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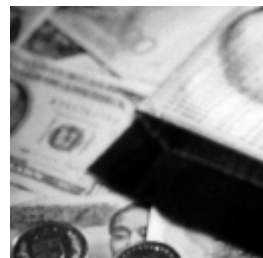
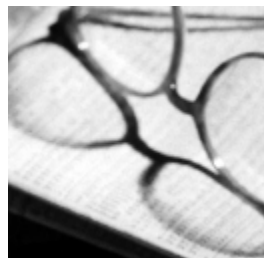
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## **Countries with international payments' difficulties: what can the IMF do?**

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# **Countries in Payments' Difficulties:**

## **What can the IMF do?**

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## Introduction

There are several different strands in the current economic literature regarding the role of IMF. In this Chapter, I develop one particular theme, namely the role of the IMF in assisting countries that have serious international payments difficulties. One characterisation of this debate is that between the ‘moral hazard’ school and the ‘liquidity’ school. The former stresses the classic perverse incentive problem created with insurance-type interventions in capital markets leading lenders to bet on being ‘bailed out’ at some future date if things go wrong - especially in countries that might be considered ‘too big to fail’.

Adherents to this school point to the sheer size of recent IMF led packages to emerging economies, the very low emerging market spreads after the assistance to Mexico in 1995 and the ‘lending boom’ to emerging economies, including the Asian economies, that then followed as evidence of the potential importance of moral hazard. In Figure 1, we plot the EMBI (define this - see footnote 2) spread from 1994 as illustration<sup>2</sup>.

(Figure 1 about here, EMBI)

Some have labelled this as a theory of plenty: a theory of too much private lending, on the one hand, and too little discipline on the other. This lack of discipline might result in countries contracting large amounts of debt (either in the public or private sectors or in the private sector with implicit or explicit guarantees) while, at the same time, failing to address structural weaknesses or not adjusting quickly enough to negative shocks as they arise.

According to this school of thought, the role of the IMF must then be very limited. Lending instruments and IMF programmes should be designed to reduce ‘moral hazard’ as far as possible. The emphasis is then on how to resolve cases of countries with payments difficulties with minimum official involvement and higher degrees of private sector involvement (PSI). A payment difficulty is essentially a problem between a country and its private creditors.

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<sup>2</sup> The EMBI is JP Morgan’s “Emerging Market Bond Index “.

The second school stresses failures in international capital markets. In particular, adherents point to asymmetric information between lenders and borrowers and co-ordination failures between lenders giving rise to potential problems of multiple equilibria. According to this school, financial markets may be subject to inherent instability and consequent ‘runs’ which may prove extremely costly for the countries concerned. Such theories might be labelled ‘too much instability’. Evidence includes lending booms and subsequent ‘sudden stops’ in capital flows (as non-residents attempt to ‘run’ and residents attempt to place funds abroad), the volatility of emerging economy risk spreads and the apparent frequency of recent financial crises.

Proponents of this view tend to believe that while countries that suffer ‘runs’ may have structural weaknesses that make them more vulnerable to “attack”, nevertheless there is a tendency that the ‘punishment’ is worse than the ‘crime’ and hence there is an ‘overshooting’ of relative prices and stocks causing grave damage to the countries that are ‘hit’ and disrupting international markets more generally through ‘contagion’. Further evidence in favour of this view is the high (unexplained) correlation between emerging country bond spreads.

In this view of the world, the role of the IMF is to attempt to stabilise capital markets and to make them work more smoothly. The IMF should, according to adherents of this view act essentially as a provider of liquidity. Indeed, simply the credible promise of liquidity should eliminate the desire of investors to ‘run’. The IMF may also act to co-ordinate lenders, at minimum providing a focal point for expectations, and hence potentially affecting equilibrium selection. More directly, both through its informal powers of persuasion and more formal conditionality, the IMF may also affect the perceptions of atomistic investors and also reduce problems of lack of discipline as stressed by the moral hazard school. The IMF may also act, as an ‘honest broker’ attempting to ameliorate problems of information asymmetry between borrowers and lenders which again, it might be argued, lead to unstable outcomes.

These appear to be quite opposite views of the world and hence somewhat difficult to reconcile. However, I will argue that both schools are right, and moreover, that they may be right simultaneously. In particular, I build on previous work and develop a very simple game theoretic model that encompasses both views of the world. I show that depending on particular assumptions, the world may indeed be characterised by both views

simultaneously. Indeed, I suggest that it is precisely because both schools are right simultaneously that makes the task of the IMF so difficult and, unfortunately, potentially without a clear normative solution.

Different waves of thought flowing through the IMF, and through its political masters, often prompted by events, may of course lead to particular policy approaches being adopted and outcomes generated. Unfortunately, such perceived changes in policy direction may only serve to increase the inherent instability of international capital markets. Hence, if this essay does have a normative message it is an appeal for distance from dogmatic discussions of either one view or the other and a call for revision of the international financial architecture built on the recognition that both views have validity.

Given this reality, more creative thinking may be required to find a better way to manage these problems including, for example, the need to consider changes in institutional structures. I use the results of the modelling exercise to comment on some of the recent debates regarding reform of the 'international financial architecture'. In particular, I consider the role of collective action clauses in bond contracts and the recent (or revived) proposals for a bankruptcy procedure for countries. The model yields interesting and new interpretations for these proposals.

It is likely, however, that particular events will continue to shape policy changes in the months and years to come. At the time of writing the first draft of this paper, Argentina was attempting to restructure, in an orderly fashion, its foreign held public sector debt to avoid explicit default. This attempt failed – or never really got off the ground. At the end of 2000 a large IMF support package was agreed but subsequently Argentina backtracked on a proposal to cut politically sensitive public expenditure, adopted more heterodox economic policies to the displeasure of the IMF and country risk soared to over 1000 basis points. It is argued that at that point the IMF had a decision to make in that, either it had to support Argentina strongly or withdraw. In fact, it did neither - the perception was one of vacillation. The model presented in this Chapter provides an explanation as to why first Argentina deviated to a more risky strategy and secondly why the IMF vacillated, being caught between the discomfort at continuing support to a country adopting more risky strategies (that subsequently made the default more painful) and the knowledge that withdrawal would no doubt have prompted a private sector run and the default that Argentina was trying to avoid.

The IMF did finally withdraw support and the feared private sector run did indeed take place. The banking and exchange controls, put in place as a consequence of the run, were an important element in bringing down the de la Rúa government at the end of 2001. At the time of writing this second draft, Argentina has devalued and defaulted. Formal negotiations between Argentina and her foreign private creditors have yet to begin and indeed I argue below that a game is continuing. On the one hand, the IMF and world leaders, concerned that new money might simply put off needed reforms and new promises might not be kept, have called for a ‘sustainable solution’ from Buenos Aires. On the other hand, President Duhalde has suggested that a sustainable solution may not be possible without international support. This is not the place to discuss solutions to the Argentine crisis. Suffice to say that the Argentine authorities are caught between the negative political and economic effects of the banking controls, and the fear that lifting these controls without an agreement with the IMF might provoke a ‘run’ on the currency and worsened monetary instability. The exchange rate dived to around 4 pesos to one dollar (from 1 to 1 in January) as the private sector found ways to ‘run’ to dollars despite the controls in place. The exchange rate subsequently recovered but, at the time of writing, is now around 3.7 pesos to the dollar, with banking controls and a more explicit Central Bank intervention policy still in place.

The chapter is organised as follows. In section 2, I review briefly some recent strands of the more theoretical debate regarding the role of the IMF. In section 3, I develop a simple model of the interaction between the IMF a country and the private capital markets. In section 4 I relate the results of this modelling exercise to the current debate regarding reforming the international financial architecture. In section 5 I use these antecedents to then focus on the case of Argentina and the difficult role of the IMF as the country's situation became more fragile. Section 5 concludes.

## **2. The role of the IMF: selected themes in the current academic debate**

A set of interesting recent papers proposes different roles for the IMF in models of sovereign lending. The three potential roles reviewed here are the IMF as ‘auditor’ versus the IMF as ‘enforcer’ versus the IMF as a ‘fund’, a potential provider of money or the promise of money.

