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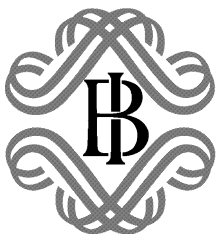
Financial crises, moral hazard and the "speciality" of the international interbank market: further evidence from the pricing of syndicated bank loans to emerging markets

by Francesco Spadafora



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FINANCIAL CRISES, MORAL HAZARD AND THE "SPECIALITY" OF THE INTERNATIONAL INTERBANK MARKET: FURTHER EVIDENCE FROM THE PRICING OF SYNDICATED BANK LOANS TO EMERGING MARKETS

by Francesco Spadafora*

Abstract

We analyse the evolution of emerging market loan spreads at a more disaggregated level than other current studies, providing statistical support to the assumption of the "speciality" of the international interbank market, to the extent that the pricing of interbank credit is insensitive to the nature (public or private) of the borrower. In sharp contrast, the public or private nature of other borrowers, such as corporates or financial firms, causes significant differences in spreads. These results could be interpreted as evidence of the possible role played by implicit government guarantees in the international interbank market, which lower the incentives for participants to monitor counterpart risk very closely. Furthermore, the specificity of banks is witnessed by the fact that only spreads on loans to emerging market banks clearly declined following the 1995 Mexican bailout, whereas evidence on the pricing of lending to corporates and financial firms is more ambiguous. Although, on the one hand, this might support the view that financial assistance from the IMF gives rise to moral hazard, on the other hand, contrary to expectations, spreads on loans to Asian banks, the major candidates in the current policy debate on moral hazard, have been unaffected by the IMF's response to Mexico's crisis.

JEL classification: F21, F20.

Keywords: risk premia, moral hazard, financial crises.

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Contents

1. Introduction[1]

During the 1990s, there was a complete change in the nature of emerging countries' access to the international financial markets, with significant implications for the working and stability of the markets themselves. In particular, the number and the amount of bond issues and syndicated bank loans in these economies increased remarkably, mostly beginning from 1995.

Alongside changes of a quantitative nature, in the 1990s the prices of emerging countries' debt instruments also changed; more precisely, the risk premium ("spread") paid by such economies with respect to a benchmark rate (generally represented by the U.S. Treasury yield for bonds or the LIBOR for loans) was reduced considerably, especially in the period following the Mexican crisis and the financial support package led by the IMF.[2]

In more general terms, the empirical analysis of the pricing of debt instruments issued by emerging countries has underlined a series of important characteristics. With reference to bonds, following a general downward trend starting in the early 1990s, there are differences in the evolution of spreads according to the riskiness of the issuer (Kamin and von Kleist, 1999). On the one hand, risk premia on liabilities with speculative-grade rating,[3] such as those on Brady bonds, increased as a result of the Mexican crisis and then decreased from

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[2] For example, in the sample of bonds issued by emerging countries used by Cline and Barnes (1997), the reduction of the average secondary market spread was of about 200 basis points between March 1995 and September 1997. A particularly striking reduction also occurred for the stripped spreads on Brady bonds issued following the restructuring that put an end to the debt crisis of Latin American countries during the 1980s. These spreads declined from 1500 basis points in March 1995 at the peak of the Mexican crisis, to 350 in September 1997, and then increased after the Asian crisis. The decline in risk premia paid by emerging economies is even more evident if we take, as a term of comparison, the high yield issues of U.S. corporates instead of the traditional Treasury bonds. In this case, indeed, the differential between spreads has fallen from the peak of 1550 basis points in March 1995 to 90 basis points, in July 1997, on the eve of the Asian crisis (spreads computed using the *JP Morgan Emerging Market Bond Index* (EMBI) and the *Merrill Lynch High Yield Master* index).

[3] This valuation corresponds to ratings higher than Ba1 and BB-plus by Moody's and Standard & Poor's respectively.

1995 on; on the other hand, spreads on bonds with investment-grade rating were both less volatile and with a different trend, declining remarkably during the whole period 1992-1997 and also during the Mexican crisis, an effect of the "flight to quality" induced by this latter.

Even more remarkable is the fact that the decline in bond spreads in the period between the second quarter of 1995 and the third quarter of 1997 appear to be greater than can be explained by the improvement in the economic fundamentals of emerging countries. This evidence introduces, on the one hand, the influence of external factors, such as the economic and monetary conditions of the industrial economies, in the determination of capital inflows to emerging countries and, on the other hand, involves the possible role played by moral hazard on the part of international investors, and in particular of banks, in lending to these countries.

The hypothesis that international financial support to economies in crisis, beginning with the rescue of Mexico in 1995, can produce moral hazard received particular attention following the 1997-98 Asian crises (Krugman, 1998) and represents one of the main questions in the current debate about the reform of the international financial architecture.

The object of this paper is to find empirical support to the hypothesis according to which a certain degree of moral hazard may be at the root of the excessive reduction of risk premia paid by borrowers in emerging countries after 1995, as a consequence of less attention being paid to the correct pricing of counterpart risk. In particular, we focus our investigation on the pricing of syndicated bank loans instead of that of bonds, both because of the importance of bank lending during the Asian crises, and because a number of studies on emerging market bond spreads have not found significant evidence of moral hazard (Zhang, 1999).

On the basis of the fact that the debate about moral hazard has, until now, been essentially of a theoretical nature, this paper aims to contribute to what is considered to be the crucial aspect of the phenomenon, i.e. its measurability (Lane and Phillips, 2000). The existence of a certain degree of moral hazard is indeed hard to question,[4] since it appears

[4] "*While the magnitude of the moral hazard created by the Mexican rescue can be questioned, it is hard to dispute the existence of moral hazard per se*". Eichengreen (2000, p. 15).

almost as an inevitable consequence of official rescue interventions, in that they tend to limit the economic and social costs of a crisis.

Despite the need for care in evaluating moral hazard, a phenomenon which can only be detected indirectly, one of the main conclusions of our empirical work points out the importance of analysing moral hazard in less general terms in order to avoid inferences that may prove misleading.

In particular, by allowing a more disaggregated classification of borrowers than that adopted by current studies on the subject, we are able to identify different reactions of loan spreads following the Mexican crisis according to the type of the borrower. In this regard, a key contribution of the paper is that it identifies a number of elements offering some support to the hypothesis of the so-called "speciality" of the international interbank market, according to which the perception of implicit or explicit official guarantees would induce in participants a lower level of attention in evaluating counterpart risks.

First of all, while the impact of the IMF intervention in Mexico on risk premia charged to emerging market corporates and financial firms is rather ambiguous, depending on whether or not one is controlling for industrial countries' interest rates, the decline of spreads on interbank loans is robust to the specification of the regression equations. In addition, while for financial firms and corporates the fact of belonging to the public sector implies lower spreads, these latter seem insensitive to the borrower's nature in the case of banks.

Finally, although our analysis confirms the limited ability of industrial countries' interest rates to explain the decline in credit spreads, the explanatory power of the supply-side variable we use, i.e. the nationality of the bank which acts as the arranger of the loan syndicate, allows us to interpret this regressor as an alternative measure to capture the influence of international liquidity in the pricing of lending to emerging markets.

