

# Does the IMF cause moral hazard? A critical review of the evidence

Axel Dreher<sup>§</sup>

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## **Abstract**

The paper provides a critical review of empirical studies on IMF induced moral hazard. Taken together, there is considerable evidence that the insurance provided by the Fund leads to moral hazard with investors in bond markets, while moral hazard in equity markets has so far not been convincingly tested. Debtor moral hazard has much less frequently been investigated, and the counterfactual is more difficult to construct. There is, however, evidence that debtor governments' policies are negatively influenced by the insurance. Their policies are more expansive leading to higher probabilities of IMF programs and shorter inter-program-periods.

**Keywords:** IMF, debtor moral hazard, creditor moral hazard

**JEL-Codes:** F32, F33, F34

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<sup>§</sup> University of Konstanz and Thurgau Institute of Economics, Department of Economics, Box D 131, 78457 Konstanz, Germany, E-mail: [mail@axel-dreher.de](mailto:mail@axel-dreher.de)

## 1. Introduction

In recent years the International Monetary Fund has come under increased scrutiny and attack. Its forecasts have been shown to be comparatively poor (Brunner and Meltzer 1990, Table 4.5) and biased in favor of optimism.<sup>1</sup> Its policy conditions have frequently been criticized as inappropriate and ineffective.<sup>2</sup> The growth of IMF staff does not seem to be related to the “need” for balance of payments credits (Vaubel 1996). The Fund has been shown to be an almost continuous provider of aid to a few dozens of developing countries and emerging market economies. While the average size of IMF loans has gone up in recent years, the number of countries borrowing from the Fund decreased.

Considerable attention has also been paid to the question whether the IMF contributes to moral hazard, a hypothesis originally proposed in Vaubel (1983). In principle, moral hazard arises when the provision of insurance leads the insured to take actions that increase the probability of bad outcomes. IMF lending may be interpreted as (subsidized) income insurance against adverse shocks. The insurance cover induces the potential recipients to lower their precautions against such damages (or even to intentionally generate a crisis). This form of moral hazard may be called “direct moral hazard” because it looks at the behavior of the direct recipients of insurance payments – the governments of the member states (Dreher and Vaubel 2004b). It ought to be distinguished from indirect moral hazard effects on the lending behavior of creditors, i.e. the “bailout” of foreign bondholders, banks etc.

IMF lending provides insurance to those creditors as well. If markets refuse to roll over maturing debt, the Fund, knowing that restructuring is costly, provides resources that can be used to finance investors’ exit. Since investors take this into account when deciding whether and where to invest, allocation of credit becomes distorted, increasing the risk of future crises.<sup>3</sup>

Whether IMF lending indeed raises moral hazard with creditors is subject to heated discussion since the bailout of Mexico in 1995, where the IMF approved loans amounting to 18 billion US\$. Proponents of the moral hazard-hypothesis attribute the decline in emerging markets bond spreads and the pronounced increase in international capital flows over the period 1995-97 to this huge bailout-package. According to them, bailout expectations

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<sup>1</sup> For a summary see Vaubel (1991: 235f.).

<sup>2</sup> E.g., International Financial Institutions Advisory Commission (1999), Boockmann and Dreher (2003), Dreher and Vaubel (2004a).

<sup>3</sup> According to Calomiris (1998), this form of moral hazard is the most pernicious one, since it removes incentives for foreign banks to avoid lending to high-risk countries.

accumulated slowly over the 1990s as sovereign bond markets developed and bonds were not restructured during crises until the end of that decade (e.g. McBrady and Seasholes 2000). They became more pronounced after further large lending programs for emerging market economies facing financial crises, including Thailand, Indonesia, South Korea, Russia and Brazil. According to the proponents of the moral hazard hypothesis, finally, the IMF's failure to prevent the Russian default in 1998 is likely to have substantially reduced moral hazard.<sup>4</sup>

However, this view also has its critics. As Nunnenkamp (1999) and Lane and Phillips (2000) argue, IMF resources are not large enough to generate serious moral hazard. Creditors' losses thus by far exceed the potential value of IMF loans (Mussa 2002). According to Jeanne and Zettelmeyer (2001) the subsidy implicit in IMF bailout packages is too small to induce significant moral hazard.<sup>5</sup> With respect to capital flows, a huge share of the increase to emerging markets following the Mexican bailout is due to foreign direct investments, which are less likely to benefit from IMF bail-outs as are bond flows and bank lending (Noy 2004).

In the end, whether or not the IMF induces moral hazard is an empirical question. A huge amount of research has recently tried to shed light on that topic – Table 1 in the Appendix provides an overview. This paper critically reviews what we know about the moral hazard of IMF lending. While Section 3 focuses on debtor moral hazard, the next section deals with the question whether the IMF contributes to moral hazard with investors. The final section provides a short summary and suggestions for further research.

## **2. Does the IMF cause moral hazard with creditors?**

Most studies examining possible IMF induced moral hazard focus on moral hazard with creditors. But how can creditor moral hazard be measured? As described in the introduction, insurance provided by the Fund might induce lenders or investors neglecting the risk of their engagement. This reduction in perceived risk would then affect the behavior of prices of bonds and equity.<sup>6</sup> Most empirical studies focus on the former. They consider IMF-related events likely to change lenders' perceptions about the risk of their engagement.

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<sup>4</sup> It is interesting to note that ex post returns on emerging markets bonds peaked in 1994-97 and declined substantially after the Russian crisis in 1998 (Klingen, Weder and Zettlemeyer 2004).

<sup>5</sup> Haldane (1999) calculates the wedge between the costs of IMF borrowing and risk adjusted spreads for eight countries, finding an implied subsidy somewhat greater than Jeanne and Zettelmeyer.

<sup>6</sup> This is to some extent related to the literature on the IMF's role in catalyzing financial flows. For example, Mody and Saravia (2003) found that the IMF's effect on a country's market access depends on fundamentals. For an excellent summary of this literature see Bird and Rowlands (2002).