Dooley and Verma (2000) focus on the potential role of the IMF as a type of contract enforcer. In their model, in the event of default, the IMF enters with

an exogenous probability and enforces a sharing of future country output between borrowers and lenders. In the absence of the IMF, there is a costly renegotiation process and hence the role of the IMF is to reduce the probability of a large sunk cost that would be implied by costly renegotiation.

It is interesting to note that in this model there is an optimal value of the probability of IMF intervention between zero and one. In other words, it appears to be optimal for the IMF to intervene unpredictably. In a further extension to the model, the authors claim that in a world where contracts are supported by reputation and not “gunboat” diplomacy, then the role of the IMF as the “enforcer” of contracts may be redundant.

A second approach considers the IMF not as an enforcer of contracts but as an auditor. This is the focus of a recent paper by Gay, Hayes and Shin (2000). In this paper, there is a trade-off whereby, as IMF intervention improves information and hence reduces the probability that borrowers are faced with large renegotiation costs, *ex ante* lenders are less willing to lend. This trade-off is referred to by the authors as the, “whistleblower” versus the “fireman” role of the IMF. In their set-up, the IMF is generally bad for lenders as the “fireman” reduces the *ex post* cost of resolution and hence reduces the stock of debt that can be supported in equilibrium - following Dooley 2000 - and this unambiguously reduces lenders’ welfare. However, for borrowers the IMF may imply a net benefit as improving the information available to lenders reduces the inefficiency of the information asymmetry and this can outweigh the costs of the lower level of debt.

Gay, Hayes and Shin (2000) also consider an IMF that acts unpredictably (which they refer to as “case by case”) but in their set-up conclude that this will make lenders better off and may make borrowers worse-off relative to the regime where the IMF follows a specific policy rule. It is in effect an intermediate model between a version with no IMF and the full IMF model. This contrasts with the Dooley and Verma result where an unpredictable IMF as enforcer may actually be the optimal policy. Of course the IMF is doing different things in the two cases so perhaps this difference is not too surprising.

The IMF clearly has other roles too apart from that of “enforcer” or “auditor.” Specifically the IMF also provides money or promises of money. This role can protect borrowers against co-ordination problems between lenders. If the IMF offers stand by arrangements then this may prevent costly self-fulfilling type

runs. This is the approach taken by Gavin and Powell (1999). However, the price for such liquidity protection may be moral hazard thus allowing borrowers or lenders to take greater risks actually making ‘fundamental’ type runs more likely. Gavin and Powell (1999) argue that private sector stand-bys (contingent facilities) might also provide countries with the same type of liquidity protection and that if these are correctly priced (i.e.: assuming that there are no information problems), then these may serve to restrict moral hazard.

In what follows I present a very simple model where the IMF only plays a role of providing money or the promise of money - following previous work by Gavin and Powell (1999). It also turns out, in this very simple approach that the IMF may end up playing unpredictably, which following Gay, Hayes and Shin (2000) may also be thought of as a 'case by case' strategy or its close cousin - the 'Constructive Ambiguity' doctrine of central banks – see also Fischer (2000).

### **3. A Simple Model**

In this section, I describe a very simple model to fix ideas. The model can be thought of as a three player game where the actors are 1) the country, 2) the IMF and 3) private sector lenders. In what follows we consider different temporal structures of the game. Let us suppose for simplicity that we restrict the potential actions of each to a bivariate decision. In particular that the country must decide a Safe or a Risky strategy, the IMF must decide whether to Assist or Not Assist and the private sector must decide whether to Lend or to Run.

#### **3.a A game with the IMF, a Country and Private Investors**

This game with three players, each with two possible actions, has eight potential outcomes. We represent the game in extensive form in Figure 2. However, in what follows we restrict the outcomes in a way that depends on some other features. Let us assume that there is a simultaneous game between the IMF and the country and that then the private sector conditions its decisions on the outcome of that game and in particular, on what the IMF does. This inter-temporal structure can be justified in at least two different ways. First, the private sector is making decisions every second in real time, whereas, IMF and country policy discussions have more of a defined structure and timetable. Second, the private sector is composed of many different



actors and may be thought of as incapable (or less capable) of making any commitment. Hence, its actions must be conditioned on the actions of others. However, as we discuss below, one interpretation of the current debate is precisely to attempt to change the inter-temporal structure of this game. We therefore explore different sequential structures below. It should come as no great surprise that the results are highly sensitive to the particular assumed inter-temporal structure.

Furthermore, we assume that the private sector's actions crucially depend on those of the IMF's. In particular, we assume that the private sector Runs unless the IMF Assists. This may seem a harsh assumption but, it makes little difference if instead we say that there is a greater probability of the private sector running without IMF assistance so long as that greater probability results in expected payoffs that satisfy certain conditions which we outline below. Hence, while this particular assumption is harsh, weaker assumptions along the same lines would similar results and it does reflect reality in a way that the IMF, and the country, must take into account. We discuss this more extensively below and also relate the assumption to the case of Argentina.

At least two more theoretical interpretations for this assumption are available. First, as discussed above the private sector has a severe co-ordination problem and hence may Run unless the IMF 'co-ordinates' in some fashion or by Assisting the IMF directly rules out a 'Run' equilibrium through its promise of liquidity. A second interpretation is that there is some (un-modelled) information problem and the private sector only trusts the country (and the IMF), if the IMF puts down its own money rather than simply indulges in 'cheap talk' without committing resources. The assumption, that the private sector 'Runs', without IMF assistance is how the 'liquidity' school argument is introduced into this version of the model. With this assumption there are then only four relevant outcomes (as in the standard prisoner's dilemma), as the private sector's action is determined by the actions of the IMF.

As there are only four outcomes that depend on the actions of the country and the IMF, we can also represent the model in a two by two matrix as in Figure 3. We label the four potential outcomes: 1. First Best, 2. On Your Own, 3. Moral Hazard and 4. Worst Case. These labels refer to some general notion of world welfare and not the payoffs of particular players. The First Best is a case where the country plays Safe, the IMF Assists and the private sector Lends. The Worst Case is when the country plays Risky, the IMF does Not Assist and the private sector Runs. A third outcome is where the country plays

Safe, the IMF does not Assist and the private sector Runs which we label as 'On Your Own'. It might also be referred to as the case where the discipline of the IMF and the private sector is most fully operating. The final outcome is that where the country plays Risky, the IMF Assists and the private sector Lends. This, we refer to as the Moral Hazard case.

### **Discussion of the payoffs**

The equilibrium of this game naturally depends on the assumed payoffs. As the actions of the private sector are assumed to follow those of the IMF, it is only the payoffs of the IMF and the country that matter. Assume that the base case is the First Best and the payoffs, both for the country and IMF, are zero. We will write the payoffs as a vector with the first element, the payoff to the country and the second, the payoff to the IMF. Hence the payoffs are  $\{\text{Country, IMF}\} = \{0,0\}$  in this case.

In order for there to be a moral hazard problem it must be the case that, given the IMF is Assisting, the country will prefer not to play Safe but would rather play Risky. We assume then, following the 'moral hazard school' that in the Moral Hazard outcome the payoffs are  $\{C, -D\}$  with  $C, D > 0$  where we assume that the country is better off and the IMF is worse off relative to the base case.

In the 'Worst Case', the country plays Risky, the IMF does Not Assist and the private sector Runs. Here we assume the payoffs are  $\{-E, -F\}$  where  $E, F > 0$ . We assume that  $-D < -F$  or in other words, for the IMF, the Moral Hazard outcome is worse than the 'worst case' outcome. One interpretation of recent lobbying of the 'moral hazard' school economists is precisely to ensure that this is the case. We discuss this particular issue further in the next section as we note that recent authors have suggested otherwise - see Eichengreen and Ruhl (2000).. For the country however the Worst Case outcome is the worst of all i.e.:  $-E$  is the lowest payoff the country may receive.

Finally, in the On Your Own outcome the payoffs are  $\{-A, -B\}$  ( $A, B > 0$ ) and we assume that  $-E < -A$ . In other words, for the country, while this outcome is clearly worse than the First Best, if the IMF is not Assisting, On Your Own is preferred to the Worst Case. Hence, if the IMF does Not Assist, it is then better for the country to play Safe and not Risky. This clearly makes sense thinking about lender Moral Hazard or in other words that the risky strategy is that the country is contracting too much debt at too low an interest rate as

lenders believe that there is a high probability of them being ‘bailed out’. We also assume that the payoff to the IMF here is  $-B$  where  $B > 0$ . This implies that if the country is playing Safe, then the IMF would prefer to Assist than to Not Assist.