The work is structured as follows. Section 2 contains a review of the empirical literature about the evolution of spreads on the debt instruments (bonds and loans) issued by emerging economies, with a discussion of the role played respectively by the economic fundamentals and the external factors in these markets, such as industrial countries' interest rates. Section 3 introduces the effect of moral hazard in lending to emerging countries, with

particular attention to IMF-led financial packages. Section 4 discusses the role of syndicated loans as a source of financing for these economies and specifies the "speciality" of the international interbank market, whereas section 5 illustrates the present empirical evidence on moral hazard. Section 6 gives the results of an econometric analysis of spreads on syndicated bank loans made at a higher level of disaggregation of borrowers than in previous studies on the subject, with section 7 containing some extensions of the same analysis. Lastly, in section 8 the main conclusions of the present study are delineated.

2. The literature about the evolution of spreads on emerging countries' debt instruments

In order to assess the factors determining credit spreads, it is necessary first of all to point out that they are a form of compensation against the risk of default, which depends in general on the ability of a country to sustain a certain level of foreign debt.

Studies on this subject typically include a regression in which the spread on a bond or loan is the dependent variable whereas the independent variables are a series of indicators of a microeconomic and macroeconomic nature, acting as proxies for the creditworthiness of the borrower or, in other words, for the probability of default.

These indicators are generally represented by the characteristics of the issuer, of the country of issue (in terms of both economic fundamentals and liquidity and solvency measures) and of the issue itself. Alternatively,[5] the rating of the issuer is used instead of the aforementioned fundamentals as a measure of creditworthiness because, besides correctly synthesising the latter, this indicator has an additional explanatory power in the interpretation of the spread.

Furthermore, independent variables include a number of external factors, the most

[5] For example in Kamin and von Kleist (1999). A study by Cantor and Packer (1996, p. 12) suggests that sovereign ratings given by agencies such as Moody's or Standard & Poor's "*completely subsume all information contained in country performance measure and, in fact, add information relative to those measures in explaining sovereign debt spreads*". In particular, the rating considers a series of specific attributes of the issuer as well as of the country of origin and, consequently, in a sample including private as well as public issuers, this indicator gives a more precise measure of risk compared with the economic fundamentals of the country.

important of which is the interest rate prevailing in industrial countries (usually the U.S. Treasury yield), to be interpreted as a proxy for the risk-free rate and for general conditions in international financial markets.

The empirical analyses of the evolution of risk premia on debt instruments in emerging countries look at spreads on both bonds and syndicated loans. The factors determining risk premia on bonds have been examined with reference, on the one hand, to spreads in the primary market (launch spread), recorded at the moment of issue (Min, 1998; Eichengreen and Mody, 1998; Kamin and von Kleist, 1999), and on the other, to spreads quoted on the secondary market (Cline and Barnes, 1997; Zhang, 1999). As regards syndicated loans, Eichengreen and Mody (2000) make the only systematic study of the factors determining the launch spread on this form of financing during the 1990s; Kamin and von Kleist analyse spreads on loans as well as on bonds.

Overall, the results of such studies confirm the expectation that better fundamentals, with a superior credit quality, determine a lower spread. This can be interpreted in favour of the presumed ability of the market to distinguish among borrowers on the basis of their riskiness.

One of the main objectives of studies on the evolution of emerging countries' risk premia is to establish to what extent the decline in spreads, especially in the period between the end of the Mexican crisis (January 1995) and the beginning of the Asian crisis (July 1997), can be attributed to the improvement in the economic fundamentals of these economies and/or in external factors, such as the state the of international financial markets and the macroeconomic development of industrial countries. Furthermore, following the Asian crisis moral hazard has been considered as a possible additional argument to explain the above-mentioned decline in spreads.[6]

The studies in question, therefore, agree on the fact that spreads paid by emerging countries systematically decreased from the first quarter of 1995 to the third quarter of 1997 to a greater extent than can be explained by the improvement in the economic fundamentals

[6] The role of moral hazard will be examined in depth in the next section.

of the borrower alone (Eichengreen and Mody, 1998; Kamin and von Kleist, 1999).

For instance, using the debtor's rating as a synthetic measure of creditworthiness, the average spread paid by an emerging issuer with the Standard & Poor's BB rating declined from 290 basis points in the third quarter of 1995 to 170 in the second quarter of 1997 (Cline and Barnes, 1997).[7]

From a theoretical point of view, a possible explanation of the excessive decline in risk premia compared with the improvement of the borrower's creditworthiness is based on the hypothesis that the initial level of spreads was itself higher than the creditworthiness. This seems to be the case for the bond market in the middle of the 1990s, when the resumption of issues by emerging countries, after the Latin-American debt crisis of the 1980s, caused a relatively high spread of initial reentry and a marked subsequent reduction (Cline and Barnes, 1997).

More generally, however, the empirical analysis has considered further possible causes of the observed decline in spreads and, in particular, has examined the influence of external factors on emerging countries, thus attributing a determinant role to the increase of the international supply of capital.

The main causes of the increase of capital inflows to emerging countries (Table 1) have been identified, on the one hand, in the favourable phase of the economic cycle and the monetary conditions in industrial countries, characterised by a lower level of interest rates and by a high availability of liquidity, and on the other hand, in structural changes in these countries.

[7] Another way of identifying the causes of the reduction in spreads is carried out by using to forecast the coefficients obtained from a regression between spreads and economic fundamentals for a determined time interval. According to this out-of-sample estimate, Cline and Barnes point out that in the third quarter of 1997 the average spread paid by emerging issuers was equal to 130 basis points, whereas according to the statistical relationship between spreads and fundamentals estimated for the period 1992-96 the average risk premium should amount to 245.

Table 1

EMERGING MARKETS – NET PRIVATE CAPITAL INFLOWS
(in billions of U.S. dollars)

	1993	1994	1995	1996	1997	1998	1999	2000
Total flows	125.7	141.5	189.3	220.5	119.6	54.3	62.5	7.6
Foreign direct investment	56.6	80.9	96.7	120.2	144.7	151.3	159.9	144.6
Portfolio investments	81.8	110.4	43.0	85.3	43.1	1.1	23.2	23.7
Other (bank loans)	-12.7	-49.8	49.6	15.0	-68.3	-98.1	-120.6	-160.6

Source: IMF (2000).

2.1 The role of industrial countries' interest rates

The decline of industrial countries' interest rates, beginning from 1991 (Figure 1), has been indicated as a cause of the first stimulus to capital inflows towards emerging countries. The empirical evidence,[8] indeed, shows a negative correlation between net private loans to such countries and the level of industrial countries' interest rates, considered as an indicator of conditions in the international financial market.

