Moral Hazard and the International Monetary Fund – A Principal Agent Model

SUBMITTED BY:

Yinglan Tan

Department of Electrical and Computer Engineering, Carnegie Institute of Technology
Carnegie Mellon University

Department of Economics, College of Humanities and Social Sciences
Carnegie Mellon University

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Advisor

Professor Daniele Coen-Pirani

Graduate School of Industrial Administration,
Carnegie Mellon University

Yinglan Tan (yinglan@cmu.edu)

Abstract

This paper presents a principal-agent model of IMF conditional lending. We analyze IMF behavior from a perspective that is different from what has been commonplace in previous conditionality models of the IMF. We concentrate on the disregarded question of what is the optimal transfer as a function of the variables that are observable to the IMF, in the presence of commitment technology. The paper shows that in the presence of commitment technology by the IMF, additional credit granted by the IMF would stimulate more adjustment from the recipient crisis-hit government. In the absence of commitment technology, credit granted by IMF can lead to debtor moral hazard. Case studies show that the IMF has had a history of non-commitment, thereby breeding moral hazard and convoluting market signals.

Keywords: IMF; conditionality; principle-agent model

1. Introduction

The past decade saw the reversal of the declining trend that had been exhibited with the use of IMF funds in recent years. The increase in the use of IMF credit coincided with the onset of the debt crisis in the 1980s, Mexico in 1995, and East Asia, Russia and Brazil in the past two years. However, there has been a public outcry that the funds channeled to these emerging markets has not translated into economic recovery. The main complaint is that such large financial support packages generate substantial 'moral hazard' which encourages both emerging market countries and their creditors to undertake imprudent risks that ultimately materialize in damaging financial crises. Thus, the argument goes, the international support that is intended to ameliorate the effects of crises is actually the fundamental reason – or at least a key reason – why we have crises in the first place.

In this paper, I will argue the problem of moral hazard in the context of the principle-agent model and analyze the actions of the IMF with and without commitment technology and their ensuing repercussions. This analysis is of direct relevance to the current debate on reforming the International Financial Architecture (IFA), which has been triggered by the large international financial crises of the mid-to-late 1990s, and which has generated a renewed interest by researchers and policy-makers on possible reforms of IMF crisis lending and of its conditionality practices.

To state the conclusion in advance, the main results are as follows. In the presence of commitment technology by the IMF, additional credit granted by the IMF should stimulate more adjustment from the recipient crisis-hit government. In other words, the optimal contract should be established such that higher transfers from the IMF should be positively correlated with the performance of the country if there has been no precedence that the IMF has broken its promise before. In the absence of commitment technology, credit granted by IMF can lead to debtor moral hazard.

To set the stage for what follows, it is worth summarizing the main concerns that has been expressed about the IMF's lack of commitment technology. Apart from the thorny issue of moral hazard, lack of commitment increases market uncertainty because the markets have no clear indicators as to why, when, or to what extent the IMF will bail out a country or if at all. Secondly the ad hoc nature of the IMF bail outs reveals the subordination of economic considerations to political motivations. The IMF bail out of Mexico in 1994/95 is an example of such favoritism. Mexico shares a border and is a member of a free trade area with the most powerful member country of the IMF. This ensured IMF aid which was swiftly administered and vastly superior to Mexico's legal quota. These are lengthy issues which would require a paper on its own so I shall not delve on them but use them to

illustrate that commitment technology is an integral component that the IMF should adhere to.

In this paper, I start with a brief restatement of the initial role envisaged for the IMF, and then indicate how these roles have evolved in Section II. In Section III, I provide a brief background of IMF arrangements and the rationale for these arrangements. Next analysis turns to the moral hazard problem faced by the IMF and the problems faced by conditionality in Section IV. Thereafter, the principal-agent model is established in the context of IMF lending and the twin scenarios of IMF commitment and IMF non-commitment in Section V. In Section VI, I evaluate IMF recent policies based on the principle-agent model using several case studies. Then, the proposed IMF reforms and recommendations are discussed in Section VII. Section VIII concludes.

2. Historical Background of IMF and its Role

It is important to look at the origins of the IMF to examine the original aim of its formation and how its policies evolved. The IMF's was formed in 1944 at the Bretton Woods conference to facilitate international trade by providing short-term liquidity through a fund contributed by member countries. This function is fashionably known today as an "IMF bailout". Another key role is to facilitate collective action at the global level as a safeguard against market failures. This will be discussed in the next subsection. In its early days, the IMF constituted a formal structure to foster international cooperation to avoid the repetition of the Great Depression.

Another principal function of the IMF is to assume the responsibility of a supervision and surveillance unit whereby appraisal and regular review take place by " conducting multilateral surveillance twice a year in the context of its World Economic Outlook (WEO) Report. " (IMF Factsheet – Purpose, 1998)

The Fund is also instrumental in information gathering and dissemination. The Fund maintains databases that are useful for policy formulation, and disseminates information which can benefit private market participants and the general public. The IMF wants banks to lend money to good projects but however there is a sunk cost to determine the feasibility of the project. Unless there is a coordinated effort, there might be under investment in information gathering (UN ESCAP, 1996). It can be seen that the IMF is a crisis preventor by providing early warning signals disclosure of information.

The IMF's role has gradually changed in recent years and its new roles include providing new solutions and new public goods to externalities of the "New Order", providing a good housekeeping seal of approval lenders for sovereign borrowers who have successfully followed Fund programs and conditionality and advocating open policies towards international trade (Mussa 2000).

More specifically, IMF's role in facilitating balance of payments adjustments in developing countries as well as other macroeconomic difficulties emerged after .the oil price increases (Kruger 1997), especially the 1979 price hike followed by a worldwide recession, which resulted in severe payment imbalances for a large number of developing countries[1]. This situation basically lasted throughout the 1980s throughout the present time. Now, the 182-member organization has a ready fund of approximately US$300 billion to be the lender of last-resort to countries facing deficit or balance of payments disequilibrium.

2.1 Market Failures and the IMF

It is necessary to examine market failures to understand how the IMF plays its part in remedying market failures at the global level. Keynes and his contemporaries were acutely aware that market economies are not perfect and flawless—indeed, the Great Depression can be viewed as the most massive market failure that the world had experienced since the beginning of capitalism (Stiglitz, 1997). The private sector, in striving for profit maximization, may not have the proper incentives to direct an ailing economy back on track (more often than not, the public sector have been responsible for the economy to plunge into a depression due to distorted incentives between public and private welfare). He had shown how suitably-designed government intervention could help the economy pull out of an economic downturn. In the same vein, Boughton(2000) argued that crisis management is a public good that cannot be provided by markets alone.

The concept of global public goods is essential here. Following Samuelson's definition of the concept of public goods (in 1954), it became clear that the benefits of some public goods extended only within a limited geographic region. *Global public goods* are public goods whose benefits extend well beyond national borders to the global level. Economic coordination (amongst environment, knowledge, international security, and humanitarian assistance) is a major component that is facilitated by the IMF. From the global standpoint, the IMF is seen as an honest broker to solve a collective action problem by arranging concerted lending.

Without collective action, the onset of market failure has severe repercussions. If the debtor country defaults on its loans, prices of its bond will dwindle rapidly, as buyers pull out from the market. This will induce forced selling and a further collapse as liquidations come from lenders and redemptions demanded by clients. The shortage of cash will be instantaneously transmitted to the bond prices of the crisis country and then spread to the securities of other governments and finally to unrelated asset classes as investor will sell whatever that can be sole. Markets close. The classic lender of last resort is necessary to prevent panic as well as permitting the market to operate as can be seen in the recent failures in Russia which brought home forcefully the importance of the institutional infrastructure required to make markets work. This includes having appropriate legal and financial institutions, ensuring competition and contract enforcement, providing for bankruptcy, and enhancing the safety and soundness of banks. At the same time, public institutions have also made more extensive use of market mechanisms.

