

Moral hazard:

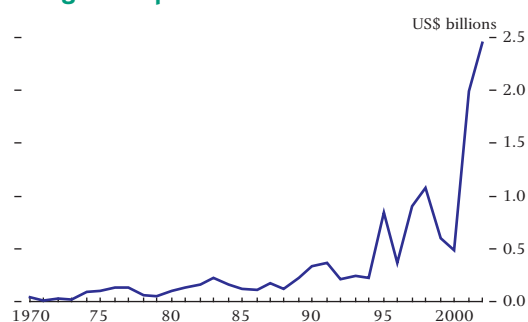
how does IMF lending affect debtor and creditor incentives?

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When the IMF lends to countries in crisis does this distort materially the risk-taking incentives of debtors and creditors – so-called ‘moral hazard’? The existing literature is undecided. In this article, we take a critical look at the existing evidence and present some new evidence of our own. Taken together, it suggests that debtor and creditor moral hazard has been, and remains, a concern.

SINCE THE MID-1990s, financial crises have become more frequent in emerging market economies. In response, the International Monetary Fund (IMF), and other international financial institutions, have often contributed financing to help cushion the side-effects. These financial cushions have been large. Indeed, they have often been substantially larger than at any time in the IMF’s history. As Chart 1 illustrates, the average annual purchase by member countries drawing on the IMF’s General Resources Account (GRA) has risen from around US\$150 million during the 1980s to over US\$2 billion entering the 21st century¹.

Chart 1:
Average GRA purchases^(a)



Sources: Gai and Taylor (2003) and IMF.

(a) Average annual purchase from GRA (excluding reserve tranche purchases) of those IMF member countries making a purchase in given year.

These developments raise some difficult public policy questions. In particular, is this rise in official sector financing a natural response to an increased incidence of financial crisis from the 1990s onwards?

Or might it actually have sowed the seeds of future crises by blunting the incentives of debtors and creditors to undertake effective credit risk-management? And what analysis can be brought to bear to address these questions?

Although the analogy is not exact, IMF facilities can usefully be considered as a kind of insurance policy. Short-term liquidity support from the IMF offers some insurance against the short-term liquidity problems facing countries. Liquidity crises represent a *real hazard* that such insurance can help mitigate. In this role, IMF insurance is clearly welfare-enhancing.

As with any insurance policy, however, the benefit comes at a cost. Mitigating the real hazard of crisis might at the same time aggravate the *moral hazard* of distorted incentives. Risk-mitigants may lead the insured parties to become less attentive to these risks: in an international context, this might lead debtors to undertake riskier and/or larger-scale borrowing and creditors to undertake riskier and/or larger-scale lending.

All insurance policies, IMF or otherwise, entail some degree of moral hazard. That is in their nature. An optimal insurance contract will seek, however, to balance these moral hazard costs against the real hazard benefits that insurance confers. Assessing the appropriate scale of IMF lending involves the same trade-off, both in individual country cases and in aggregate. But to strike that balance we need

¹: On the basis of data since 1970, IMF loans are currently at their highest ever average level in relation to gross domestic product (GDP) (Chart 3).

quantitative evidence on the importance of these two types of hazard.

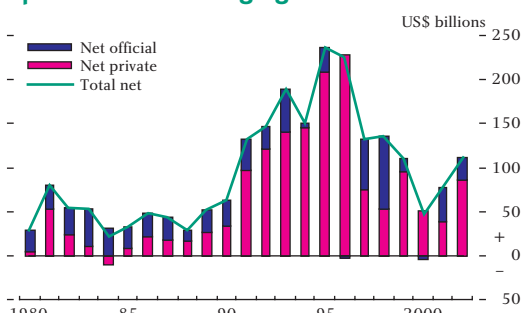
Below, we consider some of the existing empirical evidence on the moral hazard induced by IMF financing and critically evaluate the conclusions which have been reached. We then summarise some new evidence which aims to identify more precisely moral hazard affecting debtor countries and private creditors. The empirical evidence is only illustrative; it is doubtful whether empirical evidence in this area could ever be definitive. But taken together it paints a consistent picture: large-scale IMF lending may lead to a significant distortion of incentives.

What the papers say

Emerging market capital flows

It is striking – indeed, surprising – that there have been relatively few formal empirical studies of whether large-scale IMF loans have led to a significant distortion of (debtor and creditor) incentives. There has, of course, been no shortage of informal studies and punditry. For example, a number of commentators have pointed to the decline in capital flows to emerging markets, relative to say the mid-1990s, as evidence against pervasive moral hazard (Chart 2). Low capital flows are not consistent with excessive risk-taking, so this argument goes.

Chart 2:
Capital flows to emerging markets



Source: IMF World Economic Outlook.

This approach is, however, asking the wrong question. The issue is not capital flows now versus those in the past. That difference depends on a wide range of factors – for example, changing risk-aversion among creditors and macro-fundamentals among debtors, as well as IMF lending policies. In principle, a more useful comparison is between current capital flows and their counterfactual level in the absence of the

IMF. But the latter is unobservable, so this approach is impossible to apply in practice.

More generally, it is a matter of debate just how ‘depressed’ current levels of capital flows to emerging markets really are. True, they are well below their high-water mark in 1996, with net private flows less than half that level. But with hindsight, the mid-1990s were probably an overshoot. Recent flows may have seen a return to normality. Moreover, the composition of capital flows over recent years – much more equity and less debt – may also be more in line with a sustainable position, given that some emerging markets had by the late 1990s encumbered themselves with excessively high debt-equity ratios.