### Discussion of Potential Equilibria

If the country and the IMF are acting simultaneously, with the payoffs as defined above, it is simple to see that this game has no Nash equilibrium in pure strategies. In particular, start from the First Best. If the IMF is Assisting, the country then prefers to play Risky so the country prefers the Moral Hazard solution to the First Best. But if the country is playing Risky then the IMF prefers to Not Assist and hence prefers the Worst Case to Moral Hazard. However, if the IMF is Not Assisting and the private sector Runs, then the country prefers to play Safe (i.e.: the country prefers On Your Own to the Worst Case) but then if the country is playing Safe, the IMF should Assist and we are back to the First Best. Hence, there is no Nash equilibrium in pure strategies.

However, it is well known, that in such a situation there is, at least one, equilibrium in mixed strategies where the IMF plays randomly between Assist and Not Assist and where the country plays randomly between Safe and Risky. In particular, suppose that the probability that the IMF plays Assist is  $p$  and the probability that the country plays Safe is  $q$ . It follows that, given the payoffs there is a particular pair of probabilities,  $p$  and  $q$ , that make the Country indifferent between playing Safe and playing Risky and that make the IMF indifferent between Assisting and not Assisting respectively. This probability pair then defines the mixed-strategy equilibrium.

To find the probability,  $p$ , that the IMF Assists in this equilibrium, consider the position of the country. To ensure that the country is indifferent between playing Safe and Risky, it must be the case that the expected payoff to the country from playing Safe, calculated using the probabilities of the IMF playing Assist or not, is equal to the expected payoff to the country of playing Safe, again weighted by the probabilities of the IMF Assisting or Not Assisting. In mathematical terms:

$$p0 + (1 - p)(-A) = pC + (1 - p)(-E)$$

It then follows by rearranging this equation that:

$$p = \frac{E - A}{E - A - C}$$

The existence of ‘moral hazard’ is critical in the explanation of why there is no equilibrium in pure strategies and only in mixed strategies. If there were no ‘moral hazard’ then C would not be positive but would be zero or negative (C is the payoff to the Country if it plays Risky given the IMF Assists). If there was no moral hazard present, then the probability p would be unity (or would not be well-defined as it would be greater than one) and, if the other payoffs remained unchanged, then the Best Case would then be a pure-strategy equilibrium.

In similar vein, the probability that the country plays Safe, q, can also be found by considering the position of the IMF. The IMF will be indifferent to Assisting and or not Assisting if its expected payoff from playing Assist is equal to the expected payoff of Not Assisting: i.e.: if:

$$qD + (1 - q)B = qF + (1 - q)E$$

Rearranging this equation we find that:

$$q = \frac{D - F}{D - F - B}$$

It is easy to check from our assumptions regarding payoffs above that  $0 < p < 1$  and  $0 < q < 1$ .

There are various interpretations of this mixed strategy equilibrium. First, the IMF and G7 have consistently stated their preference for a ‘case by case’ approach to countries with international payments’ difficulties and that has indeed been the norm in practice. There is a close analogy here between the ‘case by case’ approach applied to countries and the apparent affinity for ‘Constructive Ambiguity’ of central banks when it comes to helping banks in distress.

There are at least two interpretations of the reasons why ‘case by case’ or ‘Constructive Ambiguity’ may be useful. One is that the world is just too

complex to write down the right set of rules and hence flexibility is required to deal with particular cases as they arise. This might be referred to as the ‘incomplete contracts’ view. However, the other interpretation is that ‘case by case’ or ‘Constructive Ambiguity’ really implies unpredictability. As we show in the game above, if there is ‘moral hazard’, and other conditions are met, then unpredictability may be necessary for there to be an equilibrium. Under this interpretation, to ensure an equilibrium the IMF must never Assist with certainty, and the country will respond by never being absolutely clear that it will play Safe in order for each to be content given the strategy of the other<sup>3</sup>.

A second interpretation of mixed play is that players actually chose a pure strategy but there is some uncertainty about what the other player will do. That is to say, as Binmore (1992) puts it, “each player chooses, *as though* their opponents were playing mixed strategies. Insofar as any mixing occurs it happens within players’ heads”<sup>4</sup>. A third interpretation is that, while the equilibrium is in mixed strategies, players may take time to get there. Players will note changes in opponents’ actions over time, which may of course depend on the changes in each other player’s actions, and attempt to infer if players are then playing in pure or mixed strategies and assess the relevant probabilities. Over time, if the mixed strategy equilibrium is stable, then there will be a convergence to the probabilities in that equilibrium but the outcomes observed will reflect this convergence process. Loosely speaking, players might then be thought of as playing a set of ‘disequilibrium’ pure strategies that, over time, converge to the mixed strategy equilibrium<sup>5</sup>.

I remain agnostic as to the particular interpretation of the mixed strategy equilibrium. However, the important point is that given the payoffs, the mixed strategy equilibrium is the only Nash equilibrium to this game.

It is interesting to note that the probability that the country plays Safe depends on the relationship between (D-F) and B: the payoffs to the IMF. If (D-F) is

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<sup>3</sup> In Gavin and Powell (1999), we developed a slightly more complex model with imperfect information where the IMF prefers a mixed strategy equilibrium to a Nash equilibrium in pure strategies where the IMF always Assists in the case of a systemic problem and never Assists in the case of an individual problem giving a slightly different interpretation of the Constructive Ambiguity doctrine. See Fischer (2001) for a further discussion of the analogy between ‘case by case’ and the ‘constructive ambiguity’ doctrine of central banks and the interpretation that such approaches are in part designed to control ‘moral hazard’.

<sup>4</sup> This is known as ‘purification’ of a mixed strategy Nash equilibrium – see Binmore (1992), p519.

<sup>5</sup> Binmore (1992) illustrates this possibility with an example where players are fully rational but myopic. In his words, “Players always choose a pure strategy that maximises expected payoffs given their beliefs. But their beliefs change as they observe their opponent’s play. In the long run, their beliefs converge on the Nash equilibrium of the game”. See Binmore (1992), pp404-408.

large, relative to B, then the probability that the country will play Safe, in this mixed strategy equilibrium, increases. This means that if the Moral Hazard outcome is very bad for the IMF compared to the Worst Case outcome (this is summarised by the difference, D-F), then the probability that the country plays Safe rises in equilibrium. On the other hand if (D-F) is reduced, then the probability that the country plays Safe diminishes.

The welfare of the country in the mixed strategy equilibrium is equal to  $(1-p)(-A)$  or  $-AC/(E-A+C)$ <sup>6</sup>. This is increasing in E but decreasing in A and C. This implies that, for example, increasing E (i.e.: making  $-E$  more negative, making the Risky strategy combined with non-assistance from the IMF more painful for the country), would actually increase country welfare in the equilibrium – as the IMF would have to Assist more frequently for an equilibrium to be found. This is somewhat analogous to the result that increasing the pain of a country in default might actually make a country better off, ex ante, as it would support greater private lending, although the mechanism for this result here is quite different.

While the equilibrium of this game is in mixed strategies, ex post after the dice are rolled, particular outcomes will be observed. These outcomes may result in a higher or a lower welfare for each player ex post compared to the ex ante welfare of the mixed strategy equilibrium. In particular, if the IMF Assists the welfare of the country is either C or zero depending if the country ends up playing Risky or Safe respectively. These welfare levels are clearly higher than  $(1-p)(-A)$ , the ex ante welfare level of the mixed strategy equilibrium while if the IMF does Not Assist the country's welfare levels are lower (either  $-A$  or worst of all  $-E$ ).

As noted in the introduction, a common argument is that after the Mexican 'bailout', international capital markets were affected by severe moral hazard. Some have even gone as far as to blame the Asian crisis on such moral hazard and hence the very low risk spreads post-Tequila in 1996/97<sup>7</sup>. More recently, there has been a focus on attempting to limit this moral hazard and hence greater pressure to restrict IMF action.

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<sup>6</sup> Note that in the Nash, mixed strategy equilibrium, the country is indifferent to playing Safe or Risky by definition and so the payoff to the country can be calculated as simply the payoff to playing Safe.