Looking back at IMF's history, the Suez crisis of 1956 put the Fund on the map, as all four of the countries involved – Egypt, France, Israel and the UK – turned to the Fund for financial assistance. When the major industrial countries faced ever greater difficulties maintaining a fixed price for gold and fixed exchange rates in the 1960s and early 1970s, they

were largely able to cope on their own. The eruption of the Mexico debt crisis and the "IMF rescue package" in 1982 was the arguably the first major incident which the Fund played a pivotal role in the effort to bring about orderly adjustment to the world economy and marked the beginning of the age of structural adjustment around the world. Boughton (2000) argues that 'the major turning point both for the international financial system and the IMF' was not the collapse of fixed exchange rates in 1973, but the debt crisis of 1982. That summer, Mexico's bank creditors refused to roll over a series of loans and forced the country to seek immediate help from Washington. This was the first time that the US government was prepared to provide short-term help, but a lasting solution required an institution that had a broad international membership, large financial resources, credibility with both creditors and debtors and an ability to act quickly. A key innovation by the Fund in 1982 was to recognize that it was in the banks' own interest to keep lending to Mexico and other countries that got into trouble around the same time - but only if they *all* kept doing so while the countries put better policies in place and strengthened their economies.

3. Recent System

The founders of the International Monetary Fund believed that even if governments pursue sound economic policy, normal trading may lead to temporary shortfalls in balance of payments. Thus, one of the functions of the IMF is to provide its members "with opportunity to correct maladjustments in their balance of payments without resorting to measures destructive of national or international prosperity" (*Articles of Agreement*, cited in de Vries 1986:14).

To achieve this, the Fund requires members to keep on deposit at the IMF a "quota" of national currency, the specific amount depending upon the size of the member's economy. This approach is designed to lower the risks of international trade and thus encourage countries not to engage in competitive devaluations of currency and beggar-thy-neighbor trade policies.

In times of crisis, there are two kinds of resources that a member country can use, **reserves** and **credit**. **Reserve** tranches can be purchased at any time by the government with the only condition that the member must be in "balance-of-payments need". Otherwise the use of these limited reserves has no conditionality, charges or repurchase requirements. (Articles of IMF*: Terms of lending*, 2000)

A member starts using **credit** tranches (Santella, 1999) when the Fund's holdings of the country's currency exceed that member's quota. Four tranches are defined and each one entails the purchase of the equivalent of 25% of the quota. In general, a drawing of the first credit tranche only requires that the country meets the "balance-of-payments need" criterion and that authorities are willing to make adjustments to correct the external disequilibrium. The first tranche is subject to minimum conditionality and has a repurchase requirement[2]. Use of Fund's credit beyond the first tranche, the so-called upper credit tranches, requires substantial justification, will be subject to strict conditionality and has a repurchase requirement.

By providing countries with loans of foreign exchange during financial crises, the International Monetary Fund plays the role of an international lender of last resort (Fischer 1999). When a bailout occurs, the emerging country undergoes a recession, but the lender is paid in full. For example, in Argentina in 2001, investors received additional payments for renegotiating their claims at market prices. Much of the lending to these countries takes the form of short and medium term notes and credits priced at a spread above U.S. Treasury or

Eurodollar rates (Lerrick, Meltzer 2002) The existence of a lender of last resort introduces moral hazard, which this paper will deal with formally.

Shortfalls in foreign reserves may arise from normal trading, but they may also arise from bad policy. And if a government knows it has access to an IMF loan, it will have weaker incentive to adjust its policies. The loan simply ends up subsidizing the balance of payments deficit, encouraging bad policies. Viewed another way, the government have learnt that promises of reform can be made and broken at low cost and that every $10 billion of IMF loans yields $1 billion each year in interest subsidies.

To encourage such countries not to engage in beggar-thy-neighbor policies[3], the IMF founded the "Stand-By Arrangement" (SBA) in 1952[4]. Under an SBA, a large amount of hard currency (greater than 25 percent of the member's quota) is set aside for the duration of the agreement. The government can draw on these funds at scheduled intervals and the arrangement is thought of as a "loan," even though the government is under no obligation to actually draw down any of the foreign exchange provided. The currency simply "stands-by" if needed.

The SBA has implicit ramifications in the problem of moral hazard. The Fund counters this by attaching conditions to an SBA [5]. This is the so-called conditionality. Formally, conditionality is the practice by which the International Monetary Fund (IMF, or Fund) makes its financial assistance to member countries contingent on the implementation of specific economic policies. According to Article I(v) of its Articles of Agreement (quoted above) one of the purposes of the IMF is to intervene in support of member countries which are in a position of external disequilibrium. When it does so the IMF typically negotiates a program of adjustment with the recipient country as a pre-condition for the initial disbursement of resources, and it makes the release of its funds contingent on the implementation of these programs. However, I will argue later in this paper that this measure is insufficient.

Conditionality can help to ensure that adjustment to a balance of payment disequilibrium will take place and that the temporary relief offered by the Fund's intervention will not lead to delays in the implementation of necessary adjustment policies. This in turn implies that the recipient country will be in a position to repay the Fund in due course. Hence, IMF is acting as a "Global Guarantor".

Much has been written about IMF conditionality. This has been mostly about the content of conditionality, i.e. the type of policy changes demanded by the IMF as part of its financial assistance programs, and the effectiveness of the IMF's approach to stabilization and adjustment (see e.g. Williamson (1983) and Shadler et al. (1995)). However work on IMF

conditionality and its implication on moral hazard (which is the subject of this paper) has been relatively scarce, especially at a formal level.

3.1 History of Development of Conditionality

Before 1980, conditionality practices combine the phasing of lending and the use of quantitative performance criteria for "upper tranche credit", that is credit in excess of the first 25% of the member's quota (which is instead subject to very light conditionality).

The standard vehicle of conditional lending is the **Stand-By Arrangement (SBA),** which had been mentioned in the earlier section**,** and the **Extended Fund Facility (EFF)**, Both SBAs and EFFs are subject to a basic rate, which is based on the interest on risk-free assets in industrial countries (the SDR rate), plus a small surcharge.

In the 1980s these two facilities were supplemented by the Structural Adjustment Facility and Enhanced Structural Adjustment Facility (subsequently renamed the Poverty Reduction and Growth Facility (PRGF)) for concessional lending to low-income countries.

More recently, to deal with the larger and more rapid capital-account crises of the 1990s, the IMF introduced the **Supplementary Reserve Facility (SRF)**[6], which is larger than SBAs but subject to higher ("penal") charges, and a **Contingent Credit Line (CCL)**[7], intended to deal with "contagion"-induced capital outflows, and which is subject to "ex-ante conditionality" (or pre-qualification). The SRF was first used to enhance the assistance package to Korea (in December 1997), which was 20 times its quota, and has subsequently been used for Russia (1998), Brazil (1998), Turkey (2000/2001), and Argentina (2000/2001). No IMF member has so far used the CCL.

The **largest** financial interventions by the IMF have however occurred since the 1980s, following the debt crisis of 1982, the Mexico crisis of 1995, and the Asian and Russian crises of 1997-98 (Federico, 2001). Overall 80% of the IMF's "loans" since 1950 have been SBAs. Since the 1990s however 13% of programs have been EFFs and 35% PRGFs.72 In terms of monetary commitments, the IMF estimates that during the 1990s 40% of its lending has been for "capital-account crises", 20% for transition economies and the remaining 40% for more "traditional" current-account disequilibria (IMF (2000b)). Table 3.1 shows the drastic increases in capital flow to the Asian Crisis Countries at the onset of the 1997 Asian Economic Crisis.