Assessing financial redistributions

It is useful to divide formal empirical studies of moral hazard into two broad strands, the first looking at the effects of IMF intervention on financial redistributions among the parties to crisis, the second at the effects of such intervention on borrowing costs for debtors.

IMF financing provided to recent crisis countries has unquestionably been large, both in money amounts and in relation to GDP. As Table 1 illustrates, funds committed under large-scale IMF programmes since the mid-1990s have averaged around 6% of crisis countries’ GDP and have in some cases reached over 10% of GDP.

Table 1:
Selected IMF arrangements

| | Programme ^(a) | Funds available ^(b) : as per cent of quota | as per cent of GDP ^(c) |
|----------------|-----------------------------|---|--------------------------------------|
| Brazil 2002 | SBA with SRF | 752 | 6.9 |
| Turkey 2002 | SBA | 1,330 | 9.5 |
| Brazil 2001 | SBA with SRF | 400 | 3.0 |
| Argentina 2000 | SBA with SRF ^(d) | 800 | 7.8 |
| Turkey 1999 | SBA with SRF ^(e) | 1,560 | 10.5 |
| Brazil 1998 | SBA with SRF | 600 | 2.3 |
| Korea 1997 | SBA with SRF | 1,938 | 4.4 |
| Indonesia 1997 | SBA | 557 | 5.2 |
| Thailand 1997 | SBA | 505 | 2.6 |
| Mexico 1995 | SBA | 688 | 6.3 |

Sources: Gai and Taylor (2003), IMF and IMF World Economic Outlook.

(a) SBA – Stand-By Arrangements; SRF – Supplemental Reserve Facility (introduced from Dec. 1997).

(b) Funds available include augmentations to initial amount announced.

(c) Relative to GDP in year of initial programme announcement.

(d) SRF approved Jan. 2001.

(e) SRF approved Dec. 2000.

But there is an important respect in which the analogy between IMF loans and insurance contracts breaks down. Insurance contracts involve a permanent transfer of funds from the insurer to the insuree on realisation of the risk. By contrast, IMF loans involve only a temporary transfer. They are loans, not gifts. Certainly, the headline IMF loan amounts in Table 1 are likely to give a misleading impression of the size of any net long-term transfers.

The IMF can of course bring about a net financial redistribution through the cost (rather than the quantum) of its loans. As many IMF loans are made at an essentially risk-free rate of interest – based on the rate on Special Drawing Rights (SDRs) – this risk might, at first blush, appear significant. In practice, however, there are two mitigating factors.

First, IMF loans have in practice ranked ahead of both private sector and bilateral official loans in terms of seniority. Second, partly as a result, arrears to the IMF have historically been very rare². If IMF loans are essentially risk-free, then charging a risk-free rate would be appropriate. The subsidy component of IMF loans would be trifling and the resulting distortion to incentives associated with IMF lending correspondingly limited³.

This point is underscored if we set these (small or zero) average transfers to debtors and creditors from the IMF alongside the *negative* costs each faces as a result of crisis. For debtors, there are widely varying estimates of the costs of recent crises. But they all share the common characteristic that they are large. In terms of output forgone, these costs have ranged anywhere from 5% to over 25% of pre-crisis GDP⁴. For creditors, some estimates would put the value loss on their emerging market portfolio associated with recent crises as high as US\$240 billion⁵.

In the light of this analysis, *net* transfers to debtors and creditors resulting from recent crises appear likely to have been strongly negative. So if risk-taking behaviour by debtors and creditors is based on these

net transfers, neither party's incentives to take crisis risks are likely to have been much affected by recent IMF interventions, whether large or small.

Assessing financing costs

A second approach has aimed to detect moral hazard indirectly by examining the borrowing costs facing debtor countries. The theory here is that IMF loans help protect both debtors and creditors from the risk choices they face; they mitigate the downside risks of default. So IMF intervention should result in a fall in the equilibrium cost of borrowing between debtors and creditors. That, in turn, may provide incentives for lending and borrowing beyond prudent levels. In other words, observed borrowing costs may serve as a diagnostic on (excessive) risk-taking incentives.

A number of studies have looked at this phenomenon around the time of IMF intervention events, when 'news' is revealed to the markets about the IMF's future lending intentions. Taken together, these studies suggest there is some evidence of (dwindling) moral hazard towards the end of the 1990s, but that this may have largely disappeared moving into the 21st century. For example, Zhang (1999) examines borrowing spreads either side of the Mexican IMF package in 1995, but fails to detect any significant effect. Dell'Ariccia, Schnabel and Zettelmeyer (2002) and McBrady and Seasholes (2000) consider two 'reverse' moral hazard events in the late 1990s: the first, the Russian default on domestic debt in 1998; the second, the decision by Pakistan to restructure its international bonds in 1999. There is evidence from these studies of spreads having risen in response and the distribution of spreads having widened. Both are consistent with some moral hazard having been squeezed from the system by these events. Finally, Kamin (2002) compares spreads over recent years with those prior to the Mexican crisis (the 'no moral hazard' counterfactual) and finds few differences between the two periods. This is taken as evidence against moral hazard having been present over recent years⁶.

2: Jeanne and Zettelmeyer (2001a).

3: See Mussa (2002), Jeanne and Zettelmeyer (2001b).

4: See, for example, Hoggarth, Reis and Saporta (2001).

5: From Cline (2002).

6: All of these studies are careful to control for the effect of macroeconomic fundamentals on borrowing costs when assessing the impact of IMF loans. The study by Lane and Phillips (2000) looks at a wider range of IMF events (22 of them between 1994 and 1999), but does not control for movements in fundamentals given the short window considered.