Unexpected bailouts, for example, might increase the perceived probability of future bailouts. If investor moral hazard exists, this should be reflected by bond yields. Similar tests have been applied to equity markets. While those studies will be the focus of Section 2.2, the next section deals with moral hazard in bond markets.

### **2.1. Evidence from bond markets**

In principle, the following tests have been proposed to analyze creditor moral hazard in bond markets:

If (for given fundamentals) future bailouts seem to become more likely,

- do bond spreads decrease?
- are more or longer-term funds flowing to emerging markets?
- do countries where bailouts are more likely receive more or cheaper capital?
- do bond spreads respond less to changes in fundamentals?
- is the dispersion of spreads reduced for given creditworthiness?

The first three tests are obvious. For given fundamentals, greater probability of getting IMF money reduces creditors' expected losses. In the presence of creditor moral hazard, therefore, average bond spreads decrease – the more so, the higher the probability that a certain country is being bailed out should a crisis occur. Similarly, capital flows to emerging markets increase, especially to countries that are particularly likely of being bailed-out. Expectations of an IMF bailout should also increase the maturity structure of loans, since default risk is reduced.

The other two tests for creditor moral hazard have been suggested by Dell'Arricia, Schnabel and Zettelmeyer (2002). If investors expect to be bailed-out, the risk premium they demand would depend on fundamentals to a lesser extent. In the extreme, when investors expect to be bailed out completely, fundamentals would have no impact on yields at all. The same argument makes bond-spreads less volatile for given dispersion in creditworthiness. As Dell'Arricia et al. (2002: 10) put it, “as investors pay less attention to differences in fundamentals across countries, the differences between country spreads should also narrow”.

Conducting these tests, however, is not straightforward. The following sections deal with each of them in turn.

### Reactions of spreads/ rates of return

A first attempt to test for investor moral hazard is Zhang (1999), focusing on the IMF crisis package for Mexico in 1995. As described in the introduction, it has been argued that this IMF bailout was responsible for reduced spreads on emerging market bonds in late 1995 to mid 1997. Zhang runs OLS regressions, employing two different datasets with quarterly average spreads on six Eurobonds and four Brady bonds from eight emerging markets countries over the period 1/1992-2/1997 as dependent variable. Controlling for changes in economic fundamentals and international capital market conditions his regression includes a dummy for the time of the Mexican crisis and, to test for long-run changes resulting from the IMF bailout, a dummy for the period from the fourth quarter of 1995 onwards. As the results from both datasets show that the coefficient of the post-crisis dummy is completely insignificant instead of being significantly negative, Zhang concludes that the observed decline in spreads has been a reaction to the increased liquidity in international capital markets and, to a lesser extent, to changes in fundamentals instead of being the consequence of moral hazard.

Eichengreen and Mody (2000) analyze the impact of the IMF on the costs of borrowing for emerging market countries. They assembled a huge number of primary-market (launch) bonds spreads from Capital Bondware between the first quarter of 1991 and the fourth quarter of 1999. Since there is a sample selection problem (a country's spread is only observed when it actually issues bonds) they estimate a Heckman selection model. In both the selection and the spreads equation, they include dummies for IMF programs and control for a huge number of fundamentals. Their results show that IMF programs have a positive impact on market access and reduce spreads. As the authors point out, this could either be because investors perceive conclusions of IMF programs as a commitment for reforms or because IMF lending creates moral hazard. The authors do not attempt to distinguish between the two effects.

A second paper analyzing the behavior of bond spreads around the Mexican crisis is Kamin (2004). One of his tests is similar to that of Zhang. The dependent variable is the monthly change in J.P.Morgan's Emerging Markets Bond Index (EMBI) spread from March 1992-November 2001. His OLS error-correction model takes the average credit rating of the included countries, U.S. corporate high-yield spreads and contemporaneous changes in U.S. treasury yields into account. As a test for moral hazard, Kamin uses his model to calculate the predicted value of the EMBI, so that the predicted parameters reflect the average behavior of spreads over the entire period. If moral hazard would be important, Kamin argues, the model

should over-predict spreads after 1994 and under-predict them before. As the model in fact predicts spreads to be higher than the actual levels before 1995, the moral hazard hypothesis is not supported by the data.

Another attempt to measure whether the IMF induces moral hazard with investors in the long-run has been made by Dell'Arricia et al. (2002). Although considering the Mexican crisis of 1995 and the Asian crisis of 1997/98 as well, their main focus is on the 1998 Russian crisis. As Dell'Arricia et al. argue, this non-bailout is well suited as a test for moral hazard, since it has been unexpected and, contrary to the Mexican crisis, did probably not change investors' perceptions of market risks (After the Mexican and Asian crises, investors should have been aware of the risks associated with emerging market bonds. Moreover, Russia had been downgraded by major rating agencies in the first half of 1998). Their test for moral hazard is thus whether bond spreads increased after the Fund did not bail out Russia. They focus on two datasets: an unbalanced sample of launch spreads contained in Capital Data's Bondware for 54 countries and the balanced panel of the EMBI Global secondary market spreads including 21 countries. Like Eichengreen and Mody (2000) they estimate a Heckman selection model for the launch spreads data to correct for sample selection.

Dell'Arricia et al. employ a huge set of fundamentals in their regressions, including data on domestic economic conditions, external sector conditions, international interest rates, political variables, country characteristics and credit ratings.

Since the levels of spreads rose sharply immediately after the crisis, assuming a stable relationship between fundamentals and bond spreads would bias the results in the direction of rejection of moral hazard. To test for the long-run impact of the IMF non-bailout, the period of financial turbulence was therefore omitted from the regressions. However, the results are robust to the choice of the exclusion window.

Specifically, Dell'Arricia et al. estimate models for spreads of the pre-crisis and post-crisis periods separately and compare the fitted spreads for each month in every country over the two models. Applying those tests to the Mexican and Asian crises did not produce evidence that moral hazard did increase. However, the results are quite supportive of the moral hazard hypothesis in the event of the Russian non-bailout: In a huge number of countries and periods, spreads estimated with the post-crises model are significantly higher compared to the pre-crisis model. This result is robust to the method of estimation and data used.