Table 3.1 **Asian Crisis Countries (a)**

Selected data on financial flows, US$ billion

	1996	1997	1998
Net private capital flows	63	-22	-33
Net official flows	-5	30	21
Change in reserves (b)	-5	30	-52
Current account balance	-53	-24	69

(a) Indonesia, Korea, Malaysia, the Phillipines and Thailand
(b) A minus sign indicates an increase
Source: World Economic Outlook database

Source: IMF Lending Facilities (Source: World Bank documents)

4. The Concept of Moral Hazard

After looking at how lending agreements are arranged by the IMF, it is easy to forget that the lending agreement has certain loopholes. First, we need to set the stage by introducing the concept of moral hazard. Moral hazard is a pervasive phenomenon that infects virtually all human endeavors. Car owners seek to minimize the financial losses of their car from being stolen and so purchase car theft insurance. In insuring against some of the adverse consequences of the car owner's own behavior, car insurance companies generate some moral hazard. Expecting coverage from the insurance, car owners are less prudent than they would be without such expectations – and the insurance companies know it. In the event that the car insurance company knows that no effort is being exerted on the part of the car owner to prevent car theft, the car insurance company can refuse to account for the financial losses in the event of the car being stolen, but the degree of effort is often unobservable.

A more formal example of the phenomenon of 'moral hazard' is the principal/agent problem, which the paper employs as a model, where the risk neutral principal has to rely on the unobservable efforts of the risk averse agent to generate an output that depends on these efforts, from which the agent derives increasing disutility, and on other (unobservable) random factors. The ideal, but unachievable, solution would be for the principal to compensate the agent with a certain payment depending on his level of effort – up to the *economically appropriate* point where the expected value of the marginal product of effort is equal to the marginal payment which is equal to the marginal disutility of effort. Payment based on output, rather than unobservable effort, provides a partial solution – it provides some incentive for the agent to supply effort which is linked probabilistically to output. But

a distortion remains that leaves the agent supplying less than the economically appropriate level of (unobservable) effort. This distortion is the consequence of moral hazard.

There is a tenor of empirical evidence which points towards moral hazard in the economic activities of certain countries at the international level. The salient point of this paper is that international banks had lent large sums of funds to the region's domestic intermediaries, with apparent neglect of the standards for sound risk evaluation. Underlying this overlending syndrome may have been the presumption that short-term liabilities would be effectively guaranteed by either a direct government intervention in favor of the financial debtors, or by an indirect bail-out through IMF support programs. The ratio of short-term external liabilities to foreign reserves - an indicator of financial fragility - was above 100% in Korea, Indonesia and Thailand. The model proposed in the paper looks at this from a slightly different perspective. The model assumes that the IMF does not always have to transfer funds to the crisis-hit country in case of a low-output shock. That is we assume that the IMF can commit to the threat of non-intervention in the event of negligent governance (i.e. the absence of appropriate reforms and lax risk evaluation of domestic projects). Given that the IMF can commit to this mandate, the model addresses the optimal transfer to the crisis country as a function of the macroeconomic variables that are observable to the IMF. In practice, the IMF cannot always commit to non-intervention. We shall look at the case of non-commitment in Section 5.3.

5. The Principal Agent Model

5.1 Set-up

Consider the following two-agent model. The principal is the IMF and the agent is a recipient country. We consider a single period. We shall consider both the IMF and the recipient (debtor) country as utility-maximizing entities. The model says that the adjustment effort of a country is not observable to the IMF (and therefore to us). Simply, we show that higher transfers from the IMF to the country should be positively correlated with some measure of the performance of the country.

We have made two central assumptions about IMF. Firstly, the IMF's utility function is underpinned by the assumption that the Fund is concerned about the macroeconomic performance of the recipient country (which may, for instance, contribute to global stability (contagion effect) and/or international trade and externalities caused by currency depreciation). Secondly, the IMF seeks to minimize the use of its resources (to maintain their revolving nature) ie. minimize capital aid payments.

We have also made three central assumptions about authorities receiving IMF funds. Firstly, they value positively the credit provided by the Fund because it allows them resources to smoothen the stabilization. Secondly, they dislike undertaking adjustment. There are many ways to rationalize this kind of behavior and the most simple one is going to be adopted here. In this context adjustment can be thought of as an efficient supply-side measure (e.g. price liberalization, or a reduction in tariffs) which increases domestic output but also implies a political economy cost for the policy makers in the recipient country. Thirdly, the country is risk adverse.

5.2 Case of Commitment

The optimal contract for IMF when effort is observable

If we assume that the IMF can commit to the threat of non-intervention in the event of negligent governance (i.e. the absence of appropriate reforms and lax risk evaluation of domestic projects), then the best choice of effort (e) that the IMF hopes that the debtor country achieves, is:

$$\int (R - k(R))\, f(R \mid e) dR$$

which characterizes the IMF's goal to optimize the macroeconomic performance of the country and minimize capital aid payments.

such that

$$\int v(k(R))(f(R \mid e)dR) - g(e) \geq u^{bar}$$ (Participational condition to IMF aid program)

This specifies the constraining condition that the crisis-hit country is willing to participate in the IMF structural adjustment program [8].

We find the Lagragian function to be

$$\int k(R) f(R \mid e) - \alpha \int v(k(R)) f(R \mid e) - g(e) - u_{bar}$$

Differentiating and solving,

$\alpha = \frac{1}{v'(k(R))}$ $\therefore$ which is only dependent on level of effort and not the effectiveness of reform, given a fixed amount of capital aid. α is the Lagragian multiplier for the above constrains.

By substitution,

Optimal Effort for country, e*= max $\int Rf(R \mid e)dR - v^{-1}(u_{bar} + g(e))dR$

Optimal Capital Aid, k* = $v^{-1}(u_{bar} + g(e^*))$ (fixed)

Hence, in the principal-agent model with observable country effort, an optimal contract specifies that the country choose the effort **e*** that maximizes

$\int Rf(R \mid e)dR - v^{-1}(u_{bar} + g(e))dR$ and ensues a fixed capital payment to the country of $v^{-1}(u_{bar} + g(e^*))$. This is the uniquely optimal contract.

When effort is not observable

Practically, the IMF is not able to observe the effort of the debtor country, which is analogous to the car insurance company being unable to observe the effort of the car owner preventing car theft (by leaving the car unlocked etc). Hence, to adhere to its goal

of optimizing the macroeconomic performance of the country and minimizing capital aid payments, the following condition now holds:

The IMF will minimize capital payments such that

$$\int k(R)) f(R \mid e) dR$$

constrained by

(i) $\int v(k(R))(f(R \mid e)dR) - g(e) \geq u^{bar}$ (Participational condition to IMF aid program)

(ii) e solves **Max** $\int v(k(R)) f(R \mid e^*)dR - g(e^*)$ (Debtor country incentive condition)

Constrain (ii) ensures that under capital aid k(R), the debtor 's country's optimal effort choice is e* to maximize the ruling party's own utility. The debtor country would choose e* to maximize their own utility.

How does the IMF optimally implement each of the two possible levels of effort exerted by the crisis-hit country? We consider each in turn

Implementing e^{Low}: Suppose, first, the IMF wishes to implement effort level e^{Low} , IMF would offer the debtor country the fixed amount of capital aid, k*:

$$k^* = v^{-1}(u_{bar} + g(e^{low}))$$

Implementing e^{High} : The more interesting case arises when the IMF decides to induce e^{High} from the debtor country.

