p \in (0, 1)$, and $b \in [0, D]$. Then there is an \bar{b} such that, for every $b > \bar{b}$, $p < q(b)$ and the indebted country will undertake unsound economic policies.*

Corollary 1 *Given the result in Proposition 1, it is easy to see that a country has incentive to borrow to much. Moreover, since the lender will receive the payment for sure, it will accept to lend to much.*

3 The imperfect information, many borrowers-many lenders game

In this section we provide the analysis for the game with many indebted countries, and many international lenders described in section 2.1. According to that setup the countries are indexed by the level of sanctions s they expect to face in case of debt repudiation, where s is continuously distributed according to the distribution function, $f(s)$, defined in the interval $[\underline{s}, \bar{s}]$. $f(s)$ is assumed to be public information. The sanction s , which we call *market sanction* is thus a sum of many individuals lenders actions against one sovereign such that it is now a random variable.¹⁰

After a country defaults a dead-weight loss k is imposed to the financial markets as a result of a confidence crisis and contagion. This dead-weight cost includes the loss the world economy has in the form of decline in trade, crisis contagion, increase in the world interest rates, and court and bankruptcies procedures costs to enforce the broken contracts.¹¹ Assume that k is the same for every defaulting countries.

We can now write down a country's expected payoff for each kind of economic policy it chooses as function of its debt burden, the size of the bailout, and the market sanction. Accordingly, the expected payoff of country which undertakes *unsound* economic policies may be written as:

$$\Pi^U(D, b, s) = q(b)[y + e - D + b] + (1 - q(b))[y + e - D + b - s]$$

Substituting the IMF's relief budget constraint, the expected payoff may be rewritten as:

$$\Pi^U(b, s) = q(b)[y + e + (1 - \frac{1}{N})b] + (1 - q(b))[y + e + (1 - \frac{1}{N})b - s]$$

or

$$\Pi^U(b, s) = y + e + (1 - \frac{1}{N})b - (1 - q(b))s \tag{1}$$

¹⁰If we denote the set of lenders by L , with typical element l , then $s = \sum_{l \in L} s_l$. Finally, assume that if the lender l imposes a sanction s_l , this lender will collect some amount αs_l , for $\alpha \in (0, 1)$, i.e., a sanction s_l is no necessarily a fee paid to l .

¹¹To overcome a crisis a country must increase the size of its reserves. To do that the country try to built a trade surplus by increasing its exports and decreasing its imports. Because it is not easy to increase exports in the short-run countries rely on cutting income and inducing a major recession. Obviously, each country imports are other exports so a troubled country downturn is exported around its region. Stiglitz [18] calls this beggar-thy-neighbor policies because the downturn is achieved at the country's neighbor expenses. Obviously a loss to the world economy.

The expected payoff to a country with *sound* economic policies is given by:

$$\Pi^S(D, b, s) = p[y + e - D] + (1 - p)[y + e - D + b - (1 - q(b))s]$$

where $p \equiv Pr\{y + e \geq D\}$. Also substituting the Fund's budget constraint we have:

$$\Pi^S(b, s) = p\left[y + e - \frac{b}{N}\right] + (1 - p)\left[y + e - \frac{b}{N} + b - (1 - q(b))s\right]$$

or

$$\Pi^S(b, s) = y + e - \frac{1}{N}b + (1 - p)[b - (1 - q(b))s] \quad (2)$$

A country's choice of economic policy is thus summarized by its payoff function. Since both Π^U and Π^S are decreasing in the sanction s , but at different rates so that the population of countries will divide itself between those for whom $\Pi^U > \Pi^S$ will undertake unsound economic policies, and vice versa. It is useful to identify the marginal country who is just indifferent between tight and loose policies. This country has s denoted by \tilde{s} defined by $\Pi^U = \Pi^S$ or, from (2) and (1), by

$$b - q(b)\tilde{s} = 0 \quad (3)$$

That is, for the marginal individual, the benefit from unsound economic policies and getting the bailout b just equals the expected sanction given the credibility the IMF lends through the bailout. Any country with $s < \tilde{s}$ will default with certainty while any with $s > \tilde{s}$ will default only with probability p .