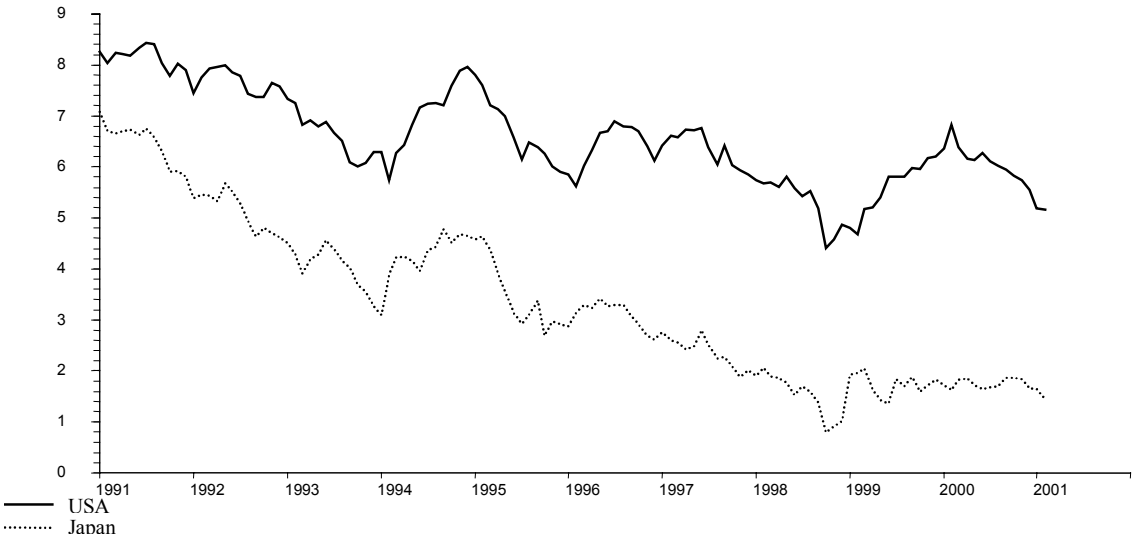
With particular reference to Japan, the main lender to Asia, the hypothesis is that the low level of domestic interest rates and the weakness of the internal demand for loans may have encouraged local banks to increase investments in the financial assets (bonds and loans) issued by emerging markets.

According to some interpretations (Cline and Barnes, 1997), the significant decline in risk premia paid by emerging countries between the end of 1995 and the middle of 1997 could therefore be attributed, first of all, to variations in the conditions of international financial markets (an increase in liquidity) and, to a lesser extent, to variations in the economic fundamentals of these countries.

[8] World Bank (2001).

Figure 1

RATE OF RETURN ON 10-YEARS GOVERNMENT SECURITIES IN THE U.S. AND JAPAN



Source: Thomson Financial Datastream.

The increase in the availability of capital, in other words, may have caused competitive downward pressure on spreads of assets belonging to the same class of risk; in fact, the aforementioned decline may not have been an exclusive characteristic of emerging market liabilities but were probably of a more general nature, common to instruments considered in competition with such liabilities as regards to portfolio allocation.

In particular, on the basis of the so-called "capital market segmentation hypothesis" (Zhang, 1999), international financial markets could be divided into different classes according to the asset riskiness; emerging market bonds are therefore competitive instruments of both equities and corporate high yield bonds, all belonging to the same class of (high) risk.[9]

From the analytical point of view, in order to test the hypothesis of causality between

[9] The empirical evidence confirms how the reduction in spreads on emerging market bonds (for all ratings) follows a decline in the risk premium on U.S. corporate high yield bonds, an indicator of market risk aversion: the average value of the latter spread declined by about 150 basis points in the same time interval (one year and a half) in which the average spread on emerging market bonds decreased by 200 basis points (Cline and Barnes, 1997). In addition, econometric estimates (Zhang, 1999) support the hypothesis that the aforementioned bonds belong to the same class of risk, underlining a significant positive correlation among respective spreads: on average, an increase of one basis point in the risk premium on corporate issues increases the spread on Eurobonds by half a basis point and Brady bonds by 1.2 basis points.

the interest rates of industrial countries (as proxies for the international capital supply) and spreads paid by emerging countries, the studies in question include a risk-free benchmark yield among the independent variables of the regression equation, i.e. the yield of a government bond issued by an industrial country with the same maturity and currency of denomination as the bond in the emerging country.

The interpretation of the statistical results, nevertheless, introduces some problems because the sign of the relation between benchmark rates and spreads is in general indeterminate; this occurs because the variation of the aforementioned interest rates can produce effects both on the demand and the supply of debt instruments in emerging countries and, accordingly, the effect on spreads is ambiguous.

In principle, a positive relationship between spreads and industrial countries' interest rates is first of all explainable on the basis of a simple "mathematical" effect, determined by the mere existence of a probability of default on the riskier emerging country bond.[10] Moreover, a direct relationship between these two variables can be explained since a low level of the benchmark rate is probably indicative of an abundance of capital supply, which in turn means greater competition among lenders and thus a reduction in the debt price, that is, in the spread.

The positive correlation between the decline in spreads and the reduction in benchmark interest rates is also explained by the increased "appetite for risk" on the part of international investors, who may have increased the demand for the (riskier) liabilities in emerging countries in order to balance the fall in yields in mature markets, (Kamin and von Kleist, 1999). These hypotheses, nevertheless, do not seem to be confirmed from the statistical point of view, either by using as a benchmark a U.S. or a Japanese interest rate.[11]

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[10] In particular, by indicating with r and i the rates of interest on, respectively, the risk free and the risky assets and with p the probability of default, the arbitrage condition $(1+r)=(1-p)(1+i)+p0$ implies that the spread $s=i-r$ equals $s=(1+r)\frac{p}{1-p}$. Kamin and von Kleist (1999); Cline and Barnes (1997).

[11] In Cline and Barnes's and Min's studies of bond spreads the coefficients, respectively, on 10-year T-bonds and 3-month T-bills are positive but statistically insignificant. Kamin and von Kleist (1999, p. 31) do not mention any contribution of the U.S. and Japanese benchmark yields in explaining the evolution of spreads on bonds of emerging countries, particularly on Brady bonds: "....*recent studies lend support to the*

A negative correlation, contrary to the "natural" positive relationship based on the mathematical effect, can be justified by an interpretation of the movements in the benchmark rates in terms of supply; more precisely, an increase (reduction) of interest rates in industrial countries, determining less (more) favourable conditions for currency financing, causes a reduction (increase) in the supply of debt instruments by emerging countries and, consequently, a decline (increase) in the risk premium.[12]

For these reasons, overall, the empirical evidence does not allow us to attribute univocally the reduction of spreads on emerging countries' debt instruments to the decline of interest rates in industrial economies.

In this respect, a possible explanation of the uncertainty about the positive or negative relationship between these two variables is due to the fact that they can change over time in accordance with the prevalence of the demand or supply of bonds/loans in the aforementioned countries (Eichengreen and Mody, 1998). With reference to the evidence for the 1990s, for instance, whereas in the first part of the decade the dominant effect was on the supply side, when a reduction of interest rates in the United States increased the volume of issues in emerging economies and the relative spread, in the second half of the decade the dominant effect was on the demand side, the decline in interest rates helping to encourage investment in financial activities in emerging countries and, consequently, a squeeze in the relative spreads.

The time-varying relationship between benchmark interest rates and the risk premium

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evidence….that the decline in industrial countries' interest rates in recent years does not explain the decline in emerging market spreads".