Rearranging constrain (ii) and solving in the same way,

(ii) $\int v(k(R))(f(R \mid e^{high})dR) - g(e^{high}) >= \int v(k(R))(f(R \mid e^{low})dR) - g(e^{low})$

Lagragian = $\int k(R) f(R \mid e) - \alpha[\int v(k(R)) f(R \mid e)dR - g(e) - u^{bar}]$ -

$\beta[\int v(k(R)) f(R \mid e^{low}) - g(e^{low}) - \int v(k(R)) f(R \mid e^{high})dR + g(e^*)]$

Differentiating and Solving,

$$L' = -f(R \mid e^{high}) + \alpha v'(k(R)) f(R \mid e^{high}) + \beta[f(R \mid e^{high}) - f(R \mid e^{low})] v'(k(R)) = 0$$

$$\therefore \frac{1}{v'(k(R))} = \alpha + \beta[1 - \frac{f(R \mid e^{low})}{f(R \mid e^{high})}]$$, where α is the Lagrangian multiplier for constrain I, β is the Lagrangian multiplier for constrain II. It is proven that α and β are both greater than zero.

By substituting,

Optimal Effort for country, $e^{high} = \max \int Rf(R \mid e^{high})dR - \int Rf(R \mid e^{low})dR$

Optimal Capital Aid, $k^* = v^{-1}(u_{bar} + g(e^{high}))$

The optimal aid for implementing e^{high} involves a larger expected aid than is required when effort is observable. In this case, non-observability causes a welfare loss for the IMF. The optimal aid for implementing e^{low} does not change when effort is observable/unobservable. It can be shown (using Jensen's inequality [9]) that the expected value of IMF capital aid in the case of non-observability and when high effort by the debtor's country is desired is greater than the fixed capital aid in the observable case.

It is also proved in the Appendix that the expected value of IMF capital aid in the case of non-observability and when high effort by the debtor's country is desired is greater than the fixed capital aid in the observable case.

This shows that in the principal-agent model with unobservable effort, a risk-adverse crisis-hit country, and two possible effort choices, the optimal compensation scheme for implementing e^{high} involves a larger capital transfer than is required when effort is observable. The optimal aid scheme for implementing e^{Low} involves the same fixed wage payment as if effort were observable. This is summarized graphically in Figure 5.1.

Figure 5.1 Predictions of Principal-Agent Model

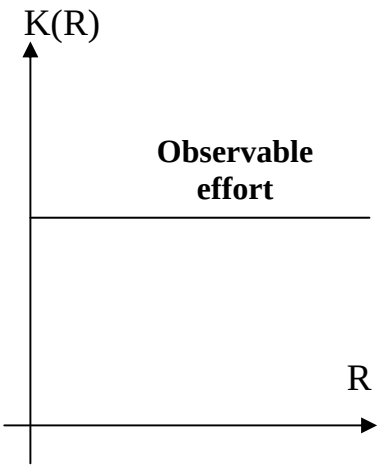


Fig 5.1(a) Capital transfer when level of effort exerted by debtor country is observable.

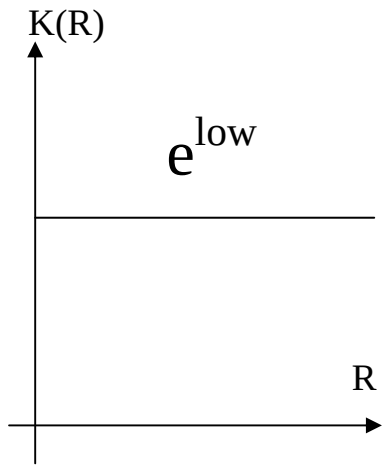


Fig 5.1(b) Capital transfer when desired level of effort by IMF exerted by debtor country is low. (unobservable effort).

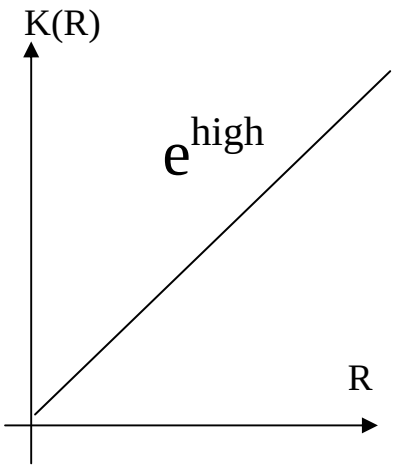


Fig 5.1(c) Capital transfer when desired level of effort by IMF exerted by debtor country is high. (unobservable effort).

Intuitively, the higher the R (effectiveness of reform), the higher the probability that the R was a result of high effort. This can be shown formally. If the model is valid, the corollary is that should see that additional credit granted by the IMF should stimulate more adjustment from the recipient government. In other words, higher transfers from the IMF should be positively correlated with the performance of the country.

The IMF should induce the level of effort according to the expected value of effective reforms $\int Rf(R|e^{high})dR - \int Rf(R|e^{low})dR$ with the difference in the expected capital aid that is required to be implemented for e^{low} and e^{high} .

5.3 Case of Non-Commitment

When the IMF fails to commit to the threat of non-intervention in the event of negligent governance, the case is trivial but an important consideration. The upshot is that the IMF will provide the crisis-hit country with capital aid irregardless of its macroeconomic reforms for fear of contagion. This has two fold implications. First, that officials in member countries may not implement politically-costly policies because they know the IMF will be there to bail them out if they get into serious trouble; and second, that because the IMF will come to the rescue, investors do not appraise -- indeed do not even bother to appraise, riskiness of projects accurately, and are too willing to lend to countries with weak economies.

Why does the IMF bail-out countries in crisis? There has been a fair amount of literature on this issue most including Edison, Luangaram, Miller's domino effect and lifeboats theory (1998), L. Kodres(2000) Goldstein and Pauzner (2001).Perhaps this statement by the Honorable John J. LaFalce, United States House of Representatives on the Asian Economic Crisis in 1997 captures the essence most aptly.

"Inaction would be contrary to what should be a central tenet of U.S. and IMF policies -- halting the precipitous decline of Asian, and other regions', currencies. Continued currency depreciation will only exacerbate the deteriorating Asian domestic economies. Inevitably, that pain will spread to our own economy, in the form of lost export sales and investments, market turmoil, and increased unemployment."

In reality, although the probability of contagion may be small, the penalty is large. It is not prudent for the IMF to undertake the risk which may jeopardize the global economy, and as we shall see in the case studies, the economy of the United States in particular. This is because USA is a key player in both the IMF and the World Bank. The Congress, G7 nations and US policy-makers are the main sources of funding for the IMF. The lack of funds channeled to the twin tigers of the IMF and the World Bank would be akin to having their wings clipped.

6. Case Studies of the Principal Agent Model in Action

We shall now look at how the IMF has been guided by the principle-agent model in the crafting and implementation of policies towards crisis-hit countries, both in the presence and absence of commitment technology.

6.1 Case Studies of Non-Commitment

Empirically, it is important to examine case studies to show instances whereby the IMF helped out countries which did not reform for fear of contagion i.e cases of non commitment. This has been the key reason put forth by oppositions of the IMF of why we have crisis in the first place. We should expect to observe no correlation between aid and measures of reform. In all of the case studies we examine, we find that the results coincide with what had been proposed.

6.1.1 Mexico in 1994

In 1994, after years of capital inflows, a sudden run on the peso forced the government to abandon its policy of a fixed exchange rate, leading to widespread fears of a default on Mexico's foreign debt. This in turn prompted the US and IMF to put together a $50 billion rescue package, named the Peso support package in a bid to declare their commitment to globalization and openness more clear as well as to avoid contagion.