Box 1: Property insurance

A new insurance fund is introduced for helping deal with theft – a real hazard. The new policy fines all captured thieves an amount equal to the average amount stolen in any theft, in addition to returning the stolen goods. The proceeds of these fines are pooled in the insurance fund and are used to compensate the victims of theft. Assume also, for simplicity, that the probability of the average thief being caught is one half. Now, this new policy is, *ex ante*, revenue-neutral. The proceeds of the fines will be sufficient exactly to compensate the victims of theft. On average, there is no net transfer from thief to victim.

But the incentives such a policy creates are less than benign. Thieves who are good at their job (who have a lower than average probability of being caught and/or who steal an above-average amount) will find that the

marginal benefits of theft outweigh the marginal costs. The opposite is true of below-average quality thieves. The risk-taking incentives of the high-quality thieves will be sharpened; those of the low-quality blunted. The upshot will be a rise in theft. Repeat offenders will come to dominate the market. With the passage of time, the new policy will no longer be revenue-neutral.

A similar set of incentives also affect the victims of crime. Those with an above-average probability of being a victim – they have failed to install a security alarm system – will take even fewer precautions; there are no marginal benefits from doing so, irrespective of the amount at risk. Those with good alarm systems will not bother having them maintained for the same reason. In time, the average safety of houses will fall and the probability of a successful theft will rise.

All of these studies face a basic identification problem. A fall in borrowing costs is consistent with IMF loans inducing moral hazard. It is also consistent, however, with IMF loans mitigating the real hazard of crisis. The former is welfare-depleting, the latter welfare-enhancing. So even concrete evidence of a lowering of spreads around IMF intervention events needs to be interpreted cautiously as signifying a moral hazard problem; it may as likely signal a real hazard solution.

Taken together, this evidence paints a rather benign picture. It suggests that moral hazard may have been a temporary problem of the past, but is not a particular feature of the present. There are several good reasons for questioning that consensus.

Questioning the consensus

Average transfers and marginal incentives

Moral hazard is about incentives to take risk. These incentives hinge on a comparison of the marginal benefits of risk-taking and its marginal costs. The key word here is *marginal*. Average costs and benefits may have a bearing on risk-taking decisions, but they are not the key arbiter. For example, the introduction of a policy that offers zero net benefits on average will not necessarily leave incentives unaffected. A revenue-neutral tax measure is not necessarily incentive-neutral. It may tilt the marginal

incentives of some agents in ways that affect aggregate behaviour in the economy. Box 1 provides a stylised example.

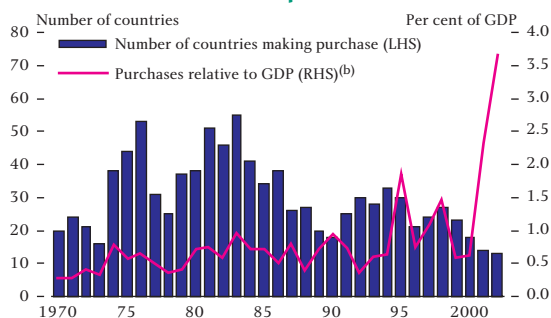
Ex ante, IMF loans may well have left the average creditor and debtor no better off. But they will potentially have affected the marginal incentives of certain kinds of creditors and debtors, in ways that are potentially damaging to the international monetary system.

On the creditor side, the investors who are likely to extract the largest marginal benefits from IMF loans are those that are fastest on their feet – short-term creditors who can take the IMF money and run. It is precisely this set of investors who are most likely to prompt liquidity crises in the first place. On the debtor side, the borrowers who are likely to extract the largest marginal benefits are those whose macroeconomic policies make them most susceptible to crisis. So we would see evidence of repeated victims of crisis.

How would we detect if such incentive effects were building up? The evolving composition of the IMF's loan book potentially offers some clues. Two stylised facts are striking here. First, the degree of concentration in the IMF's loan book has reached levels last seen in the 1970s. The top five borrowers

account for 70% of credit outstanding; and the top three borrowers – Argentina, Brazil and Turkey – account for around 60%. More generally, it is striking that at the same time as the average size of IMF loans has gone up, the actual number of countries borrowing from the IMF has shrunk (Chart 3). Certain types of (large and rising) borrower are coming to dominate the IMF lending pool.

Chart 3:
Number and size of GRA purchases^(a)



Sources: Gai and Taylor (2003), IMF and MF World Economic Outlook.

(a) Purchase from GRA (excluding reserve tranche purchases). Sample is those member countries for which purchase and GDP data available.

(b) Sum of purchases of IMF member countries making a purchase in given year relative to their total GDP.

Second, there is evidence of both prolonged and repeated use of IMF resources by these borrowers. A recent study by the IMF's Independent Evaluation Office (IMF IEO (2002)) is illuminating here. It takes one definition of prolonged users to be countries which have been under IMF-supported programmes for seven or more years in a ten-year period. On this definition, prolonged use has increased sharply since the 1970s in terms of numbers of countries, their share of IMF membership and their share of IMF exposures. In 2001, prolonged users accounted for around half of the IMF's outstanding obligations. Moreover, there is evidence of persistence in prolonged use. Each of the IMF's three largest creditors are repeat users of funds. Clearly, if these patterns were to be extrapolated into the future, they suggest a problem. Evergreening of official loans is tantamount to a gift. Small transfers from the IMF in the past may give way to larger transfers in the future.

These stylised facts suggest a rising and increasingly concentrated set of credit risks on the IMF's books, related to a persistent core of crisis-prone countries.