Noy (2004) and Zoli (2004) recently applied variations of the test proposed by Dell'Arricia et al. While Noy confirms the earlier findings, Zoli reports opposite results. In

Noy (2004), four moral hazard-related groups of events are analyzed: The 1995 Mexican program; the Asian crisis/ introduction of SRF/ suggestion of quota increase; the 1998 quota increase/ 600 percent of quota program for Brazil; and the approval of the program with Argentina in 2000. Employing a panel of 15 *EMBIplus* countries, Noy explains (monthly) bond spreads by a range of macroeconomic variables over the years 1998-2000. After each event a four months window has been omitted from the regression. For these four months the model is employed to derive predicted values of the spreads, and the presence of moral hazard would lead to them being higher than the actual ones. As it turns out, however, predicted spreads are on average lower than actual spreads. The events under study do thus not seem to have increased moral hazard. To the contrary, repeating the analysis for the 1998 non-bailout of Russia confirms the results of Dell'Arricia et al. (2002). Zoli (2004) employs a larger sample of 32 countries, different control variables and allows for non-linear effects of a country's outstanding official and officially guaranteed debt on the supply of capital. What she finds is, that moral hazard increased following the Mexican crisis, but did not decrease after the Russian non-bailout. Her results show that the impact of outstanding debt on spreads significantly differs in the post- as compared to the pre-crisis period, in the direction associated with moral hazard. Moreover, debtor countries do not seem to be credit constrained after the Mexican crisis, while they were before.

Instead of focusing on long-term effects of IMF actions, Lane and Phillips (2000), McBrady and Seasholes (2000), Tillmann (2001), Haldane and Scheibe (2003) and Evrensel and Kutan (2004a) analyze the reactions of bond markets around the days of events potentially relevant for expectations about bailouts. Lane and Phillips focus on a large number of news relating to the potential size of IMF rescue packages, including the Mexican bailout, the Russian default, the increase in the access limit to IMF resources in 1994, the introduction of the Supplemental Reserve Facility (SRF)<sup>7</sup> in 1997 and the increase in Fund quotas in 1999. Studying the short-term response of EMBI spreads and individual country's spreads to those IMF-related news, they find little systematic evidence. Most of the events studied do not lead to statistically significant movements of spreads in the expected direction, the exception being the Russian default of 1998. However, as has been shown by Haldane and Scheibe (2003), those results depend on the choice of events. Focusing on a different (similarly large) set of

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<sup>7</sup> This facility has been implemented to provide financial assistance to countries experiencing exceptional balance of payments difficulties due to a large short-term financing need resulting from a sudden and disruptive loss of market confidence.

IMF-related news, they report the opposite: In the majority of the cases, spreads move in the direction consistent with the moral hazard hypothesis, and in many cases economically significantly so.

McBrady and Seasholes (2000) observe a significant increase in bond spreads after the bailing in of investors in Pakistan by the Paris Club in early 1999. Their paper examines the daily price movements of 402 different bonds from 2/24/1999-2/26/1999, when officials from Pakistan's Ministry of Finance met with representatives of the Paris Club to negotiate a debt rescheduling arrangement. They regress the change in spreads over those three days on country-specific and bond-specific factors and find that larger undrawn ESAF<sup>8</sup> balances significantly reduce the increases of spread. Larger undrawn balances under the IMF's Stand-by and Extended Fund Facility (EFF) both lead to significantly larger increases in spreads.<sup>9</sup> The authors' explanation for their results is that the reduced probability of being bailed out makes the Fund's general resources less valuable (thus decreasing moral hazard). In the case of the ESAF, however, funds devoted to poor countries cannot be withheld from them in the event of financial distress. Private bondholders can thus not be bailed in, making undrawn ESAF funds relatively more valuable to bondholders.

Tillmann (2001) analyzes the response of risk premia to 42 IMF-related events. Specifically, he tests whether there is a structural break in the risk-return relationship in bond prices of emerging markets that coincides with IMF-news. Tillmann employs a Markov-switching GARCH-M model to daily data of the *EMBIplus* over the period 1/1/1994-11/2/2000. He includes dummies that are equal to one on the day the news appear and zero otherwise.

If moral hazard is important, the price of risk should be lower when IMF bailouts become more likely. IMF lending should thus raise the probability of jumping to a regime that is characterized by a low price of risk. As the results show, IMF-related news do not raise the probability of switching to a state that can be associated with a moral hazard regime.

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<sup>8</sup> The Enhanced Structural Adjustment Facility (ESAF) provides concessional assistance to low-income countries.

<sup>9</sup> The Stand-By Arrangement is designed to address short-term balance-of-payments problems and is the most widely used facility of the IMF, the Extended Fund Facility supports medium-term programs.

Another recent attempt to analyze the importance of moral hazard in bond markets is Evrensel and Kutan (2004a).<sup>10</sup> They focus on country specific daily bond spreads of Indonesia (12/19/1996-2/27/2003) and Korea (5/17/1996-2/27/2003). As explanatory variables their analysis includes exchange rates and stock returns (both lagged by one day), U.S. corporate bond spreads, a dummy that equals one on the starting day of IMF program negotiations, a dummy that is one on the day of program approval, a dummy for the period between negotiations and approval, and a dummy for the entire program period.

Estimating OLS and GARCH regressions, the authors find that program duration tends to increase spreads, which they take as evidence against moral hazard. To the contrary, spreads in both countries significantly declined on the starting day of the negotiations and the day of program approval giving support to the moral hazard hypothesis.<sup>11</sup>

To test whether country specific IMF-related news increase moral hazard in other countries, Evrensel and Kutan also include dummies for program approvals in countries other than Indonesia and Korea. The results show that these news do not decrease country spreads.