[12] Eichengreen and Mody (1998 and 2000) confirm this negative relationship, because an increase of the interest rate on the 10-year T-bonds causes a reduction in both the probability of a bond issue by an emerging country and in the spread. The same supply effect seems to be valid in the case of syndicated loans, as an increase of the interest rate on the 3-year T-bonds (the average loan term) reduces the spread, although only slightly. After correcting for selectivity, however, the authors find little significant impact of U.S. Treasury rates on spreads. Unlike the previous case of bond issuing, nevertheless, a higher U.S. interest rate remarkably increases the probability of observing a loan and this can be explained on the basis of the fact that the increase in benchmark interest rates encourages banks to increase the volume of loans and induces them to ask for lower spreads.

paid by such countries, therefore, introduces the role of the institutional changes[13] that occurred in industrial countries during the last decade, which were in a cause/effect relationship with the increase of investments in financial assets issued by emerging economies. Such changes would in fact have contributed to the prevalence of the effect of demand (or of "appetite-for-risk") on supply from the middle of the decade on.

In particular, changes in the structure, instruments and regulation of financial systems in industrial countries, between the end of the 1980s and the beginning of the 1990s, have represented a further, perhaps more important, factor in encouraging capital inflows towards emerging countries and a consequent decline in spreads (Cline and Barnes, 1997). Without such changes, the amount of capital available for emerging countries would probably have been limited, regardless of the economic and financial conditions prevailing in mature markets.[14]

3. Moral hazard in international lending to emerging markets

Moral hazard in the financial system has been blamed as one of the factors at the root of the recent Asian crisis, as it has led both to excessive foreign borrowing and domestic lending by poorly regulated financial intermediaries that ultimately proved insolvent.

At international level, the moral hazard argument arises in two main contexts. First, moral hazard relates to official financial packages led by the IMF, starting with the Mexican crisis of 1994-95; second, moral hazard arises from the possible role played by implicit government guarantees in the (national and international) interbank market, which lower the incentives for participants to monitor counterpart risk closely. This phenomenon is part of

[13] Structural changes can be divided into different categories: evolution of saving models, with the move from bank deposits to shares and bonds through mutual funds; gradual liberalisation of rules for investing in emerging markets by institutional investors such as pensions funds and insurance companies; improvement of the creditworthiness of emerging countries, particularly in Latin America; improvement of the access to information about emerging countries; deregulation and improvement of domestic bond markets in industrialised countries; and growth of banking competition in Europe, as a consequence of the European Union.

[14] In this regard, the diffusion of rating has had a catalytic effect encouraging capital inflows to emerging markets because the rules of institutional investors often tie up investments essentially in instruments with investment-grade rating.

the larger debate about the ability of the market to screen debtors and fully assess their riskiness. In general, two different positions are held.

On the one hand, according to the supporters of the "efficiently-functioning market view", investors have strong incentives to be informed and to distinguish among issuers; such aptitude is shown by the existence of different risk premia on debt instruments issued by countries with different economic characteristics and ratings. Following this view, the decline in spreads paid by emerging countries between the beginning of 1995 and the first half of 1997 is thus to be attributed to the improvement of their macroeconomic and financial fundamentals, following the processes of liberalisation and structural reforms and the policy adjustments induced by the Mexican crisis.

On the other hand, the more sceptical observers of market efficiency state that, since the necessary information for a correct risk pricing is expensive to acquire and evaluate, investors fix the premia under conditions of incomplete information about the economic and financial situation of the issuer; therefore, this is at the origin of the herd behaviour and the high volatility of quotations. Such observers, besides, do not consider the improvement of economic fundamentals sufficient to justify the remarkable decline of spreads paid by emerging markets in the second half of the 1990s, attributing this decline to a general decrease of incentives to assess exactly the creditworthiness of the borrower on the part of international investors.[15]

Finally, it is worth noting that, to the extent that the decline of emerging market spreads reflects a dumping of the evaluation of counterpart risk, this phenomenon probably involves the bond market more than the loan one, because the demand for bonds can come from private investors, whereas syndicated loans involve professional brokers (Cline and Barnes, 1997). The lower aptitude of bond subscribers to price risks correctly represents, therefore, a further possible explanation of the greater decline in spreads on such instruments than on syndicated loans.

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[15] "*Investors in their exuberance may have been snapping up emerging-market debt in disregard of historical relationships between fundamentals and yields*". Eichengreen and Mody (1998, p. 3). "*The decline in spreads reflects the enthusiasm of a broader set of investors less accustomed to evaluation of underlying risk*". Cline and Barnes (1997, p. 9).

3.1 IMF-led financial packages and moral hazard

Moral hazard[16] has been indicated as one of the possible factors determining the increase of capital inflows to emerging countries after the rescue by the international financial community of Mexico in 1995,[17] a country that was the main individual recipient of IMF credits during the 6 years before the crisis. In particular, the rescue of Mexico and the consequent expectation of further future interventions of the same kind, in case of difficulties in servicing foreign debt, have been indicated as causes of the previous mentioned lower level of attention paid to risk pricing. In other words, the hypothesis is that the existence of a safety net of implicit or explicit guarantees provided by governments, central banks and international financial institutions would induce in creditors, particularly the banks, the perception that they were protected from the risks of lending to emerging countries, stimulating to some extent moral hazard. This would be at the origin of the high increase in international lending and the decline of spreads following the financial intervention benefiting Mexico.[18]

This hypothesis underlines the essentially forward-looking nature of moral hazard, in that a particular case of an official rescue intervention may influence expectations on how such situations will be addressed in the future.

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[16] In order to properly understand the phenomenon it is worth noting the distinction between debtor-side and creditor-side moral hazard. More precisely, in the context under examination the availability of official financial assistance can determine incentives to bear excessive risks on the part of both potential IFI debtor countries and creditors of these countries, to the extent to which the financial aid affects the expected returns: in particular, debtors are able to continue borrowing in the international capital markets while maintaining an economic policy stance inconsistent with the fiscal and external positions, and creditors supply funds with a pricing that does not reflect the actual riskiness of the borrower. In any case, the main consequence of moral hazard, an incorrect risk pricing, reflects the interaction in the behaviour of both debtors and creditors. Lane and Phillips (2000).

[17] For a discussion of the evolution and resolution of the Mexican crisis see IMF (1995).

[18] "*Excessively broad national safety nets have contributed to problems of moral hazard*". IMF (1998a, p. 4); "*With banks enjoying deposit insurance, lender-of-last-resort services, and in some cases implicit and explicit guarantees, along with the expectation that they will be able to withdraw their funds on demand insofar as the IMF injects offsetting resources in response to a crisis, it has been suggested that spread compression on syndicated bank loans to developing countries is an indication of the extent of moral hazard*". Eichengreen and Mody (2000 p. 7). "*An additional factor contributing to the decline in spreads may arguably have been the perceived expansion in the implicit international safety net extended to very large borrowing countries, following the concerted rescue package provided to Mexico a few years later*". Bernard and Bisignano (2000, p. 18).

In this regard, it should be noted that in order to observe moral hazard the mere expectation of an international intervention, particularly by the IMF, is not enough, since the expected intervention must be of such dimensions as to rescue a high number of creditors. Accordingly, the existence of formal limits of access (of public dominion) to IMF resources should, in principle, be sufficient to prevent (or at least to diminish) moral hazard. At the moment, the access of each member country to Stand-By Arrangements or Extended Fund Facilities financing is subject to a 100 per cent annual and a 300 per cent cumulative limit to the quota. Therefore, this creates the risk of creditors remaining "*too far back in the queue*" (Lane and Phillips, 2000).