An important consideration by the IMF in late 1994 was that the Treasury's state-by-state analysis showed that a Mexican meltdown would affect U.S. employment drastically. (Delong, Eichengreen, 2001). Tony Lake, then National Security Advisor of U.S, also argued that the crisis could threaten political stability in Mexico and that political disorder might mean a wave of illegal immigration into the United States. Furthermore, Mexico shares a border and is a member of a free trade area with the most powerful member country of the IMF. This ensured IMF aid which was swiftly administered and vastly superior to Mexico's legal quota.

In the 1994 Mexican crisis, growth remained disappointingly slow after the support package. Real GDP fell by 6.6% in 1995 [10]. Mexico inflation also continued to exceed U.S. inflation and peaked at 52% in 1995, due to the impact of more expensive imports. Unemployment peaked towards the end of 1995, about a year into the recession. Real wages

fell sharply, as did public and private investment. Recession brought widespread bankruptcies and up to two million redundancies, as firms struggled to cope with their bank loan repayments and suddenly increased prices of imports, following the devaluation of the peso.

The ad hoc nature of the IMF bail outs reveals the subordination of economic considerations to political motivations. It is evident that there is no correlation between the amount of credit granted to Mexico and the macroeconomic performance after the package was administered. It can be seen from Figure 6.1 that the 2nd tranche of credit was administered to Mexico by the IMF despite the lack-luster performance after receiving the 1st tranche.

Regarding the problem of moral hazard, there were concerns about moral hazard in 1995, but it would take the Asian crisis (and the Latin America crisis after it) to give them resonance. The phrase "moral hazard" appeared in the newspapers in 1995, in the wake of the Mexican rescue, only one-fourth as often as it would appear in 1998 (See Figure 5.2)

Figure 6.1

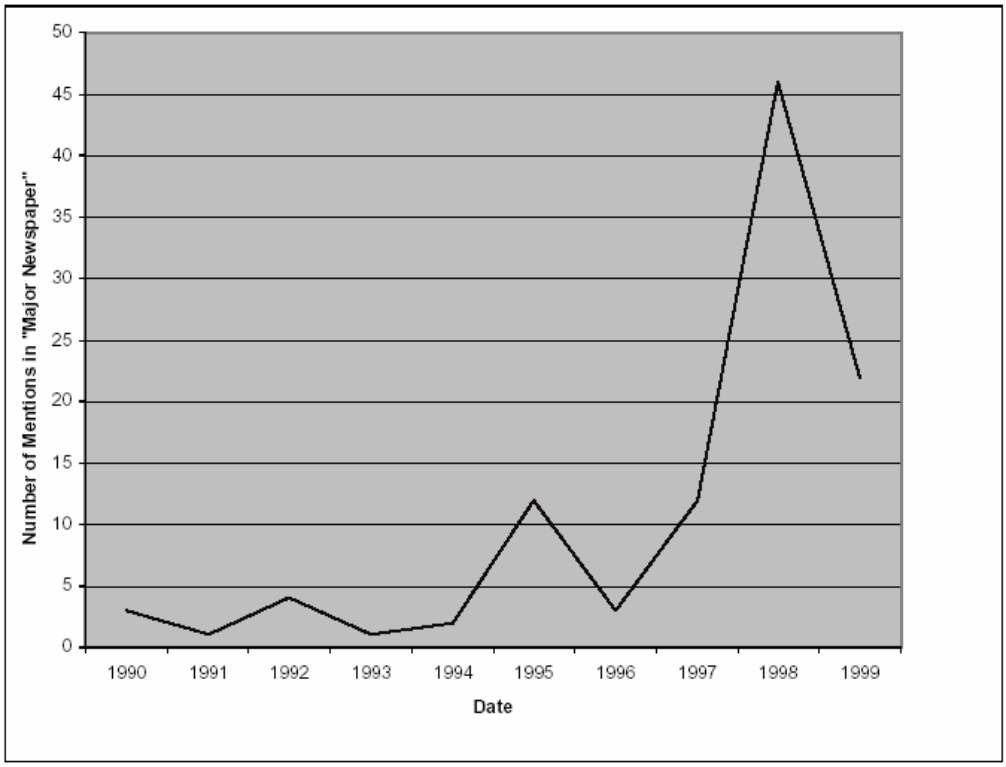
History of Lending Arrangements: Mexico
(In thousands of SDRs)

Facility	Date of Arrangement	Date of Expiration or Cancellation	Amount Agreed	Amount Drawn	Amount Outstanding
Stand-By Arrangements	7/7/99	11/30/00	3103000	1939500	0
Stand-By Arrangements	2/1/95	2/15/97	12070200	8758020	0
Extended Arrangements	5/26/89	5/25/93	3729600	3263400	0
Stand-By Arrangements	11/19/86	4/1/88	1400000	1400000	0

Source: IMF statistics, as of April 2002

Figure 6.2

References in Major Newspapers to Moral Hazard



Source : Delong, Eichengreen, 2001, pg 94

6.1.2 Asian Crisis in 1997

In June 1997, a large Thai current account deficit was raising questions about the nation's competitiveness. The baht, according to some estimates, was overvalued by 20%. Valuations on the Bangkok stock exchange had been trending downward since 1996. The inefficiency of infrastructure investment and the frothiness of the real estate market were notorious. Non-performing loans were perhaps $20 billion by the start of 1997. In May, capital and reserves hemorrhaged out drastically. On July 2, 1997 the central bank scrapped the fixed exchange rate and watched the baht fall by one-sixth on that day alone.

On July 6th the Philippine Finance Minister was quoted by the Straits Times as saying that his country's peso "might devalue." Five days later the Philippines, another country with chronic competitiveness problems, had abandoned its fixed exchange rate, following Thailand down. While this helped the Philippines avoid a more serious crisis, it

raised further questions about the stability of other currencies. On July 8th the Malaysian ringgit came under heavy speculative pressure. On July 11th Indonesia announced that it was widening its exchange rate band and then stopped defending the rate. On July 13th Korea's eighth-largest chaebol, Kia, and its creditor banks announced an urgent restructuring designed to avoid bankruptcy (following other failures by smaller chaebol earlier in the year). And on July 14 Malaysia stopped supporting the ringgit. The crisis was in full swing.

In October, The IMF recognized that the crisis could be contagious, and administered a $40 billion support program to assist Indonesia, and this time the administration committed to making available a contingent line of credit worth about $3 billion in the event. Korea and the Fund agreed on a support program of $57 billion, the largest IMF-led program ever.

Table 6.4 shows that the inflation rate in Indonesia in 1999-2000 showed a deterioration post-crisis (90.7% in Korea and 209% in Indonesia) which sends a signal that the monetary structures of these two countries were still unstable. Considering the substantial funds injected by the IMF, recovery was slow; in Indonesia, the government was still in deficit as of 1999 while in Korea, the real GDP growth rate dipped in 1999. (Table 6.6). There is evidently no correlation between the Quota of SDRs granted and the macroeconomic performance.