<sup>7</sup> Mussa (this volume) also suggests that the IMF was not tough enough on Argentina during the 'good times' of 1996/7 and some might even go as far as to blame the Argentine crisis on 'moral hazard' too. After all, if Argentina's fiscal policy was characterised by a chronic lack of fiscal responsibility, as Mussa suggests, then lender 'moral hazard' must be one candidate explanation for the low risk spreads at that time.

This story can be rationalised easily within the context of the simple model above. After Mexico, it might be hypothesised that the dice were rolled and the ‘moral hazard’ outcome observed. This outcome then consisted of countries adopting a more Risky strategy, the IMF Assisting through large packages and the private sector Lending. Subsequently, one interpretation might be that various lobbying activities by, moral hazard school economists have attempted to increase D-F or in other words that the IMF has a lower relative payoff to the Moral Hazard outcome versus Not Assisting if the country plays Risky. These lobbying activities may then be rationalised as attempts to increase the probability that countries play Safe. From the above it follows that if D-F is raised then this increases  $q$ , the probability that the country plays Safe in the Nash equilibrium.<sup>8</sup>

An additional step to the game might be added where the private sector ex ante (i.e.: before the game analysed above has started) offers a standard debt contract to the country. The ‘fair’ interest rate on this contract (say fixed such that expected returns to the private sector ex ante are zero or the same as some opportunity cost of funds), will reflect the potential outcomes of the mixed strategy equilibrium weighted by their respective probabilities. Given that in the mixed strategy equilibrium there is a positive probability (namely  $p(1-q)$ ) of the Moral Hazard outcome, the ex ante ‘risk spread’ will then reflect to some extent, ‘lender moral hazard’. Ex post, the private sector will win or lose relative to this ‘fair interest rate’ depending on the observed outcome of the roll of the dice and which particular outcome is observed<sup>9</sup>. Private Sector Involvement, in its broad sense, might then be defined as any outcome where the private sector loses according to this measure.

### **3b: Repeating the game: the opportunities for cooperation**

Let us now consider what might happen assuming the above one-shot game is repeated. In the one shot game, the only equilibrium was one in mixed strategies. As discussed above, if the IMF offers Assist the country would prefer to play Risky but if the country plays Risky the IMF would prefer to

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<sup>8</sup> Naturally the actual outcome of the game here is random and is in some sense then less interesting. The story relates to how the probabilities in that equilibrium might change as the payoffs change. It is also important whether the outcomes are random ones from some probability distribution or whether they are changing pure strategy equilibria. Binmore (1992) defines a kibitzer as someone who watches a game but does not play, but by some rule of nature, is always more expert than the actual players themselves. He then goes on to note how kibitzers may interpret different games. A kibitzer, who observes a game where players are playing randomly may of course think that he is observing a pure strategy Nash equilibrium when in fact he is observing just one potential outcome of mixed strategy play (see footnote 5, p397).

<sup>9</sup> I am indebted to Chris Gilbert, David Vines and Leandro Arozamena for pointing this out.

play Safe but in that case the IMF would prefer to Assist. As it was assumed that the country could not commit to play Safe if the IMF offered Assist (moral hazard), then the First Best was not an equilibrium and given the assumed structure of payoffs there was indeed no pure strategy equilibrium available.

However, in a repeated version of this game there may be an opportunity for co-operation developing between the IMF and the country. Note that the best outcome for the IMF is the First Best. Suppose that the IMF offers the First Best but with the threat that if the country deviates (and plays Risky to obtain the Moral Hazard outcome), then the IMF will respond with the Nash (mixed strategy) equilibrium forever. As we had before, the payoff to the country in the Nash equilibrium is equal to  $(1-p)(-A)$  and the country is then clearly worse off than that in the First Best, which is equal to zero. It is possible then, that the First Best can be attained through this approach<sup>10</sup>.

In this example, the country must weigh up the welfare of staying in the First Best forever, which is equal to zero, versus the alternative of deviating and obtaining the payoff,  $C$ , from the Moral Hazard outcome for one period and then the welfare of the mixed strategy equilibrium for the rest of time. The First Best can then be supported if:

$$C \geq \frac{\delta}{1-\delta} (1-p)(-A) \geq 0$$

Where  $\delta$  is the discount factor of the country and hence the second term on the left hand side gives the payoff to playing the Nash equilibrium forever, discounted by one period. Substituting for  $p$  in terms of the payoffs and rearranging, this yields the following condition for the First Best to be supported:

$$\delta \geq 1 - \frac{A}{C+E}$$

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<sup>10</sup> As is well known this is only one potential 'cooperative' outcome of many. The IMF might, for example, use On Your Own forever as the threatened trigger punishment strategy where the IMF does not Assist and the Country prefers to play Safe. On Your Own in this game is the country's security level (or Max-Min) in the sense that it gives the best payoff for the country assuming that the IMF will always choose the worst action for the country given the country's choice. There is no claim to uniqueness here. Another issue is whether the assumed trigger strategies are non-renegotiable. We do not discuss these issues further here and leave the analysis of a proven non-renegotiable punishment strategy for future research – see Fudenberg and Maskin (1986).



By our original assumptions  $A, C, E > 0$  so we know that this gives a threshold discount factor of less than one<sup>11</sup>. The larger is  $C$  (the payoff from deviating and obtaining the Moral Hazard outcome for one period), then the higher is the threshold discount factor or in other words, if  $C$  is large then the country must weight future payoffs more highly for the First Best to be supported. This is because increasing  $C$  increases the reward from deviation. The threshold discount factor also rises if  $E$  is increased. If the country's pain from playing Risky and the IMF not Assisting is greater, then as the welfare in the Nash equilibrium rises, the discount factor now has to be greater to support the First Best.

Suppose that default only occurs when the country plays Risky and the IMF does Not Assist<sup>12</sup>, where the payoff to the country is equal to  $-E$  such that in fact  $-E = yG - (1-y)H$  where  $(1-y)$  is the probability of default ( $0 < y < 1$ ) and  $H$  ( $H > E > A$ ) is the cost of default<sup>13</sup>. Perhaps, somewhat surprisingly then, if default is made less costly, ( $H$  is reduced such that  $-H$  is less negative), then the First Best has more chance of being supported in the sense that the threshold discount factor increases<sup>14</sup>. This simple model then provides some interesting results which we follow-up on below in a discussion on the reform of the international financial architecture.

However, it also raises some difficult questions. Suppose the probability of avoiding default in the case of Risky play and not obtaining IMF assistance,  $y$ , is a stochastic variable with some persistence over time and that even if the IMF and the country are in the First Best the value of this probability and its stochastic process are known. For example, it is likely that  $y$  will be highly

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<sup>11</sup> We note that if  $C+E > A$ , then the threshold discount factor is greater than zero too, although there is no obvious reason why that is the case. If then  $C$  or  $E$  are sufficiently small or  $A$  sufficiently large (subject to the restrictions to obtain the unique Nash mixed strategy equilibrium), any positive discount factor would support the First Best.

<sup>12</sup> In other words if the country plays Safe we assume that the technology is such that the country is protected from insolvency and if the IMF Assists but the country plays Risky (the moral hazard outcome) then we assume that the IMF bails out the country if there are insufficient resources (or unwillingness) to pay private creditors.

<sup>13</sup> This may be motivated by saying that there is a probability  $y$  of a good outcome from the Risky strategy in which case the payoff is  $+G$  and a probability of  $(1-y)$  of a bad outcome, in which case the country defaults, and the cost of default is then represented by  $-H$ . This structure may be motivated either within an 'ability to pay' or a 'willingness to pay' type model of default. In the latter case, given the bad outcome (and the lack of IMF Assistance), it would be in the best interest of the country to default rather than, say, pursue some very costly adjustment.