Nevertheless, the empirical evidence weakens the real importance of such limits, considering that in the most recent interventions (Mexico in 1995, Indonesia, Korea and Thailand in 1997) appealing to the clause of "exceptional circumstances", justifiable on the basis of the potentially systemic nature of the crises in question, has allowed funding to be granted beyond the aforementioned limits (the size of funding in terms of quota has fluctuated between 490 and 690 per cent). These so-called "high-access cases" have therefore been the object of an inflamed dispute regarding their potential role as precedents enhancing the forward-looking nature of moral hazard.

Although it is impossible to deny completely that the Fund's financial support has in such cases allowed the recipient countries to serve their maturing foreign debt for a certain period, such support does not seem to have ever involved a complete rescue of private creditors, since the size of the intervention varied, as a ratio to total external debt, from a minimum of 5.8 per cent in the case of Thailand to a maximum of 27.9 per cent for Mexico (Table 2).

Table 2

BIS REPORTING BANK CLAIMS ON CRISIS COUNTRIES AND OFFICIAL FINANCING

(stocks in billions of U.S. dollars)

Country	Period	Stock of debt (1)		Official financing (2)					
		Total	Short term	Total			of which: IMF		
				absolute value	as % of total debt	as % of short term debt	absolute value	as % of total debt	as % of short term debt
Mexico	Dec. 94	64.6	33.1	50.0	77.4	151.1	18.0	27.9	54.4
Indonesia	June 97	58.7	34.7	37.9	64.6	109.2	10.1	17.2	29.1
Korea	June 97	103.4	70.2	58.4	56.5	83.2	21.1	20.4	30.1
Thailand	June 97	69.4	45.6	17.2	24.8	37.7	4.0	5.8	8.8
Brazil	June 98	73.3	41.0	41.5	56.6	101.2	18.1	24.7	44.1

Sources: BIS (1999); IMF (1998). (1) BIS reporting bank claims on crisis countries. (2) IMF, World Bank, Regional Development Banks and Bilateral Creditor.

Against this background, moral hazard is more often associated with the more limited hypothesis according to which the Fund's programs, beginning with the Mexico intervention, have given rise to the perception that official financial support is primarily used in favour of the short-term external credits provided by international banks.[19] In this respect (Table 3), in the period June 1994 - December 1996, the ratio between short-term foreign debt and official reserves increased in all the so-called ASEAN-5 countries (Korea, the Philippines, Indonesia, Malaysia and Thailand), although on the verge of the Asian crisis it appeared to decrease slightly in the three more involved countries (Korea, Thailand and Indonesia).

[19] "*For short-term credit provided by international banks and other investors there is greater concern about possible moral hazard*". IMF (1998a, p.8). "*The powerful root of moral hazard lies in the IMF's encouragement, or lenders' perception of its encouragement, of short-term, foreign currency loans to developing countries, particularly where the domestic banking and financial infrastructure is weak*". Report of the Meltzer Commission (*International Financial Institution Advisory Commission*), set up in November 1998 by the US Congress, under the legislation allowing about $18 bn of further financing to the IMF.

Table 3

RATIO BETWEEN SHORT-TERM EXTERNAL DEBT AND OFFICIAL RESERVES

Country	June 94	Dec. 96	June 97	Dec. 97	June 98	Dec. 98	June 99	Dec. 99	June 00
Argentina	1.32	-	1.21	1.88	-	1.65	1.90	1.62	1.83
Indonesia	1.72	1.81	1.70	2.32	1.62	1.20	0.98	0.80	0.83
Korea	1.62	2.13	2.06	3.25	1.03	0.82	0.74	0.62	0.49
Malaysia	0.25	0.47	0.61	0.80	0.63	0.43	0.31	0.30	0.24
Mexico	1.72	-	0.61	1.18	-	1.06	0.99	0.84	0.85
Philippines	0.40	0.77	0.85	1.88	1.37	1.18	0.82	0.68	0.62
Russia	-	-	-	2.55	3.12	2.37	2.03	1.43	0.76
Thailand	1.00	1.69	1.45	1.62	1.21	0.96	0.77	0.48	0.48

Sources: *Joint BIS - IMF – OECD - World Bank Statistics on External Debt*; Corsetti, Pesenti and Rubini (1998); Radelet and Sachs (1998).

Objectively, in the cases of Mexico, Indonesia and Brazil the size of the official financial intervention has been at least equal to the amount of the short-term foreign debt (Table 2). Besides, with reference to this latter, the intervention of the Fund in Mexico recorded the highest percentage (54.4 per cent).

In the aforementioned cases, therefore, owing to the absence of default events on short-term debt, the hypothesis of a rescue for holders of such liabilities is not at all improbable, unlike the losses suffered (at least temporarily) by investors in long-term bonds and equities, because of the fall in quotations.

Moral hazard was paid considerable attention on the occasion of the Asian crisis in 1997, becoming the subject of the debate about the reform of the international financial architecture and the role of the IMF. At an official level,[20] too, there is recognition of the possible role of moral hazard in bank lending by the G10 countries to Asian economies in general, and their banking systems in particular; for example, the perception by the market of

[20] *"Some foreign investors, including G10 banks, may have assumed that implicit guarantees existed on these claims in particular on banking sector claims. Accordingly, as in past crises, a significant element of moral hazard may have existed*". BIS (1999, p. 14).

the existence of implicit guarantees[21] for international interbank liabilities, by reducing incentives to correctly price the counterpart risk, may have pushed the international banking system to compete with financial markets in funding such economies, determining the remarkable interbank capital inflow recorded from 1994 on.

In this respect, one of the questions often used to reduce the role of moral hazard in the Asian crisis is the different nature of capital inflows toward the countries involved, in comparison with the previous case of Mexico. Whereas in Asia capital inflows mostly took the form of bank and interbank loans, in the Mexican case external investments were directed to government bonds, which were the main beneficiaries of the bailout operation led by the IMF in 1995. Nevertheless, it should be observed that at the end of December 1994 foreign investors held about 20.5 billion dollars of the Mexican public external debt, equal to 23 per cent of the total and 60 per cent of the short-term debt, more than three times the amount of official reserves; in particular, 17 billion were held in foreign currency securities, the so-called "Tesobonos".

Although there are no precise figures regarding the composition of foreign holders of the Mexican debt, a certain number of international banks were probably involved. Accordingly, in order to assess the importance of a particular episode of rescue in determining moral hazard, what can be really important is not so much the kind of financial instrument benefiting from official intervention as the nature of the holders of the instrument itself.

The empirical evidence seems partly to confirm the suspicions about moral hazard, to the extent that the trend of spreads on debt instruments in emerging countries during the 1990s cannot be completely explained either by improvements in the economic fundamentals of such countries, or by the changing monetary conditions in the industrial countries (Eichengreen and Mody, 1998).

[21] The Korean case of March 1998 is an example of implicit guarantees turning into explicit ones in favour of international interbank deposits: following the end-1997 crisis, the creditor banks, in the face of a government guarantee, agreed to roll over their loans for three months at an interest rate equalling that on US Treasury bills plus a 250 basis points spread.