Taken together, findings are far from being conclusive. What do these findings tell about the moral hazard-hypothesis? There are some problems. First, the studies of Lane and Phillips, MacBrady and Seasholes, Tillmann, and Evrensel and Kutan do not adequately control for other influences like changes in fundamentals, data on which are not available on a daily basis. For example, the only control variables Evrensel and Kutan include in their regressions are stock returns and the exchange rate. However, investor moral hazard might also exist with respect to equity markets (Section 2.2). Although data on stock returns are lagged by one day, they might be endogenous to bond spreads. Second, approval of an IMF lending program is usually associated with financial crisis. Crises change investors' expectations about market risk. Any reduction in perceived risk through increased lending could thus easily be offset by an increase in perceived risk due to the crisis itself. Third, most of the analyzed events were probably not important enough to change perceptions about future bailouts. The announcement of increased financing for Indonesia in January 1998, for example, is unlikely to have had any significant influence on expectations about future IMF

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<sup>10</sup> Evrensel and Kutan (2004a) base their analysis on research by Sarno and Taylor (1999), who have been the first to test for moral hazard in equity markets. Since Sarno and Taylor do not focus on the IMF, their study is not included in this review article.

<sup>11</sup> Similar results are reported by Ganapolsky and Schmuckler (2001) for Argentina where bond prices increased significantly after the announcement of an arrangement with the IMF in October 1995.

engagements in other countries. And fourth, changes in IMF policy might have been expected prior to official announcement.

Evrensel and Kutan, moreover, base their analysis on two countries. However, there is no good reason to believe that the findings for Indonesia and Korea will hold in general. Also, why should non-exceptional news about IMF programs in other countries change investors' perceptions about the likelihood of being bailed out in Indonesia and Korea? As another problem, they assume the coefficients of exchange rates and stock markets to be constant over time. However, IMF events inducing moral hazard with the investors would decrease the absolute magnitude of those coefficients (Dell'Arricia et al. 2002). Finally, it is not possible to distinguish the expected effects of the IMF arrangement for the program country from an increase in moral hazard. Although there is considerable evidence that IMF programs do generally not promote growth or growth oriented policies (Evrensel 2002, Przeworski and Vreeland 2000, Boockmann and Dreher 2003, Dreher 2004), investors might have expected the IMF programs and associated extremely detailed conditionality to alleviate the crises. Decreased spreads could thus reflect expected improvements in policy instead of being a signal of moral hazard.<sup>12</sup>

In summary, the studies focusing on short-term movements in bond markets did not shed much light on the moral hazard phenomenon. However, although more promising, there are some pitfalls with analyzing longer-term reactions as well. Employing dummies for IMF programs like Eichengreen and Mody did cannot solve the identification problem whether a reduction in spreads is due to moral hazard or to a reduction in real hazards of crises. Simply including event dummies in the regression is therefore no adequate test. This is especially true if the dummy is meant to capture changes in the degree of moral hazard but coefficients on fundamentals are assumed to be unchanged by the crisis. Indeed, it has been argued above that these coefficients would change in the presence of moral hazard. Moreover, the choice of events is critical for a meaningful test. As argued by Dell'Arricia et al. (2002: 8) the Mexican bailout is not well suited to test for the existence of moral hazard. The Mexican crisis probably increased the perceived riskiness of emerging market debt. This could have offset reductions in spreads due to moral hazard. The same is true for other events employed, e.g., by Noy (2004).

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<sup>12</sup> In order to investigate this issue, Evrensel and Kutan (2004b) replicate their analysis for Indonesia, comparing the results with developments in the foreign exchange market. The results show that the forward exchange rate depreciates with the announcement of the IMF program, which, according to the authors, strengthens the moral hazard-interpretation of their results.

While Dell'Arricia et al. take most of those problems carefully into account, at least three problems remain. First, an IMF program could directly affect the probability of future financial crises if, e.g., the presence of the insurance reduces the probability of runs on a country's currency or debt. Second, fundamentals which have been included to the regressions as exogenous variables might in fact also depend on expectations about the availability of IMF money (debtor moral hazard), making fundamentals endogenous to the model. And finally, the event window under study might be too long to attribute the observed impact (mainly) to the IMF-related event. In the case of the Russian non-bail-out, for example, the Long-Term-Capital-Management (LTCM) crisis and a general worsening of the world economic outlook fall in the period under study and might be responsible for the increased bond spreads (Noy 2004).

Summarizing the evidence of the IMF's impact on bond spreads, there seems to be some evidence in favor of the hypothesis that moral hazard has indeed been present in the bond markets prior to the Russian crises. Taking shortcomings of earlier work into account, Dell'Arricia et al. (2002) report evidence that the degree of moral hazard decreased after the Russian crises of 1998. Like most other studies they do not find an increase in moral hazard after the Mexican crisis in 1995.

#### Reaction of flows to emerging markets/ financing of strategically important countries

Mina and Martinez-Vasquez (2002) and Martinez-Vasquez and Mina (2003) propose to employ the maturity structure of a country's loans to test for IMF-induced moral hazard. As the authors argue, lenders would reduce not only overall lending when their perceptions about default risk worsens but also shorten the maturity structure: "If expectations of an IMF bailout reduce investors' risk perceptions and generate an increase in the maturity of international loans, then such reactions could reasonably be used as a measure for the existence of moral hazard" (Mina and Martinez-Vasquez 2002: 9). In testing whether the IMF's effect on the maturity structure of loans has indeed been the consequence of moral hazard instead of improved fundamentals or the beneficial effect of commitment to reform, the OLS regressions include a large number of control variables. While Mina and Martinez-Vasquez (2002) focus on 71 countries over the period 1992-1997, Martinez-Vasquez and Mina (2003) analyze six Middle East and North African countries over the same period.<sup>13</sup> In both studies the IMF-related variables are agreed credit as a percentage of GDP one year ahead, to account for

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<sup>13</sup> Note that in the later study sample size is too small for drawing rigorous conclusions.

investors' expectations of a future bailout, and withdrawn IMF credit one year ahead, to account for investors' expectations about the country's commitment to the Fund's reform program. The latter variable has been used in prior empirical research to proxy compliance with IMF conditionality (Killick 1995, Dreher 2003). As Killick (1995: 58) points out, credit agreed but left undrawn may be a useful indicator of performance under a program. After concluding an arrangement, part of the credit associated with it will be paid out immediately. The rest is payable in tranches. Since IMF credits are highly subsidized, countries have incentives to draw all the money available immediately. Only if non-compliance is prevalent, the IMF withholds part or all of the money. Withdrawn loans can thus proxy for lenders' expectations whether the program country is committed to economic reform.