4 The Optimal Ex-Ante Bailout Strategy and the Credible Threat Problem

4.1 The optimal bailout strategy when the Fund can commit

In this section the IMF first anticipates the countries' behavior and, based on those, it takes all its decisions. The countries then decide whether to default or not, taking as given the Fund's announced policies regarding financial assistance. As argued before, the IMF's objective is to ensure the stability of the financial markets and, at the same time, guarantee liquidity of its members. Assuming that the Fund chooses the whether to bailout or not, and the size of the bailout to maximize its own expected payoff, the IMF's problem can be written as follows:

$$\max_b \left\{ N \int_{\underline{s}}^{\tilde{s}} [\Pi^U(b, x) - k]f(x)dx + N \int_{\tilde{s}}^{\bar{s}} \Pi^S(p, b, x)f(x)dx \right\} \quad (4)$$

The first-best outcome would have all countries choosing sound policies and, therefore every sovereign default should be triggered by a random shock whose

probability is $(1 - p)$. All debt repudiating countries are punished, and the Fund bails them out.¹²

Note that if the sanctions are sufficiently high comparatively to the bailout, it is possible to discourage all unsound policies. Interestingly, if the policymakers do expect their country to be punished at the maximal extent, they would adopt sound economic policies at the first place and thus the default would be avoided with probability p . Therefore, the best outcome for the Fund, as well as the world economy, would be the one where no unsound policies will be taken, sovereign default is reduced to a minimum. In this best outcome the \underline{s} -type country chooses sound economic policies and, if this country is better off by doing so clearly every other $s > \underline{s}$ is also better off sticking to a debt service strategy. To see this pick a vector $(b, s) \gg 0$ such that a given s -type sovereign takes sound policies. If we decrease s to \underline{s} , we can also decrease b to \underline{b} (3), say \underline{b} , so that \underline{s} also sticks with sound policies. But if \underline{b} is not high enough to make \underline{s} willing to repudiate its debt, clearly \underline{b} is not high enough to make any other country $s > \underline{s}$ willing to repudiate too.

Proposition 2 (Minimal Bailout) *If the bailout is small enough, i.e., $\forall b \leq \underline{b}$, where \underline{b} solves (3) for $s = \underline{s}$, then no unsound policies will be observed in equilibrium regardless of the sanction.*

On the other hand, if the market sanctions are too high, than the IMF would be willing to renege its ex-ante strategy and offer a bailout to a troubled country. In other words, if both the IMF, and the countries expect a sanction level which is higher than \underline{s} , say $E s = \int_{\underline{s}}^{\bar{s}} x f(x) dx$, than some countries will default by choosing unsound policies. In this case, the IMF will be better off by reneging its minimal bailout strategy. This occurs because bailout is applied after default is eminent, but before sanctions are applied. So, if default is eminent, the IMF will be better off by bailing out any illiquid country before sanctions are realized.

4.2 The Credible Threat Problem

We have seen that the expectation of bailout will generate more default, as a sovereign country expects to benefit from IMF money transfer. In order to avoid the moral hazard problem, the IMF can commit to a minimal debt relief of a debt repudiating country. Hence, if the IMF is able to commit to a minimal bailout, i.e., set $b = \underline{b}$ ex-ante, no unsound policies will be taken, fewer countries will default, and all default verified will be the result of a random shock. The credible threat problem arises from the fact that whether an ex-ante announced decision of not debt relieving will be, in fact, ex-post implemented. The key factor for the analysis is now the dead-weight cost created by a sovereign debt repudiation.

The ex-ante optimal sanction outcome is sustainable only if the countries believe that the minimal bailout \underline{b} will be ex-post imposed along with a positive sanction. It is easy to see, however, that this result is not sustainable ex-post.