Table 6.3

History of Lending Arrangements: Indonesia
(In thousands of SDRs)

Facility	Date of Arrangement	Date of Expiration or Cancellation	Amount Agreed	Amount Drawn	Amount Outstanding
Extended Arrangements	2/4/00	12/31/03	3638000	1436040	1436040
Extended Arrangements	8/25/98	2/4/00	5383100	3797700	3797700
Stand-By Arrangements	11/5/97	8/25/98	8338240	3669120	1742832

Source: IMF statistics, as of April 2002

Table 6.4

Indonesia	1995	1996	1997	1998	1999	2000
Real Growth Rates of GDP	10.94	10.44	-39.78	31.77	12.42	4.78
Percentage of Government Deficit over GDP in a year[1]	2.22	1.16	-0.67	-2.95	-1.14	N.A.
Inflation rate	7.97	6.73	57.64	20.49	3.72	11.50
Quota of SDRs imposed by IMF[2]	1497.60	1497.60	1497.60	1497.60	2079.30	2079.30

1: negative indicates a deficit

2: Millions of SDR, end of period

Source: IMF International Financial Statistics

Table 6.5

History of Lending Arrangements: Korea
(In thousands of SDRs)

Facility	Date of Arrangement	Date of Expiration or Cancellation	Amount Agreed	Amount Drawn	Amount Outstanding
Stand-By Arrangements	12/4/97	12/3/00	15500000	14412500	0
of which Supplemental Reserve Facility	12/18/97	12/17/98	9950000	9950000	0
Stand-By Arrangements	7/12/85	3/10/87	280000	160000	0

Source: IMF statistics, as of April 2002

Table 6.6

Korea	1995	1996	1997	1998	1999	2000
Real Growth Rates of GDP	6.46	0.80	-2.78	6.38	2.81	N.A.
Percentage of Government Deficit over GDP in a year[1]	0.27	0.10	-1.27	N.A	N.A	N.A
Inflation rate	4.93	4.44	7.51	0.81	2.26	4.31
Quota of SDRs imposed by IMF[2]	799.60	799.60	799.60	799.60	1633.60	1633.60

1: negative indicates a deficit

2: Millions of SDR, end of period

Source: IMF International Financial Statistics

6.1.3 Brazil in 1999

A similar run on the Real (a la the Mexico peso) occurred in Brazil in 1999. From 75 billion dollars in July 1998, central bank reserves dwindled to 27 billion in January 1999. During the final months of 1998, President Cardoso of Brazil negotiated an IMF package for $41.5 billion. Ostensibly, the IMF loan was intended to shore up the Brazilian real in the wake of the financial crises in Thailand, Korea, Indonesia, and Russia and to "restore confidence".

The conditionality program set by the IMF November 1998 combines a large up-front fiscal adjustment of over 3 percent of GDP with reforms of social security, public administration, public expenditure management, tax policy, and revenue sharing. Within this framework of structural reforms, Brazil's three-year fiscal program targets primary surpluses of 2.6 percent of GDP in 1999, 2.8 percent in 2000, and 3 percent in 2001 and budget cuts of 8 billion dollars. The Brazilian authorities are also committed to further opening up the economy, ensuring firm monetary discipline and macroeconomic stability, and maintaining the current exchange rate regime.

Data is not available regarding the Brazil deficit in 1999, 2000 and 2001, hence we cannot conclude whether Brazil had met the target established by the IMF. However, from Table 6.8, we see a deterioration in the real rate of growth of GDP in 1999 although there was a strong recovery in 2000. The Real had also lost more than by more than 40 percent by late January of 1999 (IMF Survey V27:21) . By mid-1999, the first tranche of the IMF loan of more than 9 billion dollars had already been squandered to prop up Brazil's ailing currency. There is little evidence of correlation between the macroeconomic performance of Brazil and the continuation of upper-tranche grant to Brazil in 1999 [11].

It was interesting to note that there was a striking difference in the "timing" (ie. chronology) of the IMF ploy: in Asia, the IMF "bailouts" were negotiated on an ad hoc basis "after" rather than "before" the crisis. In contrast, in Brazil the IMF financial operation was negotiated "before" as part of a new standing IMF-G7 arrangement. The "economic medicine" was meant to be "preventive" rather than "curative".

Table 6.7

History of Lending Arrangements :Brazil (In thousands of SDRs)				
Facility	**Date of Arrangement**	**Date of Expiration or Cancellation**	**Amount Agreed**	**Amount Drawn**
Stand-By Arrangements	9/14/01	12/13/02	12144400	3675583
of which Supplemental Reserve Facility	9/14/01	9/13/02	9950874	3316958
Stand-By Arrangements	12/2/98	9/14/01	13024800	9470750
of which Supplemental Reserve Facility	12/2/98	3/10/99	9117360	6512400
Stand-By Arrangements	1/29/92	8/31/93	1500000	127500
Stand-By Arrangements	8/23/88	2/28/90	1096000	365300

Source: IMF statistics, as of April 2002

Table 6.8

Brazil	**1997**	**1998**	**1999**	**2000**
Real Growth Rates of GDP	8.59	0.13	-1.60	5.89
Percentage of Government Deficit over GDP in a year[1]	-7.31	N.A	N.A	N.A
Inflation rate	5.11	3.34	3.84	3.57
Quota of SDRs imposed by IMF[2]	2170.80	2170.80	3036.10	3036.10

Source: IMF International Financial Statistics

6.2 Case of Commitment

The recent case of Argentina in 2002 is an interesting case to examine. IMF's tough stance towards Argentina is a sign that it is committing to the threat of non-intervention in the event of negligent governance.

In 2000, Argentina had been stuck in a three year recession and embattled with rising unemployment, dwindling consumer confidence and higher taxes. It borrowed from the IMF in October 2000 (Figure 6.9). The IMF required Argentina to cut the government budget deficit from $5.3 billion in 2000 to $4.1 billion in 2001 and directed Argentina to cut 20 percent from $200 monthly salaries paid under an emergency employment program in the credit transfer. The "understanding" also promised a 12 to 15 percent cut in civil servant salaries and a pension "rationalization" (IMF-speak for a 13 percent cut in payments to the elderly).

Argentina, however, fell short. The coup de grace materialized in its default on $141bn of debt, and a currency devaluation in December, 2001. The peso has already lost about 70% of its value by end of 2001, prompting increases in the prices of fuel, drugs and groceries. Overall unemployment rose to a six-year record of 16.4% in May 2001. A total of 726 companies filed for bankruptcy in the first half of 2001. President Eduardo Duhalde had hoped to persuade the IMF to part with at least $10bn to resolve the crisis.

The IMF, however, ignored its cash plea on the basis that they need more adjustment, not financing. The $720 million granted in 1996 has a deterioration of the real growth rates of GDP and a greater deficit. (See Figure 6.9 and 6.10) Politically, the fund's tough stance was backed by Horst Koehler and his new deputy, Anne Krueger, who is thought to take a dimmer view of bailouts than her predecessor, Stanley Fischer. The economic team of US President George W Bush has also said it is in favor of more crisis prevention and fewer bailouts. Weisbrot (2001) argues that this is largely due to the economic team of the President acceding that the IMF has been acting as "enabler" for the loan-addicted Argentina government. This is a concrete example of the IMF commitment to its threat of non-intervention. It is too early to conclude to determine empirically whether this will pay dividends, but the signs are optimistic.

However, it can also be argued that the IMF's tough stance is not a commitment to its threat but rather due to a limited radius of contagion and of insignificant magnitude. In the US, 3 percent year-on-year growth in consumer spending helped offset a sharp decline in business investment and inventories. In Latin America, activity was underpinned by continued growth in export volumes in most countries, helped by in most cases by flexible exchange rate regimes. This is largely because trade and financial links between Argentina and most of its neighbors remain relatively limited and that the Argentine default was largely expected.