<sup>14</sup> We have to be careful here as if the cost of default is reduced such that  $-E > -A$ , then the nature of the equilibrium changes and indeed, all else remaining the same, the Worst Case becomes a pure strategy equilibrium. This possibility becomes important in section 4.

correlated to country fundamentals such as growth or the country terms of trade. Substituting in for  $y$  and rearranging the equation for the threshold value of the discount factor, above, this can be re-expressed as a threshold value for  $1-y$ , the probability of default in the case of Risky play and no IMF Assistance. It then turns out that for the First Best to be supported:

$$1-y \geq \frac{G - C - \frac{A}{1-y}}{G - H}$$

As  $H > E > A$ , it follows that  $H - \frac{A}{1-y} \geq C$  and hence this gives a threshold value for  $1-y$  which is less than one. As long as numerator is positive it is also greater than zero (this might be thought of as a limit on how large  $C$  can be in relation to  $G$  and  $A$  to control the incentives to deviate). Now, if the probability of default in the case of Risky/No Assist,  $(1-y)$ , rises to a level exceeding this threshold then the country will deviate to the Risky strategy. The intuition behind this is that as the probability of default in the Risky/No Assist outcome rises, and hence the payoff for the country in that outcome is made worse, the probability that the IMF will Assist in the mixed strategy equilibrium must rise (for there to be an equilibrium which makes the country indifferent between Safe and Risky). This then means that the ex ante welfare of the mixed strategy equilibrium for the country increases and hence the First Best has less chance of being supported. To put it another way, as country fundamentals suffer, the country can expect a greater probability of IMF Assistance in the non-cooperative mixed strategy equilibrium and hence the incentives to cooperate to achieve the cooperative First Best are eroded.

Now consider the case of a country with deteriorating fundamentals sinking deeper towards payments' problems. As the threshold value of  $(1-y)$  is less than one, it is very likely that at some point before default this value will be breached and the country will deviate to the Risky strategy. To put it simply, before a country defaults, it is likely that it will deviate. One characterisation of this result is that it supports the idea that countries will 'gamble for resurrection' before they actually default.

This raises some interesting issues. Consider the position of the IMF. Faced with the possibility of deviation to a risky strategy before default is called, an

interesting question is whether the IMF should not attempt to anticipate this set of events?

The difficult issue is then at what point should the IMF then itself decide to switch to the mixed strategy equilibrium? If  $y$  follows some stochastic process over time related to country fundamentals and the IMF today knows the conditional distribution of  $y$  before each one-shot game is played, should the IMF play with the mixed strategy equilibrium if the expected value of  $(1-y)$  next period, conditional on information at time  $t$ , is above the threshold level? Or perhaps the IMF should take a "Value at Risk" approach with a rule that it should withdraw support if there is a probability greater than  $X\%$ , that  $(1-y)$  will pass the threshold next period and that the country will deviate?.

However, if the country knows the rule by which the IMF will withdraw support based on its prediction of the future value of  $(1-y)$ , then surely the country should anticipate the IMF's actions, and may then wish to deviate one period earlier. We may then find, depending on the starting conditions, that the whole repeated game may unravel such that the First Best was not attainable in the first place. We leave a rigorous analysis of these complex issues to further research but note that the decision of whether and when the Fund should withdraw support to a country entering into payments' difficulties and the effect that that decision and the anticipation of that decision may have on a country's policy framework is both a complex and a very real issue. It is one that comes out very clearly indeed from the discussion of the Argentine case below.

#### **4. The current debate on the reform of international financial architecture**

The simple model outlined above sheds light on some recent discussions regarding the reform of the international architecture. In particular in this section, I focus on arguments related to collective action clauses in bonds, other issues regarding private sector involvement (PSI) and the possibility of establishing a bankruptcy procedure for countries.

Eichengreen and Ruhl (2000) perhaps represents the most forcefully argued paper in favour of collection action clauses in bond contracts and indeed their arguments stem from a simple game, taken from Eichengreen (2000), which is similar to the one-shot game presented above. The essential difference is in the assumptions regarding payoffs and in particular, these authors assume that,

in the end, the IMF prefers the ‘Moral Hazard’ to the ‘Worst Case’ outcome. They defend this position arguing that if the IMF does not Assist, then the ensuing crisis will be so bad for the country and potentially for international capital markets, that it is not credible for the IMF to state that they will not assist given the IMF has the country’s interest and the stability of international financial markets at heart. The equilibrium in their game is then similar to the ‘Moral Hazard’ outcome in our game above. Eichengreen and Ruhl (2000) then argue in favour of reducing the costs of a country declaring default through the addition of ‘collective action clauses’ to bond contracts. These contracts allow for a more orderly re-negotiation such that a default can be resolved more easily and is then presumably less costly for the country. They argue that if this change were made then the IMF’s payoffs would change and hence the Moral Hazard outcome would no longer be the equilibrium. Indeed, in the context of their model they argue the equivalent of the First Best would become the pure strategy equilibrium.

Eichengreen and Ruhl (2000) assume that the addition of ‘collective action clauses’ would imply that the ‘Worst Case’ is not such a bad outcome for the IMF. Their optimistic view is then that if the Worst Case outcome is now preferred to the Moral Hazard one by the IMF, then the country will chose the Safe strategy and hence we get the First Best. However, these are precisely the assumptions we have made above which imply that there is no pure strategy equilibrium.<sup>15</sup> Moreover, the introduction of collective action clauses may change the payoffs such that the country would now prefer the ‘Worst Case’ to ‘On Your Own’ i.e.: it might make  $-E > -A$  ( $E < A$ ) in the game above. If this is the case, then adding collective action clauses may make the Worst Case the only pure strategy equilibrium. To put this another way, if adding collective action clauses makes countries prefer to play Risky rather than Safe (assuming no IMF assistance), because say, default has now become less costly, then neither the IMF nor the private sector will lend. Of course, this simply reflects the standard trade-off versus the cost of ex post default and the willingness of lenders to advance credit ex ante.

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<sup>15</sup> One might interpret the game in Eichengreen and Ruhl (2000) as giving the first move to the country. Then, if the country knows that a Risky Strategy will be answered by Not Assist from the IMF, the country may well prefer to play Safe. However, this sequential play order supposes that the country can commit to its Safe strategy. This seems highly unrealistic. The country clearly has an incentive to claim it will play Safe, get IMF Assistance and then actually play Risky. The sequential structure offered in this Chapter appears more realistic and then, in the one-shot game, the addition of collective action clauses either simply ensures the unique mixed strategy equilibrium as depicted above, or, in an extreme case where the cost of default is reduced sufficiently, then the Worst Case will become a pure strategy equilibrium.

However, the repeated game presented above suggests a new interpretation of the potential value of collective action clauses. Suppose that these clauses do reduce the cost of default,  $H$ , which then reduces  $E$  (i.e. they make  $-E$  less negative or in other words make the Risky strategy for the country, combined with Not Assist from the IMF, less painful). This reduces welfare in the Nash (mixed strategy) equilibrium (as it reduces the probability of IMF Assistance in that equilibrium) and hence increases the amount of ‘punishment’ that the IMF can inflict. It therefore makes it more likely that the First Best will be attained. In other words, collective action clauses may reduce the threshold discount factor required to ensure that the country does not want to deviate.

Roubini (2000), in his comprehensive PSI survey, claims the value of collective action clauses may be overdone but does not contemplate the kind of repeated game as advanced here. Moreover, Roubini suggests that if the IMF can commit to make only limited Assistance then perhaps the country will prefer to play Safe and not Risky ( $C < 0$  in the game above), so the moral hazard problem goes away. And of course the private sector will then Lend, so then a modified "First Best" with limited IMF Assistance then may become a pure strategy equilibrium.

In similar vein, Haldane and Krug (2000) have argued that there should be a strong presumption of limited IMF and official resources. In their view, the problem has been a lack of clarity regarding official policies. They state that while some might think of this lack of clarity as ‘constructive ambiguity’, for them it has resulted in the assembly of very large packages that have then given the wrong signals to the private sector regarding the probability of being bailed out. Moreover, the authors state simply that there is no longer a political will for such large packages going forward.

The Haldane and Krug (2000) view might be considered as a criticism of the mixed strategy equilibrium in the one shot game analysed - one interpretation of which is indeed constructive ambiguity. They argue for a clear statement about how much IMF or official money is available and for clearer rules regarding how such money may be made available to borrowers. The authors also support the idea of a standstill and lending into arrears such that the borrowing country can, for a time, cease to service an ‘unsustainable debt’ but

the IMF can continue to Assist assuming that the country has adopted the right policy framework (playing Safe).