This trend has also been influenced by changes in market sentiment, which are not necessarily connected to the aforementioned factors, and can cause large variations in prices and volumes in the short term. In particular, market sentiment would have played a dominant role in determining upward movements of spreads during the Mexican crisis in 1994-95 and downward movements in the following period.[22]

4. Syndicated bank loans and the "speciality" of the international interbank market

Together with asymmetric information and contracts enforcement, moral hazard represents one of the factors typically used to explain the recent growth in syndicated loans (in particular interbank loans) to emerging markets, because of the assumed protection in favour of international lending arising from safety nets at both national and international level.

For emerging countries, syndicated loans represent a source of financing as important as bonds. They are typically licensed by a pool of about ten-twenty banks, of which two or three assume the role of co-manager. Unlike bonds, syndicated loans are not exchanged on the secondary market, as banks tend to hold them as a form of investment to improve long-term customer relations. These loans are mostly licensed to borrowers in the private sector, which dominates this segment of financial market unlike the bond market in which sovereign borrowers prevail.

Moreover, syndicated loans and bond issues had a different temporal evolution during the 1990s (Table 4). In particular, whereas syndicated loans greatly increased above all starting in 1996, from negligible levels at the beginning of the decade up to peak levels on the verge of the Asian crisis, bond issues grew more regularly until 1997, when they

[22] "*In….the wake of the Mexican crisis, blanket shifts in sentiment play the dominant role*". Eichengreen and Mody (1998, p. 38). These authors, in order to separate the effect on spreads caused by variations in fundamentals from that due to changes in market sentiment, use the Oaxaca decomposition, interpreting an increase in the Inverse Mills Ratio coefficient, a measure of sample selectivity, as evidence of a more discriminating attitude of the market and then of a closer attention to fundamentals. The result of the analysis is that the variation in the average value of the dependent variable, the spread, is larger than the amount explained by the variation in the average values of independent variables, that is, by improvements in the issuer's fundamentals.

decreased drastically.

Table 4

EMERGING MARKETS – ACCESS TO INTERNATIONAL CAPITAL MARKETS
(in billions of U.S. dollars)

Year	Total	Bond issues	Bank loans	Equity placements
1991	76.9	11.0	61.3	4.6
1992	80.1	20.1	54.0	6.0
1993	115.7	50.1	57.5	8.1
1994	135.5	45.7	72.8	17.0
1995	173.3	52.6	112.7	8.0
1996	236.5	97.6	125.2	13.7
1997	315.8	114.3	179.1	22.4
1998	189.4	73.0	107.8	8.6
1999	185.4	70.3	94.0	21.1
2000	236.4	77.2	124.4	34.8

Source: World Bank (2001).

Furthermore, spreads on the two debt instruments behaved differently over time during the 1990s, having moved in the same direction only for limited periods (Table 5). Bond spreads, indeed, increased in the first part of the decade, declined in the first quarter of 1995 and then increased again for the rest of the year and at the beginning of 1996. The decline can be attributed to a qualitative effect on the composition of issuers ("flight-to-quality"), arising from the Mexican crisis of 1994-95, which induced international investors temporarily to suspend any financing towards emerging economies and caused the exclusion from financial markets of issuers with lower ratings (speculative grade). In other words, only emerging countries with investment-grade rating (and, consequently, paying lower spreads) succeeded in staying on the market, whereas those at higher risk, particularly in Latin America, suffered credit rationing.

On the contrary, in the 1990s spreads on syndicated loans remained relatively steady and were systematically lower and less variable than bond spreads. More precisely, Cline and Barnes (1997) underline a tendency to reduce such spreads between the first half of 1995 and

the first half of 1997, although the trend is more ambiguous and the reduction is much smaller in magnitude in comparison with bonds.

Table 5

SPREADS AT LAUNCH ON LOANS AND BONDS 1991 – 1997
(in basis points)

	1991	1992	1993	1994	1995	1996	1997	Average
Loans	98	104	110	117	113	107	121	112
Bonds	270	339	354	228	218	240	229	256

Source: Eichengreen and Mody (2000).

According to the authors, this difference may be ascribed to the fact that the bond market includes more issuers from Latin America and Eastern Europe, for which spreads had reached high levels in the mid-1990s, whereas the market for syndicated loans is dominated by borrowers located in East Asia, who pay lower risk premia. Moreover, the stronger reduction in bond spreads from 1995 on could be due to the high level of the initial reentry spreads charged on emerging countries regaining access to international markets (through the vehicle of the Eurobond), following the default and Brady restructuring which characterised the debt crisis of Latin American countries in the 1980s.

Although the prevalence of Asian borrowers in the syndicated loan market may partly reflect the negative experience suffered by international banks during the above crisis, the origin of the strong inflow of banking capital to Asian countries is more correctly to be found in the dominant role that the international interbank market[23] (IIBM) has played from 1994 on in supporting expansive credit cycles in Asian countries, producing the so-called "overborrowing syndrome" (McKinnon and Pill, 1999).

In general, because of the ready availability of liquidity during the 1990s, the IIBM made a significant transformation both of maturities, by converting short-term deposits into long-term loans, and of risk, by transferring deposits from the main international banks to intermediaries in emerging countries with a lower credit standing.

In particular, the exposure toward the ASEAN-5 banking systems significantly

increased in a very few years,[24] because of the fact that for banks in the industrial countries, above all in Japan and Europe, such systems represented an attractive exhaust-valve for the domestic excess of liquidity. Indeed, low levels of domestic interest rates, weak internal demand for loans and current account surpluses in Japan, and the erosion of profits induced by the growth of competition in European financial systems as a consequence of progress in economic-financial integration in the European Union, would have encouraged Japanese and European banks to turn to Asian markets to gain higher yields, under the appetite-for-risk argument.

The relationship between the growth of interbank loans to Asian economies and conditions of liquidity in industrial countries can be assessed by considering the trend of interbank interest rates; from 1991, the 3-month rates on euro-deposit accounts in dollars and yen began to decline but the differential between such rates, equal to about two percentage points at the beginning of the same year, vanished in spring 1993 (Figure 2).

From this date on, the euro-yen rate declined below the euro-dollar rate, because of the rise in U.S. short-term yields and the significant reduction in Japanese yields. This would explain the increased lending by Japanese banks to ASEAN-5 countries and, more generally, support the hypothesis of the dominant role played by external factors in determining private capital inflows to emerging countries and the decline of spreads on their foreign borrowing. According to some empirical surveys (Fernandez-Arias, 1996), the push effect exerted by the weakness of economic conditions in the industrial countries would be more important than internal factors in explaining the aforementioned inflows.