They are not conclusive proof of moral hazard. They do suggest, however, that zero net transfers from the official sector in the past may not be a necessary (much less a sufficient) condition for the absence of moral hazard; and that the IMF's loan book itself may already bear some of the scars of those distorted incentives.

Indirect moral hazard

Moral hazard need not manifest itself as a direct and permanent transfer of funds from the IMF to debtors or creditors. Even if the transfer is temporary, it can distort risk-taking behaviour. This could be the case, for example, if the IMF supports bad policies. There is an *indirect* moral hazard⁷. The way in which such indirect moral hazard ultimately manifests itself is as a financial redistribution from domestic taxpayers (rather than the official sector) to private creditors. When bad policies are supported, it is domestic taxpayers that at the end of the day foot the bill.

Bad policies can take a variety of forms. At the relatively benign end of the spectrum, some countries have extended a blanket official deposit guarantee to their banking systems, with the support of the IMF. This action may have adverse side-effects in both the short and medium term. In the short term, if deposits are withdrawn, there will be a direct net transfer of funds from domestic taxpayers to private creditors. Over the medium term, blanket deposit insurance could be expected to dampen depositor incentives to monitor risks.

A second, less benign, form of indirect moral hazard arises if IMF loans facilitate policies of 'gambling for resurrection'. The electoral life-cycle of a government is considerably shorter than the economic life-cycle of its citizens. So faced with a default which could precipitate its demise, a government may be tempted to pursue high-risk policy strategies. If these work, the government reaps the rewards. But in the likelier event that they fail, its citizens bear the costs of an even-deeper crisis. So the short-term incentives of an incumbent government may differ from the medium-term incentives of its citizens. To the extent that the IMF supports governments pursuing high-risk strategies, they help effect a transfer from domestic taxpayers to private creditors which is damaging to welfare. In other words, there is an indirect moral hazard.

7: Jeanne and Zettelmeyer (2001b) and Mussa (2002).

A third manifestation of indirect moral hazard occurs when official sector loans are extended for geopolitical rather than economic reasons. In these cases, there may be fewer (or no) safeguards against misuse. Indeed, in extreme situations, geopolitical loans may become geopolitical gifts from the official sector, at which point geopolitical lending may lead to a direct moral hazard, rather than an indirect one. Barro and Lee (2002) find that IMF lending has in the past been sensitive to a country's political and economic proximity to some of its major shareholding countries. Mussa (2002) believes geopolitical moral hazard to have been important in a few high-profile recent IMF cases.

Tackling the identification problem

These observations cast some doubt on the conclusions to be drawn from the moral hazard literature. Historically small transfers from international taxpayers to debtor countries or their creditors may give a misleadingly reassuring impression of the distortionary effects of IMF intervention. Moreover, they also fail to reflect indirect moral hazard, since that is about transfers from domestic taxpayers, not international taxpayers, to private creditors.

So is it possible to devise empirical tests that address these identification difficulties and provide a clearer quantitative picture of moral hazard? Below we consider two separate pieces of evidence that may help. All studies of moral hazard face some intrinsic trade-offs when it comes to identification. There are three such basic identification issues.

First, do you measure risk-taking behaviour directly by looking at observed actions of debtors and creditors? Or do you infer such behaviour indirectly, for example by looking at movements in asset prices? Most of the existing literature has pursued the second course. The pieces of evidence presented below consider both approaches.

Second, are we able to disentangle empirically the effects of IMF policies on real hazard (crisis) from their effects on moral hazard (incentives)? Some, but not all, of the existing studies of moral hazard have attempted to do so, by conditioning responses on the behaviour of fundamentals. Both of the pieces of evidence we consider here attempt to weigh carefully

the potentially beneficial effects of IMF loans in mitigating real hazard.

Third, are the IMF interventions we consider truly exogenous, in the sense that they signal a clear shift in the official sector's intention to supply funds, rather than being a response to the increased incidence of crisis? Most of the existing literature has focused on particular IMF programme events to get round this problem. Below, the first study also uses this methodology, while the second considers more systematic shifts in the lending policies and practices of the IMF, which created additional international liquidity.

Our approach is to look first at the effect of IMF loans on the marginal incentives of *creditors*. This is done by considering the effect of IMF interventions on private creditors' net worth. Importantly, both the direct and the indirect moral hazard channels envisage net transfers to private creditors (albeit from different sources), and so a boost to their net worth.

Second, we look at the effect of IMF loans on the marginal incentives of *debtors*. This is done by considering the probability of different types of debtor entering an IMF programme and how this has been affected by recent international policy adaptations. Because we are examining the increased risk of future crisis resulting from the debtor pursuing sub-optimal policies, this evidence ought also to capture both moral hazard channels.

Some new evidence on creditor moral hazard

To assess creditor moral hazard, we consider the effect of IMF loans on the market capitalisation of banks that are creditors of the debtor country that is the subject of IMF intervention⁸. This is clearly an indirect test of the moral hazard hypothesis as a change in the market valuation of creditor banks is not, by itself, proof of a change in future risk-taking behaviour by these banks. Such a valuation response will, however, capture the change in price incentives for creditors to engage in future risky lending to countries that are expected to be the subject of IMF intervention. If the value of a bank rises by lending to a certain set of countries, there are likely to be incentives to undertake further such lending in the future.

8: The methodological details of the test are discussed in much greater detail in Haldane and Scheibe (2003).