As the results of both papers show, net flows of short-term foreign debt as a percentage of total external net debt flows are indeed influenced by the IMF. Expected IMF lending significantly reduces expected short-term debt flows in total flows after the Mexican crisis while it had no effect prior to 1995. This suggests that moral hazard has only been present in the post-bail-out period. A disaggregated analysis shows that Standby- and Extended Fund Facility Arrangements increase maturity, while the Enhanced Structural Adjustment Facility does not. The results also show that the commitment effect of IMF programs has little effect on debt structure.

Kamin (2004) also estimates OLS regressions testing whether capital flows to emerging markets have been influenced by the Mexican, Asian, and Russian crises. His dependent variable are quarterly log changes in capital flows (bonds and loans) from the first quarter of 1992 to the third quarter of 2001. In addition to the lagged dependent variable, the level of U.S. 3-month and 10-year Treasury yield, U.S. high-yield corporate spreads and a measure for economic growth of the G7, Kamin includes crisis dummies that equal one in the first two quarters of the crises and zero otherwise. Employing this model, he compares predicted capital flows with their actual values. For moral hazard to play a role, the model should over predict flows before 1994 and under predict them after the Mexican crisis. Applying this test, the results are quite supportive of the hypothesis that the Mexican crisis increased moral hazard while the Russian crisis decreased it: In both 1996 and 1997 capital flows are clearly higher than predicted values.

If large and systemic countries are considered separately from the other countries, no clear pattern emerges. After the Mexican bailout there is no shift in capital flows to systemic countries, as one would expect under the moral hazard hypothesis.

Similar results emerge for bond spreads. Controlling for creditworthiness variables, Kamin examines whether certain types of countries exhibit lower spreads than others. To this end, he compares actual and fitted spreads for each country at 9/30/1997 and 9/29/2000. According to his results, there is no evidence that systemic countries pay lower spreads.

Again, the results are far from being conclusive. With respect to capital flows, as Kamin himself admits, it is probably impossible to construct a rigorous test for moral hazard. Too many factors affect these flows that can not be controlled for. Also, the predictions of the models do not appear to be robust to changes in specifications, and include counterintuitive significant coefficients. Regarding the papers of Mina and Martinez-Vasquez, using actual values of the IMF variables one year ahead to proxy investors' expectations is hard to justify.

Although being instructive, these studies do neither provide compelling evidence in favor of nor against the moral hazard hypothesis.

#### Relationship between spreads and fundamentals

This test has been employed by Dell'Arricia et al. (2002), Kamin and Kleist (1999), Kamin (2004) and Lee and Shin (2004). Dell'Arricia et al. test whether bond spreads react differently to fundamentals after the Mexican, Asian and Russian crises. They thus estimate the effect of macroeconomic fundamentals on bond spreads before and after the crisis. If the non-bailout of Russia had indeed reduced moral hazard, the coefficients of the fundamentals would be greater in absolute magnitude. As it turns out, almost all coefficients change in the predicted direction after the Russian crisis, although only some of these changes are statistically significant. To the contrary, there is again no evidence that the Mexican and Asian crises increased moral hazard.

With respect to the Mexican crisis, Kamin and Kleist (1999) and Kamin (2004) come to the same conclusion. They compare differences in simulated bond spreads for different credit-rating categories prior to the Mexican crisis and thereafter (taking a huge number of fundamental variables into account). Instead of observing those differences becoming smaller after the IMF bailout, differences actually increased suggesting that investors discriminate among risks more carefully than ever.

However, as argued above, the Mexican crisis did probably act as a wake-up-call for investors leading them to reassess the risk of their emerging markets investments. According to Dell'Arricia et al. (2002), the Mexican crisis lead to a stronger discrimination against countries that earlier rescheduled their debt. Increased sensitivity to risk and greater discrimination could thus increase spreads, even if the degree of moral hazard increased

substantially. In fact, the results of Kamin show that spreads became quite concentrated by 1997 and dispersed only after the Russian non-bailout, which perfectly fits with the moral hazard hypothesis.

Recently, Lee and Shin (2004) proposed to differentiate among countries according to their likelihood to receive IMF loans should a crisis occur. Arguing along similar lines as the articles discussed in the previous sub-section, investors should react less sensitively to risk in countries where bail-outs are more likely. Focusing on monthly data for 16 EMBI Global countries over the periods 1/1998-12/2000, Lee and Shin test whether bond spreads of countries with better political connections to the Fund depend less on fundamentals. In other words, if moral hazard prevails, we would expect the slope coefficient to be smaller the more likely a certain country is bailed-out by the Fund.

To account for political connections, Lee and Shin (2004) employ the size of a country's quota in the IMF, the size of its national staff at the Fund, and a proximity variable to the Fund's major shareholders based on voting behavior in the UN General Assembly. Based on a regression over the five-year-period 1995-99, they predict the size of IMF loans to each sample country. They then estimate a similar regression as Dell'Arricia et al. (2002), but include an interaction term of each explanatory variable with the predicted loan size. As the results show, investors react less sensitively to fundamentals the higher the expected loan of the IMF.

In comparing the results for the period prior to the Russian non-bailout (1/98-6/98) and those thereafter (4/99-12/2000), Lee and Shin do not find a general decrease in moral hazard.

#### Volatility of spreads

Dell'Arricia et al. (2002) test whether the Mexican, the Asian and the Russian crises have affected the variance of the spreads. Again they calculate fitted spreads using the coefficients estimated with pre-crisis and, respectively, post-crisis data. For each month they compare the variance of the fitted spreads for the pre-crisis with the post-crisis model and test whether the two fitted variances are significantly different from each other. For the Russian crisis, the post-crisis model significantly over-predicts the pre-crisis variance in every month, while the pre-crisis model always under-predicts the post-crisis variance. The Mexican and Asian crises, to the contrary, did not produce significant changes. Again the result for Mexico is probably due to increased perceived risk and greater discrimination among countries, whereas the Asian crisis did not lead to a reassessment of bailout probabilities.