While I have sympathy for attempting to develop greater clarity for official policy, it seems very unlikely, within the context of the one shot game set out above, that a clear (credible) commitment from G7 and the IMF that there is only so much on the table, and a clear message that the private sector would have to have a much larger involvement in crisis resolution, would resolve the strategic problem as analysed. Indeed, it seems more likely that such a policy would tend to provoke a Run from the private sector making the 'punishment' worse than the 'crime'. Further, it would surely aggravate rather than solve the co-ordination problem in the private sector.

A possible defence of the Haldane and Krug (2000) view is to interpret their position as wishing to reduce C (the payoff to the country from the Moral Hazard outcome) within the context of the repeated game. This then reduces the welfare to the country of the Nash (mixed strategy) equilibrium. If this could be achieved, all else being equal the First Best is now more likely to be attained - in the sense that it will be attained for lower values of the country discount factor. However, this assumes that the limited IMF assistance is sufficient to ensure that the private sector does not run even when the IMF is assisting<sup>16</sup>.

While the depiction of the private sector is very stylised in the above game, the strategic coordination problem within the private sector is a very important element of the story. The model, and the mixed strategy equilibrium, illustrate that the IMF is caught between the potential moral hazard if it Assists and a private sector Run if it withdraws then making the 'punishment' worse than the 'crime'. This raises the question as to whether there are other devices to ensure lender coordination that would then make IMF withdrawal less costly for the country possibly altering the game above. Indeed, this is perhaps the strongest argument in favour of private sector contingency lines. Gavin and Powell (2000) suggested that a private sector contingent credit line can be seen exactly as a co-ordinating device within private sector creditors and hence

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<sup>16</sup> One view is that in the face of a liquidity run partial help is pointless in that unless the assistance is complete, the 'Run' from the private sector will not be halted. Either the promise of liquidity provision is complete, through a very large package, or not. Roubini (2000) suggests however that in a game with multiple equilibria, then there may be a role for partial assistance in order to influence equilibrium selection.

might well play such a role<sup>17</sup>. However, in practice such lines are likely to remain relatively small. In the case of Argentina a contingent line stood at less than \$5bn at the time of its use, and though while successfully used, could only be thought of as coordination between a rather small subset of lenders.

Standstills can also be thought of as another type of coordinating device. Contingent credit lines might be thought of as ex ante coordination by lenders (i.e. before any contractual default had been declared), whereas standstills are a type of ex post coordination. As analysed by Gay et al (2001) they may indeed have a useful role to play in terms of crisis resolution. However, as noted by Roubini (2000), the existence of an explicit standstill policy may provoke the 'run' ex ante. The combination of a more comprehensive contingent credit line ex ante and an explicit standstill policy ex post may be a superior alternative.

Indeed, while the introduction of collective action clauses, and a clearer message regarding the (limited) funds available from the IMF and other lenders, may make the First Best more likely to be attained and the use of creditor coordination devices might alleviate to some extent the problems of the private sector 'run', as illustrated in the repeated game model presented in this paper, the repeated game model also highlights a fundamental problem which none of these particular advances in architecture are likely to solve. That problem is that if a country is in the unfortunate position that its fundamentals are deteriorating such that default is becoming more and more likely, then at some point it is likely to have the incentives to deviate to Risky play and hence the IMF will be forced to respond with the mixed strategy. The problem that at some point deviation is likely to occur before default appears to require deeper changes in institutions.

Indeed, this more fundamental problem provides an interesting defence for the rekindled interest in the idea of a bankruptcy procedure for countries. Anne Krueger has recently explicitly proposed such a policy. Suppose that we start in the First Best of the repeated game. Krueger argues that it must be the country that is to decide whether it enters into a bankruptcy procedure or not. A bankruptcy procedure might then be thought of as an additional action

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<sup>17</sup> Some doubt that private institutions would actually satisfy their contractual obligations in times of stress while others have suggested that private banks may hedge their exposures such that liquidity is not actually increased at the time the facility is used. The successful triggering of the Argentine facility in August 2001, in conjunction with an IMF package, when the country had no access to other private credit, may now serve to dilute some of these criticisms. However this limited line could not prevent the subsequent run, default and devaluation driven by more fundamental concerns.

available to the country. The payoff to the country in the bankruptcy procedure would, on the one hand reflect the degree of protection from creditors afforded to the country, while on the other hand the country would no doubt suffer from the stigma that entering such a procedure would elicit and would suffer from additional controls and monitoring that such a procedure might entail. Let us assume that this payoff is then under the control of the international community and could be managed as a function of the probability of default.

As the probability of default increased the bankruptcy procedure could be designed to become relatively more attractive to the country such that, at the point where the probability of default in the Risky/Non-Assist outcome hits its threshold value, choosing the bankruptcy procedure would be slightly more attractive for the country than deviating to the Risky strategy. A bankruptcy procedure designed in that fashion might then keep the country playing Safe until the point at which the procedure was chosen. This line of argument might be used to place a lower and an upper bound on the attractiveness how generous or painful the bankruptcy procedure should be for the country. Note that the payoff to the country from the First Best is zero such that at the point where the country prefers to play Risky, the payoff from deviating is just above zero. At the point, where otherwise the country would deviate, the bankruptcy procedure must also give a payoff of just slightly above zero. It goes without saying though that, until that point, choosing default should never be more attractive than continuing with the First Best i.e.: it should attract a payoff of less than zero<sup>18</sup>.

Now, compared to the case considered above, where a country is almost certain to deviate before default is called it is not obvious that introducing a bankruptcy procedure is worse for the private sector. As suggested by Krueger, the bankruptcy procedure is a type of coordination device. In the absence of such a procedure, the prediction of the model above is that a country will deviate to Risky play before it defaults, the IMF will respond with play consistent with the non-cooperative mixed strategy equilibrium and at some point IMF Assistance will be withdrawn and the private sector will Run. While some lucky private creditors may get out in time, as the Run itself is very harmful to the country, the ex ante **prospects for private investors -**

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<sup>18</sup> It is assumed here that the country cannot deviate to Risky play and then opt for the bankruptcy procedure. This implies that while the country is the one that asks for the procedure to be implemented there must be a decision making body (the IMF or another) that decides whether the procedure is appropriate or not and one of the criteria for that decision must be whether the country has maintained appropriate (Safe) policies.



who in general will not know whether they will get out in time or not – may actually be better with the bankruptcy procedure in place. With a bankruptcy procedure designed according to the ideas here, the country would choose the procedure before it deviates to Risky play and before the withdrawal of IMF Assistance. From the standpoint of the private sector whether this is better or not will depend on a trade-off, between, on the one hand, the probability of getting out in time (in the absence of the procedure during the ‘Run’) and the haircut applied to the wider set of investors caught in the bankruptcy procedure. The latter may turn out to be better for the private sector and hence the argument that the private sector may reduce the amount of credit to a country if such a procedure is introduced loses much of its force.

Note also that, for the IMF, if the country deviates to Risky play this is a highly negative outcome. In the First Best the IMF obtains a payoff of zero whereas if the country deviates this becomes  $\frac{D_1^2}{1} \frac{(1-q)}{1} \frac{1}{1} \frac{1}{1}$  which is clearly negative. This suggests that the international community should also be willing to invest something in the bankruptcy procedure. As discussed above, such a procedure would have to afford the country a payoff slightly higher than zero at the point where the country would otherwise deviate. Given that if the country does deviate then this is a bad outcome for the IMF, there should be some resources that the IMF would be willing to make available to the country to provide the right incentives to choose bankruptcy over deviation in those rare and unfortunate circumstances.

## 5. On the case of Argentina

The recent Argentina crisis backs up well both the assumptions and the predictions of the model discussed above. It also helps provide an interesting, if very painful, illustration of the current deficiencies in the ‘international financial architecture’. This is not the place for a detailed discussion of the history of the Argentine crisis. In Box 1, I present, in highly schematic form, three mutually reinforcing hypotheses regarding the roots of the crisis. Suffice to say in my view the crisis was a result of a fairly complex set of factors including bad luck, a required adjustment of the current account which due to domestic inflexibility provoked recession but which was largely completed through 2000, a required but modest fiscal adjustment that was not achieved, and very bad politics - see Powell (2002). This account contrasts with that of Mussa (this volume) that emphasises the fiscal dimension. My intention here is to focus instead on the game between the IMF, the country and the private

sector as Argentina entered into payments problems as an illustration of the ideas discussed above.