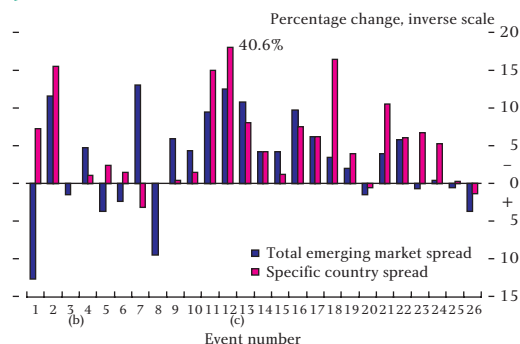
The creditors we focus on are seven UK banks with significant exposures to emerging markets⁹. For these banks, we have (confidential) Bank of England data on their individual loan exposures to emerging markets. Unfortunately, we do not have similar institution-specific balance sheet data for non-UK banks, which would allow us to test for similar effects across a wider cross-section of creditor banks.

We consider 26 IMF intervention events, beginning with the IMF loan package for Mexico in January 1995 and ending with the IMF programme for Brazil in August 2002¹⁰. This gives us a richer array of events than earlier studies, encompassing all of the large-scale systemic crises of the past few years. The analysis, then, uses information looking across a time series of IMF events, and across a cross-section of creditor banks, to examine the valuation responses of these creditor banks to IMF interventions.

Chart 4 plots the (cumulative) response of the borrowing spreads of the individual debtor country which is the subject of the IMF loan, and of emerging markets generally, to each of the 26 IMF loan events¹¹. The behaviour of borrowing spreads offers useful framing for the subsequent analysis. As Chart 4 shows, many (but not all) of the IMF events were associated with some lowering of borrowing spreads. On average, across the events, there was a 4.6% fall in borrowing costs for the intervened country and a 2.6% fall in borrowing costs for emerging markets generally¹².

To try to pinpoint the creditor dimension, we look at the market valuation responses for creditor banks. Are these positive? Are they large? Are they bigger for banks with large balance sheet exposures to the intervened country or to emerging markets generally? And are these responses still evident once we control for the positive effect of IMF loans in mitigating the real hazard of crisis?

Chart 4:
Changes in Emerging Market Bond Index (EMBI) spreads around IMF events^(a)



Sources: JP Morgan Chase & Co. and Haldane and Scheibe (2003).

(a) EMBI Global spread used where EMBI spread not available.

(b) Specific country spread not available.

(c) Event number 12 is the Russian 'non-intervention' event on 17 Aug. 1998, therefore these bars are reversed in value ie spreads increased by 40.6%.

Chart 5 plots the cumulative market valuation response of UK banks across the IMF intervention events¹³. For each event, we identify the mean (averaging across UK banks) and the high-low range for UK banks. In calculating these responses we abstract from general movements in the UK equity market, so giving a measure of 'excess' or abnormal returns to each individual bank¹⁴. For most (but not all) events, responses from UK banks are positive; the mean is around 0.45%. This may sound small. But it needs to be placed in the context of UK banks' net worth. At end-2001, the market capitalisation of UK banks was around US\$370 billion. So even a 1/2% excess return represents a jump in the market value of UK banks of perhaps US\$2 billion.

There is quite considerable variation in these responses, both across events and across banks. Table 2 lists the 'top five' events by average size of the valuation response. These events share a number of common features. First, they all involve average responses in excess of 2%. Translated into dollar terms, this represents a large increase in banks' net worth. Second, all of them (perhaps not surprisingly) involved large headline IMF packages (also shown in

9: These are HSBC, Standard Chartered, Barclays, Lloyds TSB, National Westminster, the Royal Bank of Scotland (which acquired National Westminster in 2000) and Abbey National.

10: These are listed in the Annex.

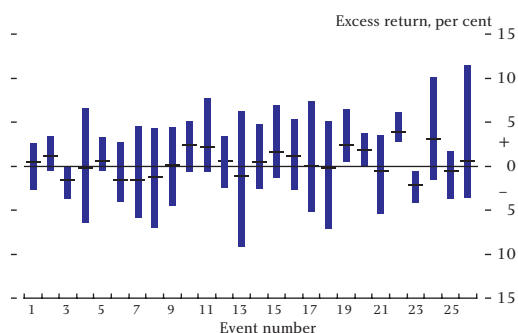
11: We consider a window of two days either side of the IMF intervention date.

12: These figures exclude the Russian 'non-intervention' event number 12 (see Annex for details).

13: Again, using a five-day window to measure responses.

14: This is done by estimating market betas for each bank. The valuation response window is again five days, centred on the IMF event. In Haldane and Scheibe (2003), we also consider unconditional returns.

Chart 5:
UK bank excess returns for selected IMF events



Sources: Datastream and Haldane and Scheibe (2003).

Table 2). Third, with the exception of the Korea package, all of them were augmentations of existing IMF packages, rather than entirely new loans. This is consistent with the ‘repeated victims’ hypothesis. Fourth, a number of them are associated with recent IMF programmes – for example, in Argentina, Brazil and Turkey. This is inconsistent with the notion that moral hazard may have been a problem in the past but has not been a problem of late. If anything, the results indicate that moral hazard may have been rising recently.

Table 2:
‘Top Five’ valuation responses for UK banks

| Rank | IMF intervention ^(a) | Mean excess return | Headline IMF package (US\$ billions) ^(b) | Event number |
|------|---------------------------------|--------------------|---|--------------|
| 1 | Brazil, Aug. 2001 | 3.84% | 15.0 | 22 |
| 2 | Turkey, Nov. 2001 | 3.01% | 16.0 ^(c) | 24 |
| 3 | Korea, Dec. 1997 | 2.41% | 21.0 | 10 |
| 4 | Argentina, Dec. 2000 | 2.32% | 13.7 | 19 |
| 5 | Russia, Jul. 1998 | 2.21% | 12.5 | 11 |

Sources: IMF and Haldane and Scheibe (2003).