## 2.2. Evidence from equity markets

There are various studies testing for the impact of the IMF on stock markets. Ganapolsky and Schmukler (2001) report that the 1995 agreement between Argentina and the IMF significantly increased stock market returns. Hayo and Kutan (2003) find that “positive” IMF news increase daily stock returns by about one percentage point. According to Brealey and Kaplanis (2004), asset prices decline substantially in the weeks leading up to the announcement of IMF involvement without reversing after agreement has been reached. With respect to bank stocks, Demirgüç-Kunt and Huizinga (1993) report that official loans and increases in resources available to multilateral lending agencies increase bank shareholders’ wealth. As one example, at the time of the US proposal to significantly increase its quota in the IMF in 1983, bank stock market capitalization increased substantially. Kho and Stulz (1999) find that the IMF program with Korea in 1997 increased bank shareholders’ wealth at the U.S. banks with the highest exposure to Korea, while IMF involvement with other Asian countries did have little effect. Kho, Lee and Stulz (1999) report that banks with exposure to a crisis country are positively affected by bailouts. Lau and McInish (2003) show that the announcement of an IMF rescue package increases stock prices of banks in countries receiving the bailout, but not in other countries. None of these studies, however, tries to separate the effects of an increase in moral hazard from a decrease in real hazards of crises (and none of them tries to explicitly test the moral hazard hypothesis). In the following I summarize the two papers themselves interpreting their analysis as tests for moral hazard.

The first paper explicitly trying to disentangle moral and real hazards in equity markets is Haldane and Scheibe (2003). Haldane and Scheibe propose an indirect way of testing for moral hazard. They analyze how the (daily) share prices of seven UK banks with significant exposure to emerging markets change to IMF-related news between 1995-2002. As a condition for moral hazard, the authors argue, positive IMF-related news would have to increase the values of the banks’ outstanding loans and thus the value of their stocks. Since investors react to incentives, this would then prompt moral hazard and induce lending to risky emerging markets in the future. Haldane and Scheibe find that the market value of the seven banks does indeed rise after the majority of the 26 IMF-related events included in their sample. Employing pooled time-series cross-section regressions, they show that “positive” IMF news significantly

- increase the absolute value of stocks,
- increase the return on banks’ stocks in excess over market returns, and

- increase the value of stocks the more, the higher the banks' exposure to emerging markets.

Conducting these tests, the authors look at cumulated stock returns over a five-day period around an IMF-related event. To measure excess returns, they control for the percentage change in the overall UK equity market index. Obviously, an increase in returns could also be due to improved fundamentals following an IMF intervention. To distinguish this reduction in real hazard from increased moral hazard, the regressions include country and emerging markets spreads proxying for a potentially reduced risk of default. In attributing reductions in spreads completely to improved fundamentals, the authors argue, their test is biased against finding moral hazard, so strengthening their results. In their interpretation, the fact that high exposure to emerging markets at the time of "positive" IMF-news increases excess returns provides additional evidence for the moral hazard hypothesis: Investors expect future bailouts to increase the value of banks' outstanding loans which increases the value of banks' stocks. Again, changed incentives would then induce those banks to increase their exposure to emerging markets.

If one accepts Haldane and Scheibe's proposal as being a test of moral hazard with creditors, the above mentioned studies by Demirgüç-Kunt and Huizinga (1993), Kho and Stulz (1999) and Kho, Lee and Stulz (1999) provide additional insights. These studies present some evidence that IMF bailouts increase the value of bank stocks which, according to Haldane and Scheibe would imply moral hazard. The same is true for the results of Lau and McInish (2003), showing that IMF bailout announcements have a positive impact on domestic banks' stock prices in the countries receiving the bailout. Contrary to the moral hazard-hypothesis, however, these bailouts do not increase stock prices of banks in other countries.

Another test for moral hazard has recently been suggested by Evrensel and Kutan (2004c). As in their study of moral hazard in the bond market (Evrensel and Kutan 2004a), they estimate time-series GARCH regressions with daily observations from 6/1/1992-12/27/2002. They test whether IMF-related events in Thailand, Korea and Indonesia (announcement of negotiations with the Fund, program approvals and duration of negotiations) affect stock returns in Indonesia and Korea. Their results for Korea and, to a lesser extent, Indonesia are in line with the hypothesis that the IMF provided investors with an implicit bailout guarantee (or at least that investors perceived the IMF engagement to partly guarantee their investment). Stock returns in Korea significantly increased after "positive" IMF-news from Thailand and Indonesia and both with the announcement of negotiations and

program approval in Korea itself. Indonesian stock returns increased significantly as its own program negotiation with the Fund has been announced.

Although an interesting approach to testing for moral hazard, the authors, as they themselves admit, cannot solve the identification problem whether IMF interventions indeed induce moral hazard or capture changes in real risk. Moreover, in order to create moral hazard, creditors would have to expect the governments of the crisis country to use part of the IMF money to support companies, thus raising their share prices. Although this might exceptionally be the case, for example if there are close ties between government and private companies, an implicit guarantee is much more straightforward for commercial banks or holders of sovereign bonds. Positive IMF news might thus just have increased investors' confidence in reforms instead of being a signal of moral hazard.

In Evrensel and Kutan (2004d) the exercise is repeated for Indonesia, Korea and Thailand, employing the same method and focusing on the same period of time, but analyzing financial stocks only. According to the authors, moral hazard would be indicated by a decline in financial stock market returns. This is based on two assumptions. First, prior to the IMF arrangement the highly distorted financial sector yields excess profits because it is protected by the countries' elites. Second, the IMF program, aiming at restructuring the financial sector increases efficiency and therefore, at least in the short-run decreases (excess) profits. If the IMF program is believed to be unsuccessful, however, markets believe distortions (and thus excess profits) to prevail. Demand for financial stocks would rise, increasing returns.