## Three hypotheses regarding the roots of the Argentine Crisis \*\*

### 1. Fiscal and debt sustainability

Argentine debt reached 46% of GDP by the end of 2000, not large by European standards but some argued too much for an emerging country of Argentina's characteristics. Fiscal irresponsibility is the explanation favoured by Michael Mussa in this volume. However risk spreads on Argentine bonds were about 670bpts in mid February 2001 reflecting an average market view, that there was some risk of default but not certainty. Wall Street economists were clearly divided. JP Morgan in September 2000 suggested the debt story was, 'Much to do about not so much'. Lehmann brothers suggested the situation was unsustainable\*.

### 2. Competitiveness, external shocks, the exchange rate, inflexibility and the sustainability of the current account

The debt position was more clearly unsustainable if Argentina could not grow. Recession started in the third quarter 1998 (although there was growth in late 1999). Through 1998, Argentina suffered from a fall in the terms of trade, the rise in the US dollar and the fall-out in emerging market risk spreads after the Russian default (increasing interest payments to external debt holders), and in January 1999, the Brazilian devaluation. With a fixed exchange rate and inflexible formal labour markets, one view was that Argentina could only adjust through recession and deflation. On the other hand, exports grew every year during Convertibility except 1999 after the devaluation of the Real, albeit from a small base. A broader question was whether the current account was sustainable. Foreign direct investment remained buoyant, private sector foreign assets had grown to over \$100bn and returns on those assets could have resulted in substantial inflows if repatriated, and during 2000 an increasing amount of debt, issued abroad in foreign currency, was transferred to domestic pension funds and banks. In Powell (2002) I argue that although the trade balance needed to adjust through 1999, by the end of 2000 this adjustment was near complete. On this view the current account was not so far from sustainability as to explain what was to follow.

### 3. Political Risk

Argentine politics has been extremely messy, and this severely affected economic management from 1998. Ex-President Menem's power waned during his second term leading to a period of very factious politics. The 1999 election campaign saw President Duhalde suggesting that the external debt should be renegotiated and ex Minister Cavallo, an architect of the currency board, apparently suggesting that the peso could float. The "Alianza" government of ex President de la Rúa was perceived as weak in part because of the weak nature of the alliance and the fact that it lacked an outright majority in Congress. Fights within the alliance and political scandal dogged 2000, culminating in the resignation of the Vice-President towards the end of the year. January to April, 2001 saw three different Economy Ministers with Lopez Murphy being ousted after a political storm created by his proposed fiscal adjustment package. Political scandal remained and an acrimonious battle between then Minister Cavallo and Central Bank President, Pedro Pou, led finally to the latter's ousting. This, plus Cavallo's idea to include the Euro in the currency board basket (arguably a political rather than an economic event), sent country risk soaring. The interaction between the electoral system, the structure of political parties and the federal nature of the country made for continuous divisions within and between parties, and between the federal and provincial governments and arguably contributed to a high cost of government, little incentives to improve the quality of public services (lack of accountability), possible corruption and difficulties in maintaining fiscal discipline. - see Calvo and Abal Medina (2001).

\* See "Argentina's Debt Dynamics: Much ado about not so much"; JP Morgan Market Brief 6/9/00 and Lehman Brothers "Global Weekly Economic Monitor", 2/3/01 section entitled, "Argentina: Speaking the Unspeakable".

\*\* Powell (2002) conducts a Vector Autoregression (VAR) econometric analysis and finds support for the view (a) that these hypotheses were mutually reinforcing and (b) that there were multiple equilibria. In particular higher risk spreads fed through to lower bank deposits, higher political risk (measured as a published political risk index constructed monthly) and weaker tax revenues that fed back to higher risk spreads.

In December 2000, Argentina obtained a very significant support package from the IMF and from a set of private sector creditors. This package was known as the "blindaje" and was essentially seen as a stand-by to protect against possible exclusion from capital markets to create confidence. (Blindaje implies armour plating or defensive protection against an attack.) The authorities claimed that the total package stood at close to \$40bn. With the blindaje in place, country risk fell to around 700 basis points over US Treasuries. This level of country risk reflected 'average market opinion', that the risk of default was significant but clearly less than unity. It is a maintained hypothesis of the discussion to follow that (a) default and devaluation were not inevitable at this stage and that (b) this agreement represented a 'cooperative' First Best, in terms of the repeated model, where Argentina had agreed to a set of Safe policies and the IMF was Assisting<sup>19</sup>.

However, even with the blindaje in place, the real economy did not appear to improve and, if anything, deteriorated in the first quarter of 2001. Moreover, there was continued political squabbling within the governing alliance in part regarding the promises made to the IMF. This resulted in the March 2001 resignation of Economy Minister Luis Machinea and then, only a few days later, of his replacement Ricardo López Murphy who was himself replaced by Domingo Cavallo after only a very short term in office. Announced policy oscillated wildly from the orthodox fiscal rectitude of López Murphy to the heterodoxy of Cavallo. Cavallo's policies included the introduction of the euro into the currency basket against which the peso was pegged, subsidies to particular industries and a relaxation of banking regulations. The resultant uncertainty was heightened by the eventual departure of Central Bank President, Pedro Pou after a 'political inquiry' that was widely regarded as undermining the Central Bank's legal independence. Country-risk soared to over 1000 basis points over US Treasuries.

The decision of President de la Rúa not to support the López Murphy fiscal adjustment package may be seen as having marked the political limit to fiscal adjustment through cutting nominal expenditure. In my opinion, a relatively modest fiscal adjustment may well have sufficed to restore confidence at that time.

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<sup>19</sup> An alternative interpretation of the risk spreads is of course that default was already deemed inevitable but that the Fund or others would bail-out international investors. I disagree with this interpretation although opinion was, of course, mixed – see Box 1.

However, in the language of the repeated game outlined above, the country had reached its limit with respect to "Safe" policies. With the \$40bn IMF-sponsored blindaje in place, but the real economy still not responding and default probabilities rising, the incentives were in place to deviate to a more Risky strategy - to attempt to 'get the economy moving'. This Risky strategy consisted of relaxing banking regulations, the introduction of subsidies aimed at particular sectors of the economy, the proposal to include the euro into the currency board peg and the subsequent introduction of a de facto dual exchange rate through a set of subsidies and tariffs based on the dollar/euro exchange rate.

With country risk soaring to over 1000 basis points in April, the IMF also had a decision to make. The choice was between support for Argentina by strongly restating its commitment to the blindaje and essentially saying that the private markets was wrong, or, withdrawal on the basis that it disagreed with the sacking of López Murphy and the subsequent change in course in Argentina's economic policy. In fact the IMF did neither. The perception from Buenos Aires was that the IMF vacillated.

It is clear that, with the country having deviated to Risky play, the IMF was caught precisely as represented in the payoffs to the non-cooperative, one-shot game discussed above. On the one hand, the IMF was surely uneasy continuing to support a country following a set of policies that the Fund did not support - see Mussa (this volume). On the other hand, the Fund was most definitely aware that if it withdrew support then this might very well provoke a private sector run and almost certain default and devaluation. As represented in the one-shot game, there is no pure strategy equilibrium to this game and, with no cooperative solution available, vacillation was indeed the equilibrium response!

The game above also contains a highly stylistic interaction between the decisions of the IMF and the private sector. This suggested interaction is amply backed up by the Argentine case. In Buenos Aires, each new policy announcement was analysed in detail from the standpoint of whether this would, finally, create a rupture with the IMF or whether the IMF would continue to support. The importance of this cannot be overstated as a common view at the time was that if the IMF withdrew, then this would create the conditions for a run on the banks and hence that source of financing for the government would be eliminated.

The announcement of the de facto dual exchange rate regime in July 2001 was, for many, the final straw that could have provoked the withdrawal of the IMF. If the IMF had indeed interpreted the measure as a dual exchange rate then it might have been very difficult to maintain support - see Mussa (this volume). As it turned out, the Argentine authorities argued successfully that it was not a dual exchange rate, as the policy operated through export subsidies and import tariffs but the speculation regarding the withdrawal of the Fund was enough to create the conditions for a run on the banks in July and August.