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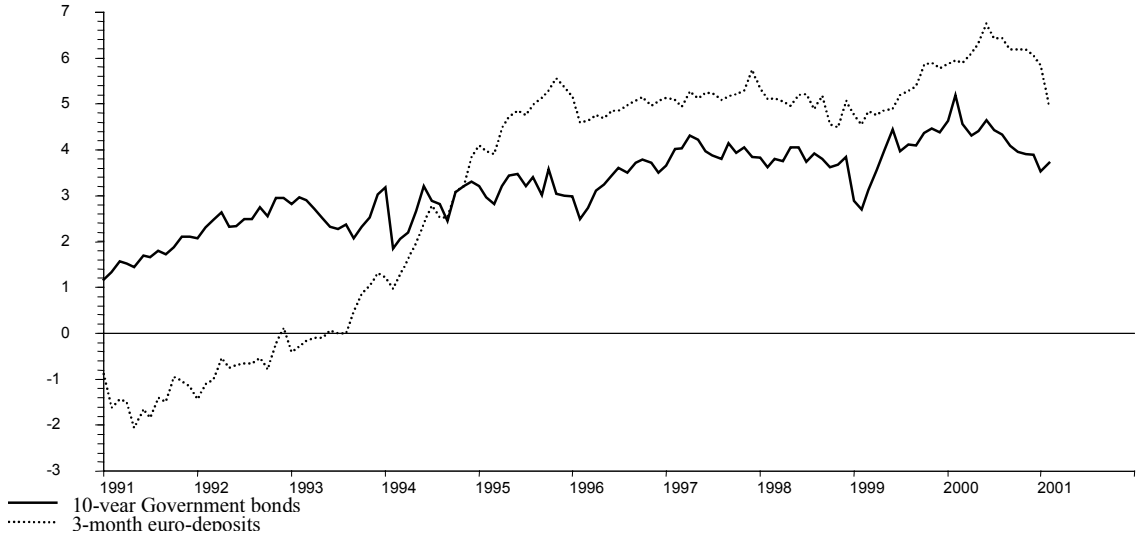
[23] The discussion on the IIBM draws heavily on Bernard and Bisignano (2000).

[24] The exposure of BIS reporting banks to Asean-5 countries increased from the 118 billion dollars of December 1993 to the 275 billion of June 1997. BIS (1999).

Figure 2

YIELD DIFFERENTIALS BETWEEN THE USA AND JAPAN 1991 - 2001



Source: Thomson Financial Datastream.

Therefore, in the case of financing to Asian emerging economies, the IIBM played a dominant role during the 1990s, of much greater importance than the role it had played in Latin American countries in the 1980s.

This result can be attributed to several factors. First of all, the lower riskiness of interbank loans is supported by the international rules on banks' capital requirements established by the Basle Agreement in 1988, according to which the amount of provisioning attached to bank loans is lower than credits to non-banking subjects. The same agreement, furthermore, fixes a risk-weighting on short-term interbank loans which is lower than that on loans to governments of non-OECD countries and this seems to have encouraged short-term foreign currency borrowing by emerging countries. Finally, the priority at times given by banks of industrial countries to replacing syndicated loans directly licensed to corporates in emerging countries with interbank loans, may depend on their lower maturity, which allows them to be more easily cancelled if necessary.

The particular importance of the IIBM however derives from the fact that from the time when the euro-deposit market began to develop, operators tended to perceive it as "special", in that deposits were constituted in large banks for which the market believed

would be supported by their respective central banks in the event of financial difficulties.[25] The history of cooperation among the monetary authorities of the major countries contributed to the belief that these countries would not allow any of their big institutions to go bankrupt, even in the event that most of their liabilities were held in a currency different from that of the country of residence of the institution.[26]

The hypothesis according to which governments, by providing implicit guarantees, would absorb an increasing portion of credit risk faced by the national banking systems, and in particular by some big international banks, seems to be confirmed by the fact that in the 1990s, both in the industrial countries and in the emerging ones, the perception of credit risk appears lower than in the previous decade, although this can be partly attributed to the improvement in fundamentals and the ready availability of international liquidity.[27]

An indication of implicit guarantees present in the interbank market can be obtained by considering the so-called "support" ratings, which include the evaluation by the rating agencies of the probability that a bank could receive assistance from the government in case of need. For the banking sectors of Asian countries, such indicators confirm the perception of significant support from the government, which on the contrary is lower in the banking sector of Latin American countries (Bernard and Bisignano, 2000).[28]

A possible interpretation of the origin of implicit guarantees in the IIBM is based on

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[25] "*Central banks might be viewed by the international community as being very reluctant to see a serious disruption in the international interbank market because of the risk of contagion in this market*". Bernard and Bisignano (2000, p. 16).

[26] The perception of implicit guarantees in favour of international interbank loans seems to be confirmed by some interviews to IIBM participants contained in a 1992 study by the G10 central banks: "*There seems to be a certain degree of complacency with respect to systemic risk. This appears to be fostered by a more or less firmly held belief that central banks or public authorities would act to prevent any disruptions from reaching systemic proportions. A number of participants maintained that the confidence with which this conviction is held acted to stabilise markets*". BIS (1992) quoted in Bernard and Bisignano (2000, p. 4).

[27] With reference to the United States and United Kingdom, for instance, lower credit risk has been empirically proven by the decline in spreads between the rates over short-term bank borrowing and on public bonds or on enterprises' commercial paper. Furthermore, in the same period the stock market quotations of bank shares increased considerably.

[28] These authors, by converting ratings on a numeric scale ranging from 1 (minimum) to 9 (maximum), find an average value of 8 for the support ratings assigned to the banking sectors of Asian countries in the period 1992-95, later with a small decline to 7.15 in 1997.

the generic problem of asymmetric information, which is typical of the initial phases of market liberalisation, during which the strong changes in the economic environment make it difficult to obtain complete information about the investment opportunities. More precisely, such guarantees would be essential to the IIBM because, due to serious problems of adverse selection, the evaluation of the counterpart risk in international lending proves difficult. Accordingly, it is necessary to provide a subsidy in the form of an unannounced but evidently implicit guarantee by governments and IFIs.

This kind of subsidy eventually reduces the cost of international credit, increases international liquidity and guarantees the working and the stability of the IIBM, but, at the same time, leaves central banks with a fundamental dilemma: on the one hand, the existence of information asymmetries makes it necessary to provide some implicit guarantees so that the market will work; on the other, these guarantees have the undesirable effect of reducing the incentive for lending banks to assess appropriately the riskiness of potential borrowers, thus determining a generic moral hazard problem.

In other words, the expectation that banks participating in the IIBM will be rescued by central banks is at the origin of what has been defined as "information insouciance", the lack of attention on the part of international banks to the available information on counterparts (Bernard and Bisignano, 2000).

Furthermore, the existence of problems of asymmetric and incomplete information about the creditworthiness of debtors and their behaviour[29] may lie at the origin of one of the IIBM characteristics, the predominance of credit rationing as an instrument to allocate resources.[30] The diffusion in the IIBM of the credit rationing phenomenon and the important

[29] The Holland Report, drawn up in 1983 by G10 central banks, explicitly states that credit risks are not fully reflected by the pricing of interbank products because of a lack of complete information. In general, on the basis of the incomplete information argument it is possible to explain the pattern of capital flows to emerging markets and, in particular, that of loan contracts. For example, the information asymmetry about a country's total indebtedness can determine a short-term borrowing structure, the prevalence of bank over bond financing and a relation between credit rationing and rate of investment. Short-term loan contracts would then be a simple consequence of the absence of enforceable constraints to the lengthening of debt.