Again the results are broadly in line with the moral hazard-hypothesis: Financial sector returns in Thailand increase by 1.2 percent on the day the program is approved. In Indonesia, there is an increase in returns of about half a percentage point on the day of the program approval, while the increase in Korea amounts to 7.4 percent.

The problems with this approach are obvious. As the authors concede, increasing stock market returns after program approval allows alternative interpretations. Investors might believe in the effectiveness of the IMF program. Instead of expecting the reforms in the financial sector to decrease stock market returns, however, they could equally well expect the efficiency gains to generate additional profits. The result of this study completely depends on investors expecting credible IMF programs to reduce (short-term) returns in the financial sector and incredible programs to increase them – an assumption that might or might not hold. Clearly, the authors' argumentation in Evrensel and Kutan (2004c) is to some extent inconsistent with this assumption. Even if the investors do expect credible reforms, the money

disbursed under the IMF program could be used to bail-out the financial sector, increasing stock market returns.

### **3. Does the IMF cause moral hazard with debtors?**

A first paper testing for direct moral hazard is Evrensel (2002) focusing on periods that are not associated with an IMF program and are located between two different programs in the same country (“inter-program-periods”). Similarly, Evrensel and Kim (2004) explain inter-program-periods for 91 countries over the years 1967-96. If IMF programs would induce moral hazard with the borrower, one would expect macroeconomic policies to worsen in inter-program-periods because otherwise the country could not negotiate additional programs. As Evrensel (2002) shows over the period 1971-97 for a sample of 42 countries for which two inter-program-periods are available, macroeconomic performance has been significantly worse in the second inter-program-period as compared to the first. According to the results, budget deficits, inflation rates and domestic credit, among others, are higher, while international reserves are smaller. Evrensel and Kim (2004) find that macroeconomic policies can explain the duration of the period a country is without an IMF program and interpret this as evidence in favor of moral hazard.

Clearly, these articles do not account for external shocks, which might have created the same results. It is therefore not obvious whether the worsening of macroeconomic policies is really due to the influence of the IMF. Also, the sample size in Evrensel (2002) is rather small. While Evrensel and Kim (2004) show that macroeconomic policies significantly influence the duration of inter-program-periods, they do not test whether these policies are pursued because IMF programs are available should a crisis occur. Their result is thus a necessary condition for moral hazard, but by no means a sufficient one.

Dreher and Vaubel (2004) propose a more direct test. They run pooled time-series cross-section regressions with 94 countries over the years 1975-97. The test for moral hazard proposed by Dreher and Vaubel is whether the policies causing financial crises are at least partially due to the influence of the IMF. Accordingly, they explain fiscal and monetary policy by the amount of credit available. If the availability of IMF money induces moral hazard with the borrower, fiscal and monetary policy should be more expansive, the higher the amount of IMF credit available at the beginning of the year relative to the country's quota.

The amount of credit available measures the quantity dimension of moral hazard generated by the IMF: as the country's quota is increasingly exhausted and, by implication, the quantity of additional credit available from the IMF diminishes, the incentive to pursue

excessive policy declines. Conversely, moral hazard increases if the country repays its credit to the IMF or if IMF quotas are raised.

The term “moral hazard” is sometimes also used in a wider sense describing an incentive to abuse the claim to an indemnity once the accident has occurred or an incentive to abuse a loan which ought to be, but may not be, repaid. To allow for the possibility of such abuse, budget deficits and monetary expansion are also regressed on the amount of new credit, which the country has received from the IMF during the previous year relative to its GDP. Officially, IMF conditionality is supposed to prevent the recipient country from embarking on over expansionary policies. However, it has been shown by various studies that the Fund’s conditionality is rather unsuccessful.<sup>14</sup>

Controlling for the rate of real GDP growth, the inflation rate and a variable measuring election dates, Dreher and Vaubel find that budget deficits and the rate of monetary expansion significantly fall as the country’s quota with the Fund is exhausted, while there appears to be no clear pattern for actual credits. When potential endogeneity of the regressors is controlled for, however, budget deficits indeed rise with IMF money received, also giving support to the hypothesis of moral hazard in the wider sense.

While those results are clearly in line with the moral hazard hypothesis, they could also reflect successful crisis management. The degree of borrowing against the country's quota with the IMF could thus be an indicator of the degree of implementation of the conditionality attached to (possibly successive) IMF programs (Conway 2004). As Jeanne and Zettelmeyer (2004) point out, it is the intended purpose of the Fund allowing crises countries more expansionary policies than they could pursue without the IMF. Whether the results of Dreher and Vaubel indicate moral hazard depends thus on whether policies would be inefficiently tight in the absence of the IMF.

Gai and Taylor (2004) analyze whether the introduction of the New Arrangements to Borrow (NAB)<sup>15</sup> and the Supplemental Reserve Facility changed the incentives of debtor countries to turn to the Fund. They construct an index of systemic importance, comprising the size of a country’s outstanding international debt securities, bank’s foreign claims on the country and its trade with the rest of the world. This is meant to capture the risk of contagion which is greater, the more important a country is in the international capital markets, the

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<sup>14</sup> Joyce (2004) provides an excellent overview. See also Dreher (2003, 2004) and Joyce (2003).

<sup>15</sup> The NAB are a set of credit arrangements between the IMF and 26 members and institutions to provide supplementary resources to the IMF if necessary to deal with a threat to the stability of the international monetary system.

larger international banks' exposure to the country and the greater its importance in international trade. Since NAB and SRF have been designed to contain the systemic impact of crises, the authors suggest this index of systemic importance to measure the perceived likelihood of being able to draw upon IMF resources in times of crisis: The more "systemic" a country, the more it should expect deriving benefits from NAB and SRF. This would lower pre-cautionary measures and thus increase Fund involvement. As the data suggest, the introduction of the SRF indeed increased the frequency of program participation, the more so, the more "systemic" a country.