Table 6.9

History of Lending Arrangements: Argentina
(In thousands of SDRs)

Type	Approval Date	Expiration Date	Amount Approved (SDR Million)	Amount Drawn (SDR Million)
Stand-by	Mar 10,2000	Mar 09, 2003	16,936.80	9,756.31
of which SRF	Jan 12, 2001	Jan 11, 2002	6,086.66	5,874.95
EFF	Feb 04, 1998	Mar 10, 2000	2,080.00	0.00
Stand-by	Apr 12, 1996	Jan 11, 1998	720.00	613.00

Source: IMF statistics, as of April 2002

Table 6.10

Argentina	1995	1996	1997	1998	1999	2000
Real Growth Rates of GDP	-6.46	-0.80	2.78	-6.38	-2.81	0.00
Percentage of Government Deficit over GDP in a year1	-0.55	-1.92	-1.49	-1.39	-2.87	-2.40
Inflation rate	0.16	0.53	0.92	-1.17	-0.94	-1.07
Quota of SDRs imposed by IMF2	1537.10	1537.10	1537.10	1537.10	2117.10	2117.10

1: negative indicates a deficit

2: Millions of SDR, end of period

Source: IMF International Financial Statistics

7. Recommendations for the IMF and Discussion of Reform Proposals

There has been a wide spectrum of opinions regarding the reforms of the IMF, ranging from those who are calling for a complete dismemberment of the Fund and those that argue that because the Fund has existed it ought to continue to exist. However, in considering these opinions, it is easy to forget the fundamental point: how can the IMF commit not to help a crisis-hit country, considering the implicit threat of contagion? The IMF has essentially two choices in times of crisis: either bail-out a country or risk contagion. The possibility of a financial catastrophe is small but the penalty is large. Intervention has been the outcome even when promises of reform were unlikely to be kept, efforts were not bona fide and the debtor country merely paying "lip service".

It is important to look at the extreme cases. Sebastian Edwards (1998) suggested abolishing the IMF entirely and setting up three independent institutions, the *Global Information Agency, the Contingent Global Financial Facility* and the *Global Restructuring Agency*, the first agency providing timely and uncensored information on countries' financial health as an early warning to take corrective measures by ranking countries' financial systems, the second would provide contingent credit lines to solvent countries, certified by the *Global Information Agency,* facing temporary liquidity problems and the third to "clean up" deal with those countries that, in spite of everything, run into a crisis. Hanke(2000) also believes in abolishing the IMF for its destructive--and politically driven mantras, causing considerable human suffering in the course of trying to accomplish a political goal. Barros (2000) propounds that although it is not prudent to abolish the IMF, it is definitely necessary to make major changes; giving up bailouts and returning to its original mission and act as a short-term lender to solvent economies. Edward's proposition is in effect splitting up the IMF with the fundamental problems still remaining while Hanke and other proponents for abolishing the IMF did not propose any constructive solution for liquidity crisises. Barros's argument appears to be the most rationale although he did not delve deeper into the issue.

On a less drastic note, Goldstein (1998) proposed that a small number of structural performance criteria were substituted for the vast array of structural benchmarks that have characterized many past Fund programs. This would require Fund staff to think harder about which structural conditions merited the highest priority in the reform effort, thereby sending a clearer signal to the borrower that failure to meet those performance criteria would likely result in a halt in Fund disbursements. Larsen(2000) proposes that the IMF should place a greater emphasis on catalyzing market-based solutions Falk(2001) also proposes a reduction and simplification of conditionality by the IMF, especially impartiality in loans as

well as scrapping all political influence over countries. The conditions should be clear and restricted, eg. repayment schedules, level of interest rates, and basic human rights.

Proponents of a market-based solution is ideal and utopic but not pragmatic. Sach(1999) believes that the presence of an international lender of last resort is essential because we are always going to have liquidity crises, The underlying reason for IMF's existence is that there is no provision for discharge of unpayable debt.

In 2000, the buzzword of the reforms of Meltzer Commission (Meltzer, 2000) was **pre-conditions for loans.** One condition is an extension of the type of standards for bank capital that developed countries have now adopted, based on the Basel agreement. Another is based on the WTO's protocol 5 that permits foreign banks to compete in the country's markets and the remaining conditions require reasonable fiscal policy and the timely release of information on the maturity distribution of sovereign debt.

Although more than fifty countries have accepted this protocol, the Meltzer Commission also recognizes that if the global financial system were at stake because a large developing country in need of liquidity assistance had not pre-qualified for a loan, pre-qualification requirement could be waived, but the lending limits, the IMF's senior status, the short maturity, and the penalty rate would still apply. The waiver of pre-qualification is still a potentially devastating condition and has long-lasting ramifications which could spark off future crisis.

To alleviate this problem, Meltzer and Lerrick (2002) proposes an alternative apart from the two unpleasant choices of risking contagion or bail-out. The gist of the proposal is for the IMF to stand ready to buy any and all debt of a crisis government to the private sector at a support price significantly below its expected restructured value once the debtor county has defaulted on its loans. The financial system would be insulated from contagion. The country's debt burden would be reduced to sustainable levels. Private lenders would bear losses, but losses with predictable limits. The uncertainty that leads to panic would no longer exist. The IMF would step back from its current role of guarantor of speculative capital to emerging economies and become a true lender of last resort that responds to market failure yet preserves market discipline.

"Conditionality serves no purpose in the proposed structure. The IMF, as creditor, is protected because creditworthiness has been restored. The debt has already been reduced to a sustainable level under conservative assumptions. Once bailouts are no longer an option, markets will enforce reform by refusing to lend additional funds, or raising rates, if a country does not follow sound policies" (Lerrick, Meltzer, 2002)

However, a potential flaw in this proposal is that the IMF could set an support price for these bonds that is too high or near to the restructured value, ending up with buying a lot of debt from the private sector. How do you commit not to do this?

Meltzer's commission's findings in 2000 appear to be pertinent to answering this question. It was found that programs which subsidize institution building only work in countries that already have a commitment to reform; it cannot be bribed from outside, or forced by "conditionality", to do it. Reform-minded governments offer windows of opportunity for change, and under those circumstances constructive reforms can be hastened and broadened by appropriate external assistance, which can benefit not only the recipient but other countries as well. Hence the IMF should only commit to help if the countries themselves have a commitment to reform. Bail-outs on the fear of contagion would only be short-term remedies but would not yield dividends in the long run if the country does not have the commitment to reform. The judgment of whether a country has a firm commitment to reform and not merely "lip service" can only be evaluated on a case by case basis, through the past behavior of the government and other macroeconomic trends.

The results of the principal-agent model also says that the IMF should commit to providing capital aid according to the expected value of reforms, with the caveat that the expected value of reforms and the expected cost of contagion cannot be easily quantified. Intuitively, the expected value of reform would tend to be high if the country itself has a commitment to reform and thus this should translate to more funds being granted.

Again, discretion of whether the country has a genuine commitment to reform is vested in an "independent" third party, the IMF and the World Bank, that would have the responsibility to determine whether the government is complying with its reform obligations. Discretion may not always be clear-cut. An appropriate analogy is that the police may be said to be responsible for crime if they directly commit crimes, or if they accept bribes and knowingly allow others to commit crimes, or if they are unreasonably lazy or incompetent. But, if crime persists, or even grows, despite the energetic best efforts of the police, they are not responsible – directly or indirectly. Similarly, if international financial support is to be held (partially) indirectly responsible for moral hazard problems generated by national economic policies, there needs to be some meaningful linkage between official international support and the national policies that are the fundamental source of the problem (Mussa 2001). The IMF, the World Bank and the regional development banks are faced with this onerous task.

Perhaps Goldstein(1998)'s guidelines are the bitter but effective medicine that the embattled Fund should heed. The proposed remedy is that the IMF should say "no" more often than in the past -- to requests for Fund assistance where the expectation is low that

the country will actually implement Fund policy conditions, to G-7 governments when they propose new tasks for the Fund that go beyond the Fund's core competence, to NGOs who seek to use a country's letter-of-intent with the Fund to advance agendas (even if desirable) that lie outside the Fund's mandate and comparative advantage, and to developing-country finance ministries that want to use micro conditions in Fund programs to impose spending discipline on other government ministries that could not be obtained via their national legislatures.