¹²If, for instance, the IMF was in control of the sanctions, the first best outcome would have zero sanctions and a zero bailout, with every country adopting sound policies, and those with ex-post liquidity problems being granted a debt forgiveness equal to $D - (y + e)$.

By differentiating [4] with respect to the sanction s , and assuming an interior \hat{s} we get

$$-N[(1 - q(\underline{b})F(\hat{s}) + (1 - p)(1 - q(\underline{b})(1 - F(\hat{s}))) < 0 \quad (5)$$

If the countries are rational, they will recognize that the IMF will not stick to its announced minimal bailout if $\hat{s} > \underline{s}$. This is because given \hat{s} , the Fund will be better off increasing the bailout ex-post. So, every s -type sovereign so that $\underline{s} < s < \hat{s}$ will still prefer to undertake unsound economic policies when the Fund is not able to commit on \underline{b} .

Proposition 3 (Debtor Moral Hazard 2) *If the IMF is not able to commit to a fixed minimal bailout level \underline{b} , as defined in the Proposition 2, than every country type s , where $\underline{s} < s < \hat{s}$, will undertake unsound economic policies and default with probability one.*

The intuition is that once a sovereign has defaulted the cost associated with this action is borne by the world economy. The IMF then sees this as a sunk cost and doesn't take it into account when taking his bailout decision. More than that, the IMF does not control the sanction, which is imposed by the market institutions when they run from the debt-repudiating country in order to protect their positions. Since the Fund acts like an utilitarian institution, it will be better off by offering the defaulting country financial assistance to avoid both the sanctions which will be imposed anyway, and the sunk cost associated with the contagion effect. The rational indebted countries will realize that, undertake unsound economic policies and repudiate its debt in the interim stage of the game.

5 The Time-Consistent Equilibria

If the IMF cannot commit to a minimal financial assistance to a defaulting country, neither cannot guarantee that the optimal ex-ante sanction will be applied, then the sovereign rationally anticipates that the Fund will revise its policies ex-post. Clearly, the IMF cannot commit with non-assistance, or zero bailout because, once a country had defaulted, the Fund would be better off conceding to avoid the dead-weight loss of contagion, court costs, and declining in the international trade. Regarding the ex-ante optimal sanction, it is not the IMF who ultimately decides on its size, but only can reduce its effects by generating market confidence. As such, given the decentralized character of the market decisions the size of the sanction is uncertain. For our analysis, it suffices to observe that the sanction is exogenous from the IMF's view point.

Given this not commitment framework, the order of plays are now reversed, i.e, the countries will decide their economic policy and announce liquidity problems or not first and, only after that, the Fund will decide between bailout or not after observe the countries move. Since the amount of sanction applicable afterwards is set by the international financial markets, not by the Fund, we shall consider the case where the IMF revises only the amount of the financial assistance. Furthermore, note that the IMF acts like a Stackelberg follower to

the sovereign, so that the Fund's action has no deterrent effect in this context. To find the equilibrium in an environment without commitment we proceed by backwards induction, solving first the IMF problem:

$$\max_b \left\{ N \int_{\underline{s}}^{\hat{s}} [y + e + (1 - \frac{1}{N})b - (1 - q(b))x - k]f(x)dx + N \int_{\hat{s}}^{\bar{s}} [y + e - \frac{1}{N}b + (1 - p)(b - (1 - q(b))x)]f(x)dx \right\} \quad (6)$$

where \hat{s} is a fixed number since the sovereigns' have already been made. The first-order condition for the IMF non-commitment problem (6) is:

$$-1 + N - Np + NpF(\hat{s} + Nsq'(b^*)[1 - p + pF(\hat{s})]) = 0 \quad (7)$$

which implicitly defines the Fund's best response to the countries' economic policy decision, $F(\hat{s})$. The Fund's best response is a positive bailout if, and only if

$$1 - N(1 - p(1 - F(\hat{s}))) > 0$$

or

$$s < F^{-1}(1 + \frac{1 - N}{pN}) := \hat{s} \quad (8)$$

This expression gives us the s -type of the indifferent sovereign. According to (7), the Fund will bailout every sovereign type $s < \hat{s}$, and the rational sovereign correctly anticipate that and choose unsound economic policies, and are sanctioned $(1 - q(b^*))s$. The other type of sovereign will choose sound policies, default with probability p , not be bailout, and be punished with sanction $(1 - p)(1 - q(0))s$.