(a) See Annex for details.

(b) Total IMF financing package (including augmentations).

(c) Figure for related IMF financing package announced Feb. 2002 (Event 25) as no figure announced at Nov. 2001.

One implication of the creditor moral hazard hypothesis is that the creditors which stand to benefit most from an IMF intervention are those with the largest exposures either to the intervened country or to other emerging markets that might be the subject of future intervention. Using bank-specific data on loan exposures allows us to assess that hypothesis.

Formal regression analysis confirmed that UK banks’ valuation responses to an IMF loan were largest for those banks with the largest emerging market portfolio overall¹⁵. There is little if any evidence, however, of a larger valuation response from banks with large direct exposures to the country immediately involved. Why is this? One explanation may lie in the availability of information. Market participants do not have the data on bank-by-bank loan exposures to emerging markets. So their reaction to IMF interventions may be to reward banks based on their overall emerging market portfolio.

A different, though related, explanation is that IMF loans serve as a more general signal of shifts in IMF lending practices. Anticipating future outlays to countries facing crisis, the valuations of creditor banks with large emerging market books will be boosted. It is this market signal that might then tempt these banks to place further risky bets with emerging markets. In short, a classic creditor moral hazard would arise. The observed empirical response of the share prices of UK banks with large emerging market books is fully consistent with that moral hazard hypothesis.

An alternative hypothesis, also consistent with the evidence, is that IMF loans are mitigating the real hazard of crisis for emerging market countries, which is welfare-enhancing both for the bank and for the country. To attempt to control for this effect, we included within our formal regression analysis an instrument proxying the fall in real hazard associated with IMF lending – specifically, the movement in yield spreads. We know from Chart 4 that in many cases yield spreads have fallen around IMF events, consistent with a decline in real hazard.

In formal regression analysis, yield spreads do indeed help explain the positive market valuation response from UK banks following IMF events. Interestingly, however, even allowing for this effect does not remove the important role of banks’ emerging market loan books as an explanatory factor¹⁶. In other words, even controlling for a fall in real hazard resulting from IMF programmes, creditor banks have still exhibited excess returns, which are bigger the larger their emerging market portfolio. This empirical stylised fact is consistent with a degree of creditor moral hazard.

15: The technical details and regression results are given in Haldane and Scheibe (2003).

16: See Tables 4 and 5 in Haldane and Scheibe (2003).

A fall in spreads is also of course consistent with increased moral hazard. So by interpreting all of the fall in spreads as a welfare-enhancing fall in real hazard – rather than a rise in moral hazard – in the regression analysis, we are probably loading the dice against finding any remaining moral hazard. That we do nonetheless find such effects strengthens our conclusions.

Of course, these empirical results are only partial. They measure the *change* in price incentives for banks over a relatively short window. So they do not tell us about the *level* of risk-taking by these banks; nor about any incentive effects of IMF interventions that are anticipated well in advance; nor about whether any market valuation response to such interventions is sustained. Capturing such effects would call for a different identification scheme.

Some new evidence on debtor moral hazard

The empirical literature on health and labour economics provides guidance on alternative identification strategies to test for moral hazard. It suggests that incentive effects are easiest to detect when there are exogenous changes in the incentive structure – for example, through a change in government policy – and where we can compare the responses of a ‘test’ group which is affected by the policy change with a ‘control’ group which is not. The estimated effect of the policy change on incentives is then inferred from the difference in the outcomes between these two groups, controlling for other factors.

So rather than use observed asset prices as an indirect proxy, an alternative approach to assessing moral hazard is to examine directly an observable action, such as a country’s use of IMF resources¹⁷. From this we can try to infer directly changes in debtor behaviour induced by changes in IMF lending practices. In particular, we focus on changes in debtor behaviour associated with the introduction of the SRF and the New Arrangements to Borrow (NAB)¹⁸.

The application of this approach is not straightforward. The policy changes we consider are not entirely exogenous, but rather a response to the Mexican crisis and Asian crises. It is also harder to distinguish between a test and control group of countries since all IMF members, at least in principle, have access to all IMF facilities. To address these difficulties, a suitable instrumental variable must be constructed that captures a country’s capacity to access IMF facilities and how this may have changed as the ‘rules of the game’ have changed.

The introduction of the SRF and the NAB were both designed to contain the systemic impact of capital account crises. This suggests a measure of systemic importance might be used to index the potential for enhanced access¹⁹. Such an index, albeit necessarily subjective, can be constructed from a weighted sum of indicators of potential crisis spillover – for example, the importance of a country in international capital markets, in international banking markets and in international trade²⁰.

Given their objectives, we would expect the introduction of the NAB and SRF to have had a greater effect on resource use the more ‘systemic’ the country. This hypothesis was examined for a sample of 19 middle-to-lower income emerging markets over the period 1995 to 2001. The sample was drawn from the major emerging market asset price indices (the Morgan Stanley equity index and the JP Morgan EMBIG bond index) and so covers most countries with access to private external finance. The sample is limited owing to restrictions on data availability but accounts, on average, for more than half of all IMF credit outstanding during the sample period. Table 3 ranks the 19 countries according to the constructed index of systemic importance.

The estimation methodology involves three main steps (see Gai and Taylor (2003)). The first is to specify our directly observable action, namely a debtor’s decision whether to use IMF resources. We

17: See Gai and Taylor (2003) for technical details and regression results.