To rigorously test for moral hazard, Gai and Taylor employ a balanced panel consisting of quarterly observations for 19 countries over the period 1/1995-4/2001. Their dependent variable takes the value of one if a country is under an IMF program in a certain quarter and draws upon IMF resources during the arrangement. Controlling for fundamental variables likely to influence the decision to turn to the Fund, the authors find that the introduction of NAB and SRF increased the probability of turning to the Fund, especially for countries of systemic importance. Moreover, for the more "systemic" countries the introduction weakened the impact of the included fundamental variables on the probability of program participation.

The authors identify the following problems with their analysis: First, their test is a necessary, but not sufficient condition for moral hazard. Second, they could only estimate a reduced form and are thus not able to disentangle demand and supply side factors. Third, the construction of the index of systemic importance is rather subjective. And finally, their results could be driven by a general structural break at the end of the nineties. As an additional problem, if the increased insurance cover would induce greater risk taking by the governments, fundamental variables employed as exogenous regressors (like the amount of international reserves) would in fact be endogenous.

#### **4. Summary**

This paper provides a critical overview of empirical studies on IMF induced moral hazard. With respect to the creditor moral hazard hypothesis, the evidence is far from being conclusive. Some of the studies reviewed in the paper encompass serious methodological problems, challenging their results. The empirical evidence shows that the results crucially depend on the choice of events. However, taken together, there is considerable evidence in favor of the hypothesis that the safety net provided by the IMF creates significant moral hazard with investors.

Whether IMF bailouts lead to moral hazard with debtor governments has so far been investigated by a small number of studies only, all finding evidence of moral hazard. If it is true that the IMF induces moral hazard with creditors and debtors, most studies for creditor moral hazard, taking fundamentals as given, suffer from endogeneity problems. While, for example, a higher probability of IMF lending would *ceteris paribus* increase investor moral hazard and thus decrease bond spreads, debtor moral hazard might at the same time increase, making policies worse and implying an increase in spreads. If IMF lending induces moral hazard with investors and debtors, the influence on spreads could be in either way. They could cancel each other out (Lee and Shin 2004). To test for creditor and debtor moral hazard simultaneously remains an interesting question for future research.

The empirical literature on moral hazard has been challenged by Jeanne and Zettelmeyer (2004) for not distinguishing efficiency-enhancing from inefficient moral hazard. Under certain assumptions, IMF-induced moral hazard might increase world welfare. Specifically, when debtor countries' governments act in the best long-run interest of their taxpayers and loans are repaid, lower spreads, higher capital inflows, and more expansive policies might be optimal. Clearly, the assumptions of governments maximizing the welfare of their taxpayers (instead of their own) is debatable. This could be tested by analyzing whether the IMF leads to redistribution at the expense of the average taxpayer (Jeanne and Zettelmeyer 2004). The test could also focus on the IMF's impact on the probability to experience economic crises. It would be hard to argue that increased capital flows and expansive policies increase efficiency if they significantly increase the risk of economic crises. The "efficiency" of moral hazard remains as another interesting question for future research.

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**Table 1: Overview of Studies on Moral Hazard**

Study	Period	Sample	Focus	Result*
Zhang (1999)	1/1992-2/1997, quarterly	6 Eurobonds, 4 Brady bonds	Bond spreads	No evidence of moral hazard
Eichengreen and Mody (2000)	1/1991-4/1999, quarterly	Bondware	Bond spreads	Consistent with moral hazard
Lane and Phillips (2000)	1995-1999, daily	EMBI <i>plus</i>	Bond spreads	No evidence of moral hazard, except for Russian non-bailout
McBrady and Seasholes (2000)	2/24/1999-2/26/1999, daily	402 Bonds	Bond spreads	Consistent with moral hazard
Tillmann (2001)	1/1/1994-11/2/2000, daily	EMBI <i>plus</i>	Bond spreads	No evidence of moral hazard
Dell'Ariccia, Schnabel and Zettelmeyer (2002)	1998-2000, daily	EMBI Global (21 countries) and Bondware (54 countries)	Bond spreads	Consistent with moral hazard
Evrensel (2002)	1971-97, yearly	42 countries	Macroeconomic Policy	Consistent with moral hazard
Mina and Martinez-Vasquez (2002)	1992-97, yearly	71 countries	Maturity structure of loans	Consistent with moral hazard
Mina and Martinez-Vasquez (2003)	1992-97, yearly	6 MENA countries	Maturity structure of loans	Consistent with moral hazard
Haldane and Scheibe (2003)	1995-2002, daily	7 UK banks	Stock returns of creditor banks	Consistent with moral hazard
Gai and Taylor (2004)	1/1995-4/2001, quarterly	19 countries	Probability of IMF programs	Consistent with moral hazard
Kamin (2004)	3/1992-11/2001, monthly	EMBI	Bond spreads, capital flows	Consistent with moral hazard between 1995-1998 but not thereafter

**Table 1 (continued)**

Study	Period	Sample	Focus	Result
Dreher and Vaubel (2004)	1975-97, yearly	94 countries	Budget deficit and monetary expansion	Consistent with moral hazard
Evrensel and Kutan (2004a)	12/19/1996-2/27/2003 and 5/17/1996-2/27/2003, daily	Indonesia and Korea	Bond spreads	Consistent with moral hazard
Evrensel and Kutan (2004c)	6/1/1992-12/27/2002, daily	Indonesia and Korea	Stock returns	Consistent with moral hazard
Evrensel and Kutan (2004d)	6/1/1992-12/27/2002, daily	Indonesia, Korea and Thailand	Stock returns in the financial sector	Consistent with moral hazard
Lee and Shin (2004)	1/1998-12/2000, monthly	EMBI Global (16 countries)	Bond spreads	Consistent with moral hazard
Evrensel and Kim (2004)	1967-96, yearly	91 countries	Macroeconomic Policy	Consistent with moral hazard
Zoli (2004)	1993-2000, quarterly	32 countries	Bond spreads	Consistent with (limited) moral hazard
Noy (2004)	1/1994-12/2000, monthly	EMBI <sup>plus</sup> (15 countries)	Bond spreads	No evidence of moral hazard

\* The result is based on the authors' own judgment.