Note that this equilibrium exists if, and only if, at least a minimal number of countries had taken sound policies, or $1 - F(\hat{s}) < \frac{N-1}{pN}$, and at least a fraction $p > \frac{N-1}{N}$ of the countries who took sound economic policies are liquid. This will ensure that the IMF has enough cash reserves to rescue all $s < \hat{s}$ type countries.

Proposition 4 (The Time Consistent Equilibrium)

- (i) If $1 - F(\hat{s}) < \frac{N-1}{pN}$, and $p > \frac{N-1}{N}$, then every sovereign for whom $s < \hat{s}$ will take unsound policies, as those for whom $s \geq \hat{s}$ will take sound policies, and the IMF will spend $b^* > 0$ given by (7) bailing out every defaulting country.
- (ii) Otherwise, all countries take sound economic policies, and the IMF spends zero in bailout.

Interestingly, we have shown the co-existence of a positive bailout and unsound economic policies proving that the Fund's bailout indeed generates debt moral hazard. Note, however that we don't address social welfare issues. This could be the first extension for this analysis. By measuring the social welfare one can verify if the debtor moral hazard is a bad thing. It might not.

Finally, in this simple model when the Fund cannot commit, we no obtain minimal bailout. Indeed, under certain conditions we find the opposite extreme case of maximal bailout. In this case the IMF spends all its revenues in bailouts.

This extreme case has arisen because of the fact that we have considered only a one-shot model. In fact, in the real world debt servicing, or repudiation, are continuously being committed and sanctions continuously being imposed. In such a setting, one might expect that a sovereign might be able to build a reputation for undertaking sound policies. This is another possible extension.

6 Concluding Remarks

In this essay we study the debtor/creditor relationship in an environment where no legal framework exists for the resolution of financial distress. This is the situation under which sovereign countries borrow from international financial institutions, and are not subject to bankruptcy procedures as those present on most of the western economies bankruptcy code. The only tool available to regulate the international financial market is financial rescue offered by international multilateral agencies such as the IMF, the Paris' Club, and the World Bank.

Our analysis characterizes how potential bailout of a sovereign country's debt impacts this country economic performance. If no bailout exists, the country must undertake an ex ante sound economic policy, and sovereign debt default is reduced to a minimal level. This happens because the international lenders will punish a defaulting country through reduction in international trade, foreign direct investment, and credit. If bailout is a clear possibility, then an incentive to some countries to undertake unsound economic policies is created; a country subject to a low level of market sanctions will have a net gain since the bail out offsets the sanctions, while a country highly susceptible to the sanctions will have a net loss.

Given the existence of negative externalities in the international financial markets in the form of crisis contagion, if a country experiences financial problems and defaults on its debt payments, banks and other creditors will flee from other emerging market economies as well. Furthermore, the sanctions imposed to a defaulting country also affects the punishers and non-defaulting countries since both loose from the reduction on international trade and investment opportunities. The dead-weight loss associated with default and contagion, plus the loss of welfare resulting from trade cut off give enough justification for some intervention in the international financial markets.

This essay provides a theoretical grounding for the IMF and other multilateral agencies intervention on the international financial markets. It shows that, unlike a common idea that the existence of bail outs creates both debtor and creditor moral hazard, it is a consequence of the sometimes "irrational" creditors' behavior: fleeing from other emerging economies, which are not financially distressed. These self-fulfilling runs would generate more crisis and higher losses.

Finally, since even a country with a sound economic policy would default as a result of some exogenous factor the IMF and other multilateral agencies should act to avoid a sequence of defaults that could be triggered a single financially distressed country. The today's architecture of the international financial markets have only one tool available, which is the private creditors'

bail out.

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