18: The NAB aimed to supplement existing IMF resources, while the SRF provides large-scale short-term financing in the event of a capital account crisis. The SRF has similar features to a domestic lender of last resort, including interest rate surcharges (ranging from 300 to 500 basis points). While the surcharges are designed to limit moral hazard, they do not appear penal compared with secondary market spreads at the time of crisis.

19: The SRF was “to be utilized in cases where the magnitude of the outflows may create a risk of contagion that could pose a potential threat to the international monetary system” (IMF (2002)), whilst participants in the NAB agreed “to make loans to the IMF when supplementary resources are needed to forestall or cope with an impairment of the international monetary system, or to deal with an exceptional situation that poses a threat to the stability of the system.” (IMF Press Release 97/5, ‘IMF Adopts a Decision on New Arrangements to Borrow’, 27 January 1997).

20: See Gai and Taylor (2003) for details.

Table 3:
Sample countries

| Average systemic index rank ^(a) | Country |
|--|----------------|
| 1 | Mexico |
| 2 | Korea |
| 3 | Brazil |
| 4 | China |
| 5 | Argentina |
| 6 | Thailand |
| 7 | Malaysia |
| 8 | Indonesia |
| 9 | Turkey |
| 10 | India |
| 11 | Hungary |
| 12 | Philippines |
| 13 | South Africa |
| 14 | Chile |
| 15 | Venezuela |
| 16 | Czech Republic |
| 17 | Colombia |
| 18 | Pakistan |
| 19 | Uruguay |

Source: Gai and Taylor (2003).

(a) Mean systemic index for 1995 Q1 to 2001 Q4.

construct a binary dependent variable which takes the value one if a country is in an IMF programme and makes a drawing on IMF resources and is zero otherwise. We restrict the programme definition to the main IMF facilities designed to address balance of payments difficulties (Stand-By Arrangements (SBA) and the Extended Fund Facility (EFF) which may be accompanied by SRF funds). Table 4 provides summary statistics on programme use for the periods before and after the introduction of the SRF in December 1997. These data suggest, on average, a rise in the frequency of programme participation after the SRF was introduced, and the more so the more systemically important the country.

Table 4:
Programme participation, 1995 Q1 to 2001 Q4^(a)

| | Number of quarterly programme participations ^(b) | Programme participations per quarter (sample average) ^(c) |
|--|---|--|
| Full sample | | |
| Pre-SRF | 55 | 0.263 (0.441) |
| Post-SRF | 121 | 0.375 (0.485) |
| Countries with average systemic index above median | | |
| Pre-SRF | 26 | 0.263 (0.442) |
| Post-SRF | 79 | 0.516 (0.501) |
| Countries with average systemic index equal or below median | | |
| Pre-SRF | 29 | 0.264 (0.443) |
| Post-SRF | 42 | 0.247 (0.433) |

Sources: IMF and Gai and Taylor (2003).

(a) Pre-SRF period is 1995 Q1 to 1997 Q3; post-SRF period is 1997 Q4 to 2001 Q4.

(b) Defined as a quarter in which a country is in an SBA or EFF programme (with or without SRF) and makes a drawing under that programme at some point before the end of the programme.

(c) Standard deviation in brackets.

A change in a country's unconditional probability of going to the IMF could merely reflect a change in its vulnerability to crisis, rather than a change in its propensity to draw on IMF resources for a given set of economic fundamentals. The second stage is thus to specify a set of factors which influence the decision on whether or not to undertake a programme. Following previous empirical studies, such as Knight and Santaella (1997), IMF (2001) and Barro and Lee (2002), we consider a range of such factors.

The most significant factors in explaining the programme participation decision were found to be: the foreign exchange reserve coverage of short-term debt; the level of the real effective exchange rate; and the residual of sovereign ratings when regressed on the other fundamentals (which could be taken to be a proxy for other information on creditworthiness). Previous studies suggest that these variables largely reflect demand-side considerations.

The third stage is to examine whether there is a change in debtors' incentives to participate in a programme, conditional on fundamentals, following the introduction of policies such as the SRF or NAB. Has there been any weakening in the relationship between fundamentals and programme participation across these policy changes? And, if so, is this weakening greater, the greater the systemic importance of a country?

The empirical results suggested that the introduction of the SRF and NAB did indeed appear to result in a greater probability of IMF loan use, for given fundamental determinants of crisis. Moreover, this increased propensity to borrow was greater among the more systemically important countries. These are necessary conditions for debtor moral hazard.

Clearly, these results need to be interpreted cautiously. For example, the dataset is a relatively narrow one and the choice of instrumental variable for systemic importance is open to debate. It is also impossible to disentangle perfectly supply-side incentives (for the IMF to provide new or larger loans) from demand-side incentives (for potential borrowers to agree on such programmes). Only the latter could be strictly interpreted as debtor moral hazard. Ideally, a structural model of demand and supply could distinguish the two, but this is not empirically tractable. Nonetheless, the results suggest that demand-side factors do help to account for

programme participation. And they do suggest that this increased use of IMF funds was particularly pronounced among countries which could be regarded as systemically important.

The last of these pieces of evidence corroborates the pattern evident from the IMF's loan book: large and increasing concentration of the IMF's portfolio among a small number of systemically important borrowers. The formal econometric evidence presented here suggests that this can be explained, at least in part, by weakened incentives among debtors. In other words, it could be interpreted as offering some support for an increase in the degree of debtor-side moral hazard during the late 1990s.

Where does this leave us?