This bank run was very clearly arrested by the final IMF package signed in August 2001. This package came as a surprise to many. In the spirit of the repeated game above it simply reflected the IMF's mixed strategy play. The sequence of speculation regarding IMF withdrawal, bank run and then IMF Assistance and the bank run being stopped backs up very clearly indeed the stylised assumptions regarding the dependence of private sector decisions on IMF action in the model and the 'coordinating' role of the IMF. Finally the Fund did indeed withdraw support and that withdrawal did indeed help to create the conditions for a final major run on the banks of November 2001. This run sparked the banking controls that helped to bring down the de la Rúa government and subsequent default and devaluation.

It can be argued that a 'game' between the IMF and Argentina, similar to that depicted above, continues today (May 2002). Indeed, at the time of writing the Argentine authorities are actively seeking assistance from the IMF and other multilaterals. Presidents Bush and Aznar and other world leaders have asked Argentina to present a 'sustainable plan' indicating implicitly that (only) if such a plan were forthcoming from Buenos Aires would international assistance become available. President Duhalde's reply was that in his opinion only with international assistance, would a plan from Buenos Aires be sustainable. President Duhalde's remark is no doubt based on the view that the private sector will fail to have confidence and invest unless an agreement with the IMF is in place. However, if international assistance is given up-front, then the IMF most likely calculates that Argentine politicians will have reduced incentives to carry through the required reforms.

In other words, with Assistance comes Moral Hazard but if no Assistance is forthcoming, the Argentine government believes that it is impossible to stop the private sector from running further. The authorities are then caught between the negative effects of the banking sector controls and the fear that lifting them, with no IMF agreement in place, might create a run on the

currency and very significant monetary instability. The continuing lack of a pure-strategy equilibrium is then still evident. Moreover, now that Assistance has been withdrawn and the 'punishment' of the mixed strategy has been dissipated, it appears very difficult indeed to regain the cooperative First Best outcome. Unfortunately, Argentina may have to resolve this crisis on its own, such that it has something to lose to make the removal of IMF support a tangible punishment before the First Best is once again supported.

What might have been different if a bankruptcy procedure for countries had existed? Following the arguments above, for such a procedure to be effective, the country should have preferred that alternative rather than deviating to the Risky strategy in the first half of 2001. If this route had been taken, then the bank runs of July and November, and the build up of public sector debt within the domestic banking system that occurred during 2001, might have been avoided. Arguably, more Argentine debt might have remained with foreigners (who effectively transferred debt to Argentine residents through 2001) and it is possible that a default might have then created more contagion. However, the debt would have been widely held and it is unlikely that this would have been a serious problem. The main point is that domestic institutions would have been stronger at the time of default the new economic direction of the country could have been developed from a much stronger position. As it happened, the weakening of the banking system through 2001, the banking system runs the banking controls, and the asymmetric pesification created large re-distributions and losses which remain to date the source of considerable friction and are preventing a final resolution of the crisis. It does seem that a more managed process would have been highly beneficial in managing the default and securing a more rapid recovery.

## **6. Conclusions**

In this chapter I have focussed on the role of the IMF in countries facing international payment's difficulties. I have suggested that the two main opposing schools of thought on this role; namely the moral hazard school and the liquidity school are both correct and moreover that they are both correct simultaneously. Unfortunately, this implies – and this is the main argument of the chapter - that the role of the Fund is an extremely difficult one, as a one

shot game between the Fund, the country and the private sector appears to have no pure strategy equilibrium. The Fund cannot give unconditional support without generating moral hazard but if it does not give support the coordination problem within the private sector may lead to a 'run' and a liquidity crisis (on top of any fundamental problems). The only Nash equilibrium in a one shot game is with the Fund hedging its bets by unpredictably giving support and the country then, only with some probability, adopting a "Safe" policy.

However, in a repeated game framework, it may be possible for cooperation to develop. In particular the IMF can offer the First Best (where the IMF Assists, the country plays Safe and the private sector Lends), but threaten that if the country deviates to Risky play then the result will be the Nash (mixed strategy) equilibrium thereafter. Under this view, a country should not deviate unless the country's discount factor is too low.

In a discussion linking the results of this simple game to the recent discussions on PSI a number of conclusions emerge. First, there is a view currently that multilateral funds, for bailouts, should be strictly limited. On the one hand, this runs the risk of creating the conditions for a private sector Run. However, the policy might be rationalised in the repeated game version of the game as this may reduce the welfare of the country in the Nash (mixed strategy equilibrium) and hence allows the IMF to inflict greater punishment and hence create a greater chance of the First Best being supported.

It is also argued that in the one shot game, introducing collective action clauses in bond contracts may simply ensure that the only equilibrium is the mixed strategy one or, if default is made much less costly, may even imply that the Worst Case (of no IMF Assistance, Risky country play and the private sector running) becomes a pure strategy equilibrium. However, interestingly collective action clauses may be rationalised in the repeated game framework. Surprisingly perhaps, if we assume that the introduction of such clauses reduces the pain of countries from playing Risky and the IMF not Assisting (the outcome where default is most likely), then this reduces the (ex ante) welfare of the country in the Nash (mixed strategy) equilibrium and hence allows the IMF to impose greater punishment. Hence there is again a greater chance of the First Best being supported.

However, a close analysis of the repeated game shows that as the probability of default rises at some point the country will have the incentive to deviate to



Risky play. This implies that countries will generally deviate before they default. This problem will not, it seems, be solved by attempting to make international assistance more rule bound or by introducing collective action clauses.

However, the introduction of a bankruptcy procedure as a new potential action for the country, that is slightly preferred by the country than deviation to the Risky strategy, just at the point where otherwise the country would deviate, might provide the best potential solution to this problem. The bankruptcy procedure should not, of course, otherwise be more attractive for the country than the First Best. This approach may yield some bounds to the attractiveness or pain that such a bankruptcy procedure should entail for an unfortunate country in such a desperate position.

A review of the role of the IMF in Argentina serves to illustrate many of these issues. While, the chapter remains agnostic with respect to the causes of the current crisis, there was clearly a failure to find an orderly solution to Argentina's external debt problem. While this has not appeared to create significant international financial contagion, it has led to a very severe crisis in Argentina and led to a set of questions regarding the role of the IMF.

The interpretation offered here is that at the start of 2001, default was not inevitable. Indeed, let us assume that Argentina was trying to implement Safe policies at the time and the Fund was assisting consistent with the First Best. However, having secured IMF Assistance at the end of 2000, Argentina adopted a set of more Risky policies to the displeasure of the Fund - largely in an attempt to get the economy moving. Around May 2001, country risk had risen to 1000 basis points and the IMF had a decision to make: support the country strongly implicitly saying that the markets were wrong or withdraw. The perception from Buenos Aires was that the Fund vacillated. The IMF was caught between continuing support for a country adopting a set of policies it became increasingly uncomfortable with (moral hazard) and the knowledge that if it withdrew support then it would provoke a Run from the private sector that would most certainly herald the default that Argentina was trying to avoid. This is precisely the structure of payoffs in the (one shot) model presented and the equilibrium play is then in mixed strategies – vacillation. The Fund finally did withdraw its support, and that most certainly was an important factor in triggering the run from the banking sector and from Argentine bonds pushing country risk from levels of around 1400 basis points to over 3000 in November 2001.

While the Argentine crisis was most certainly home bred deriving from a mixture of bad luck (negative shocks), required adjustment of the current account and the fiscal accounts and bad politics, the crisis also serves to show the dilemma facing the IMF in these situations. Criticisms of the particular policies of the various decision-makers in the IMF at the time appear to miss the point. More importantly, there is a need to analyse more carefully the nature of the underlying game. As discussed extensively above, the interaction of moral hazard plus the severe private sector coordination problem makes the role of the IMF an extremely delicate one.

Unfortunately, the one shot game appears to be one with no pure strategy equilibrium and a cooperative solution to the repeated game is likely to break down as default approaches - at least given the current institutional arrangements and standard financial contracts. Some creative thinking is required to give countries in such unfortunate situations an alternative that does not constitute a 'bail out' for private sector creditors, that protects countries from the excesses of liquidity type 'runs' and that gives, as far as possible, incentives for countries to maintain safer policies that will ensure a more rapid recovery after default.

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