8. Conclusion

The model I have constructed looked at the moral hazard problem from a slightly different perspective. The model assumes the presence of IMF commitment technology. The results of the model show that in the presence of commitment technology by the IMF, additional credit granted by the IMF should stimulate more adjustment from the recipient crisis-hit government. In other words, the optimal contract should be established such that higher transfers from the IMF should be positively correlated with the performance of the country if there has been no precedence that the IMF has broken its promise before. In the absence of commitment technology, credit granted by IMF can lead to debtor moral hazard.

The principle-agent model on IMF lending has several caveats. These limitations of the model in particular need to be kept in mind. Firstly, the risk adversity of nation is not easily determined. Although the risk adversity of the nation can be generalized as the weighted average of the risk adversity of the population, the decision of economic policies often lies in the hands of policy-makers and ruling party and this is not easily determined.

A second point is the ambiguity of effort choice selected by the government in implementing policies to meet the IMF guidelines. How hard the government work does not necessarily correlate to the correct results for country. The government may be doing all the correct things but external (economic and non-economic) factors might come into play. This often has to be evaluated on a case-by-case basis.

Thirdly, the function of a country macroeconomic performance as a variable of the effort choice based on historical precedence may not be accurate and is subject to variations like political change, external trade policies etc.

Lastly, it is almost impossible to determine the expected value of a successful reform or the cost of inaction. The severity of contagion is not easily quantified and forecasting is extremely difficult. Different models give very different results on size and timing of effects.

Empirically, the case studies show that until recently, the IMF has not been committing to threats of non-intervention and there has been no correlation between IMF loans granted and the performance of the country. It is also observed that the ad hoc nature of the IMF bail outs reveals the subordination of economic considerations to political motivations. Non-commitment on the part of the IMF has breed moral hazard and convoluted market signals.

To conclude, I agree with Meltzer and Lerrick's proposal of a true lender of last resort that responds to market failure yet preserves market discipline because there are limits -- no matter how numerous and detailed the Fund's monitoring techniques -- to how far the Fund can push a country to undertake structural reforms that it itself is not strongly committed to.

9. Appendix

[1] Most developing countries at that time were invoking the balance of payments clauses in the GATT articles to rely on quantitative restrictions to reduce imports. They maintained fixed nominal exchange rates in the face of domestic inflation for extended periods of time, and import licensing became increasingly restrictive. When countries, already greatly restricting imports because of the failure of export earnings to increase, were then confronted with the increased price of oil, many of them were confronted with major economic dislocations.

[2] The Fund presumes that countries pursuing sound economic policies will need to draw on no more than 25 percent of their quota. Thus, a member can freely draw on other countries' currency up to an amount equivalent to 25 percent of its quota whenever it faces a balance of payments shortfall (Stiles 1990, 2). A government requiring more than this amount is assumed to have bad policies.

[3] A course of action through which a country tries to reduce unemployment and increase domestic output by raising tariffs and instituting non-tariff barriers that impede imports, or by accomplishing the same objective through competitive devaluation. Countries that pursued such policies in the early 1930s found that other countries retaliated by raising their own barriers against imports, which, by reducing export markets, tended to worsen the economic difficulties that precipitated the initial protectionist action. The Smoot-Hawley Tariff Act of 1930 is often cited as a conspicuous example of this approach.

[4] Stand-By Arrangements *(SBA)*. The SBA is designed to address short-term balance-of-payments problems and is the most widely used facility of the IMF. The length of a SBA is typically 12 -18 months. Repayment is normally expected within 2-4 years unless an extension is approved. Surcharges apply to high levels of access.

[5] The authorities of the recipient government are expected to carry out the bulk of the adjustment only after the purchase of the second credit tranche. In theory, by that time the government should have implemented serious measures to increase its revenues, cut its expenditures, and contract the monetary and credit expansion. When the time comes for the next drawing, usually the next quarter, the Fund's evaluates the country's compliance in light of the performance criteria and decides whether to carry out the loan.There are also more thorough and comprehensive reviews of adjustment that take place usually once a year, where some qualitative elements not included as performance criteria are also reviewed to get an overall appraisal of the progress achieved. In practice however reform implementation is a gradual and reversible process, and only a share of the IMF's bail-outs is paid out at the outset of a reform program, and additional tranches are released depending on the level of progress in reforming policies. This gives rise to a trade-off between the early disbursement of bail-out Funds (in the absence of the agent's commitment) and staggering its lending.

[6] Supplemental Reserve Facility *(SRF).* The SRF was introduced in 1997 to meet a need for very short-term financing on a large scale. The sudden loss of market confidence experienced by emerging market economies in the 1990s led to massive outflows of capital, which required loans on a much larger scale than anything the IMF had previously been asked to provide. Countries are expected to repay loans within 1 –1½ years, but may request an extension by up to 1 year. All SRF loans carry a substantial surcharge of 3 –5 percentage points

[7] Contingent Credit Lines (CCL). The CCL differs from other IMF facilities in that it aims to help members prevent crises. Established in 1999, it is designed for countries implementing sound economic policies, which may find themselves threatened by a crisis elsewhere in the world economy, a phenomenon known as "financial contagion". The CCL is subject to the same repayment conditions as the SRF, but carries a smaller surcharge of 1-3 percentage points.

[8] R is defined as the effectiveness of reform as a weighted index of growth rate of GDP, percentage of government deficit over GDP in a year and the inflation rate. It is then proposed that the more effective the adjustment reform, the higher will be the GDP growth rate, the smaller will be the percentage of government deficit over GDP in a given year and the lower will be the inflation rate. Hence it is concurrently more likely the debtor can pay back the loan with reasonable interest in a given time frame.
k(R) is defined as the capital aid to country is constrained by 1) legal framework :the need for the IMF to lend under "adequate safeguards" and 2) size of bailout cannot exceed capital outflow by debtor country. This is dependent on the effectiveness of the reform.
v(k(R)) is defined as the level of utility associated with the amount of capital aid
g(e) is defined as the disutility experienced by the country . The recipient country faces a choice of adjustment effort. More effort leads to more output, but at a political cost.
f(R | e) is defined as the effectiveness of reform as a function of adjustment effort. (This is based on past experience.)
$\mathbf{u_{bar}}$ is defined as the reservation utility of country and its ruling party(for a certain level of effort)

[9] The proof by by using Jensen's theorem is as below:

If $E(v(k(R))\,|\,e^{high}) = u^{bar} + g(e^{high})$ and by the Law of Diminishing Marginal utility, utility of the debtor country is a convex function.

Then $v[E(k(R))\,|\,e^{high}] > u^{bar} + g(e^{high})$ But since $(k^*_{e^{high}}) = v^{-1}(u^{bar} + g(e^{high}))$ and $v(R^*_{e^{high}}) = (u^{bar} + g(e^{high}))$

$\therefore E(k(R))\,|\,e^{high} > k_{e^{high}}{}^*$

[10] Regional aggregates are based on the classification of economies by the IMF standard definitions. In datasets which included real rate of growth of GDP, the following formula was used.

$$\text{Nominal GDP Growth Rate} = \frac{\text{GDP of current year - GDP of previous year}}{\text{GDP of previous year}} \times 100$$

Real GDP Growth Rate = Nominal GDP Growth Rate – Inflation

Inflation rate was calculated by the following formula

$$\text{Inflation rate} = \frac{\text{CPI Index of current year - CPI Index of previous year}}{\text{CPI Index of previous year}} \times 100$$

[11] It is also argued by Vreeland(1999) that the Brazil government sign IMF agreements not merely for the loans they provide. The Brazil government also want conditions imposed by the Fund to gain bargaining leverage over domestic constituencies which oppose policies they prefer.

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