Effective management of international financial crises involves balancing a real hazard (crisis) on the one hand and a moral hazard (incentives) on the other. The former hazard is readily observable: it is on the front pages of the financial press when a country is hit by crisis. The latter is inherently more difficult to detect. Distorted incentives do not make for headlines; they are often hidden and slow to

accumulate. Moreover, even when identified, quantitative evidence on moral hazard will not be black and white, but rather shades of grey. The consensus from the existing moral hazard literature lies in that grey and fuzzy zone. Against that backdrop, it is not surprising that this literature has failed to have much impact on policymakers.

In this article we have tried to penetrate some of that fog. We have looked at some new data, and used some new restrictions, to shed light on risk-taking behaviour by creditors and debtors arising from changes in IMF lending policy. The evidence is far from conclusive. For example, it only tells us about changes in risk-taking induced by IMF lending practices; it does not tell us how large the stock of moral hazard may be in relation to the costs of crisis. It does, however, suggest concrete evidence of, or incentives for, such increased risk-taking in ways which apparently cannot be explained fully by changes in the real hazard of crisis. Concerns about moral hazard should continue to play a prominent role in policymakers' thinking both ahead of, but especially during, crises.

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Annex

Table A1:

Creditor moral hazard events

| Number | Event date | Event description |
|--------|--------------|---|
| 1 | 26 Jan. 1995 | IMF Managing Director Camdessus indicates support for Mexican letter of intent requesting US\$7.8 billion stand-by credit (500% of quota). |
| 2 | 1 Feb. 1995 | IMF Board approves US\$17.8 billion stand-by credit for Mexico (688% of quota), of which US\$7.8 billion available immediately. |
| 3 | 26 Mar. 1996 | IMF Board approves extended fund facility credit of US\$10.1 billion (160% of quota) for Russia. |
| 4 | 5 Aug. 1997 | Camdessus welcomes Thai policy package and suggests IMF programme will soon be ready to be forwarded to the IMF Board for endorsement. |
| 5 | 20 Aug. 1997 | IMF Board approves stand-by credit of US\$3.9 billion (505% of quota) for Thailand, of which US\$1.6 billion available immediately. |
| 6 | 8 Oct. 1997 | Camdessus announces support for Indonesia's economic programme. |
| 7 | 31 Oct. 1997 | Camdessus indicates intention to recommend IMF Board approval of US\$10 billion (490% of quota) stand-by credit to Indonesia. |
| 8 | 6 Nov. 1997 | Camdessus announces that IMF financial support for Korea would be available if needed. |
| 9 | 21 Nov. 1997 | Camdessus welcomes Korean request for IMF assistance and says he has assured Korean authorities of the IMF's full support. |
| 10 | 4 Dec. 1997 | IMF Board approves US\$21 billion (1,939% of quota) stand-by credit for Korea, of which US\$5.6 billion available immediately. |
| 11 | 13 Jul. 1998 | Camdessus announces that he is to recommend to the IMF Board support for Russia's strengthened reform programme and additional financing of US\$11.2 billion (180% of quota), to bring total financing to US\$12.5 billion. |
| 12 | 17 Aug. 1998 | Camdessus comments on Russian government announcement of debt restructuring and other policy measures. |
| 13 | 23 Sep. 1998 | Camdessus states that the IMF will be prepared to lend to Brazil if required. |
| 14 | 18 Oct. 1998 | US Congress ratifies increase in US IMF quota. |
| 15 | 13 Nov. 1998 | Camdessus announces successful conclusion of talks with Brazil and says he will recommend IMF Board approval for financial support, including SRF funds, of US\$18 billion (600% of quota). |
| 16 | 15 Jun. 1999 | Camdessus announces that an IMF Board meeting is to be scheduled to consider Mexico's request for stand-by credit of US\$4.1 billion. |
| 17 | 9 Dec. 1999 | IMF management approves letter of intent from Turkey requesting a US\$4 billion (320% of quota) stand-by arrangement. |
| 18 | 6 Dec. 2000 | IMF Managing Director Köhler proposes an extra US\$7.5 billion (600% of quota) of funds under the SRF for Turkey in addition to US\$2.9 billion remaining under existing stand-by arrangement. |
| 19 | 18 Dec. 2000 | Köhler announces agreement on strengthened Argentine programme and recommends to the IMF Board additional financing, including SRF funds, of US\$6.7 billion to bring total financing to US\$13.7 billion (500% of quota). |
| 20 | 21 Dec. 2000 | IMF Board approves third and fourth reviews of Turkey's programme and the US\$7.5 billion (600% of quota) extra funds Köhler proposed on 6 Dec. 2000. |
| 21 | 27 Apr. 2001 | Köhler announces that a recent IMF Board meeting supported Turkey's economic programme and that additional financing from the IMF and World Bank would be in the order of US\$10 billion. |
| 22 | 3 Aug. 2001 | Köhler recommends approval of US\$15 billion (400% of quota) stand-by credit for Brazil, including SRF funds. |
| 23 | 21 Aug. 2001 | Köhler indicates he is prepared to recommend an addition of US\$8 billion (290% of quota) to Argentina's stand-by credit. |
| 24 | 15 Nov. 2001 | Köhler indicates intention to recommend a new stand-by arrangement for Turkey to support reforms and close the financing gap (no amount mentioned). |
| 25 | 4 Feb. 2002 | IMF Board approves US\$16 billion stand-by credit for Turkey involving additional funds of US\$12 billion (960% of quota) with US\$4 billion undisbursed funds rolled over from the previous arrangement. |
| 26 | 7 Aug. 2002 | IMF management agrees new stand-by arrangement for Brazil which, upon Board approval, would provide additional funds of US\$30 billion (750% of quota), 80% of which would be disbursed in 2005. |

Sources: IMF and Haldane and Scheibe (2003).