[30] This characteristic is in part justifiable by the significant amount of loans given without guarantees, which distinguishes the IIBM from other international financial markets. Furthermore, according to some authors (Moffet, 1986) the IIBM is probably the financial market whose form of credit rationing is most similar to the theoretical Stiglitz and Weiss' model. Here, the asymmetric information causes both adverse selection

role it has played in the financing of ASEAN-5 countries suggest interpreting the 1997-98 events as an illiquidity crisis of the international interbank market, induced by a weakening of the perception of the contingent support provided by central banks to the main IIBM operators. This was probably the cause of the observed sudden quantitative credit rationing, whose measure can be approached by the amount of the banking capital outflow (capital reversal), above all interbank deposits, which amounted to about $60 billion for the years 1997 and 1998.

5. Empirical analysis of moral hazard

The evaluation of the empirical relevance of moral hazard has been indicated as the crucial aspect of the phenomenon, as a certain degree of moral hazard can inherently be connected to official interventions of financial support, if we consider that the economic consequences of a crisis would be worse in the absence of such interventions (Lane and Phillips, 2000). Accordingly, from the point of view of policy implications it is important, above all, to appraise the quantitative dimension of moral hazard, that is the extent to which the expectation of the official support interventions encourages excessive risk-taking on the part of private creditors. From the analytical point of view, the difficulties of a direct investigation imply that the quantitative importance of moral hazard can be fixed only indirectly. In this respect, there are essentially two approaches which complement each other.

The first approach, followed by Lane and Phillips (2000), begins by evaluating the extent to which the dimension of official financial support may influence the investor's expectations of obtaining repayment of their own exposures; secondly, it verifies the way in which markets react to the information about the size and terms of the financial support in question. The authors recognise that "*moral hazard is difficult to detect in market reactions to various IMF policy announcements and there is no evidence that such moral hazard has*

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and moral hazard effects and, eventually, a backward-bending offer curve for funds. This means that, from a certain moment on, the expected creditors yield decreases owing to the increase of lending rates and, consequently, the credit price is not adjusted for market balancing. The empirical evidence shows a modest differentiation of the IIBM credit price. In particular, the Holland Report notes that the higher riskiness of lending to some banks is reflected in a typically low risk premium paid by them, between 0.0625 and 0.25 per cent. However, in general credit rationing is the prevailing form in the IIBM. Bernard and Bisignano (2000).

recently been on the rise".[31]

The second approach analyses the evolution of spreads on debt instruments (bank loans or bond issues) before and after a particular crisis, in order to fix the extent to which international financial markets offer funds at rates not justified by the real riskiness of the borrower. This means assessing whether the trend of the risk premium can be explained or not on the basis, on the one hand, of the economic fundamentals determining the debtors' creditworthiness and, on the other, of external factors, such as conditions in the international financial markets in terms of prices and quantities. As a consequence, a reduction of spreads is not obviously connected to moral hazard if it corresponds to a real improvement of the debtors' creditworthiness, that is an improvement justified by fundamentals, and/or to the evolution of external factors: in other words, if the reduction is not induced by the perception of implicit or explicit bailout guarantees from the public sector.

From the analytical point of view, the studies on this question typically present a regression with the spread as the dependent variable, adding to the traditional "fundamental" independent variables, of a microeconomic and macroeconomic nature, a certain number of time dummies whose interval includes cases of crisis and official rescue interventions.

In this way, unless there are errors in the specification of the model, variations of the risk premium not explained by the fundamental variables can be interpreted as arising from structural changes in the level of spreads themselves; besides, these changes can potentially be attributed to official packages of financial assistance and to the moral hazard they might induce.

In particular, in the case of the Mexican crisis, after 1995 the validity of the moral hazard argument should led to observe a systematic reduction of emerging market spreads that could not be explained by variations of fundamentals, but was assignable to excessive risk-taking on the part of international lenders induced by the official rescue intervention in the country.

With particular reference to the effort to detect moral hazard, the most direct precursors

[31] Lane and Phillips (2000, abstract).

of our work, albeit with a focus on bond spreads, are Kamin and von Kleist and, above all, Zhang, the latter being one of a very few examples of a study explicitly devoted to detecting moral hazard.[32] It analyses the evolution of secondary market spreads on six Eurobonds and four Brady bonds issued by eight emerging countries in the period going from the first quarter of 1992 to the second quarter of 1997. The econometric results induce the author to exclude the empirical importance of moral hazard, because the key variable used to test for it, a dummy separating the pre- and the post-Mexican crisis periods, does not underline the negative coefficient that would give confirmation; on the contrary, this coefficient is positive and statistically not significant.

According to Zhang, therefore, the decline of spreads between the end of 1995 and the middle of 1997 should be attributed to variations in the economic fundamentals and, above all, to variations in the supply conditions (increase of liquidity) in the international financial markets. This hypothesis would be supported by the fact that the decline happened simultaneously with that observed for spreads on high-yield bonds issued by U.S. corporates with speculative-grade rating.

In addition, in Zhang's regression the positive sign of the coefficient on this high-risk yield is itself interpreted as evidence contrary to the hypothesis of moral hazard. Indeed, if the Mexican rescue had really encouraged moral hazard, the consequent perception of a lower riskiness for emerging market bonds would have induced a move towards the latter from high-yield bonds and this would have involved a negative correlation among spreads. On the contrary, the empirical evidence shows that this correlation has a positive sign.

Kamin and von Kleist's study differs from Zhang's first of all because they adopt the issuer's rating as the synthesis variable of its creditworthiness, which proves highly significant in all the versions of the regression equation. In order to fix a possible temporal trend in the spreads, the authors include a series of dummies for each of the years from 1991

[32] Dell'Ariccia *et al*. (2000) also test for moral hazard in the context of a regression model of spread determination. However, they differ from other studies in that, on the one hand, they focus on the Russian crisis and, on the other, rather than just looking at the impact on the average level of spreads, they test whether that crisis led to changes: in the level of spreads in a wide range of individual countries; in the sensitivity with which spreads react to fundamentals; and finally, in the cross-county variance of spreads.

to 1996, with the first semester of 1997 representing the benchmark period. Alternatively, in a narrow version of the regression, such variables are replaced by the single time dummy such as Zhang's, which separates the pre-Mexico crisis period (1991-94) from the post-crisis one (1995-97), in order to isolate the possible effects of the Mexican events on the risk pricing of emerging countries' liabilities.

In both cases, the results suggest that the Mexican episode had a significant effect on the evolution of risk premia, whose temporal trend also depends on the riskiness of the instrument (i.e. the decline of spreads is stronger for high-rated bonds): unlike Zhang, the coefficient on the single Mexico dummy has a negative sign and is statistically significant.[33]

Finally, with reference to syndicated loans, Eichengreen and Mody analyse over 4500 loans to emerging markets in the period 1991-97, with spreads calculated on the London Interbank Offered Rate (LIBOR). They do not include any time dummies among regressors but confirm both the possible existence of moral hazard and the difficulties of evaluation that characterise it.[34] Furthermore, unlike other studies, the authors jointly examine both the debtor's choice of borrowing and the supplier banks' choice of pricing, in order to reduce the sample selectivity bias;[35] in their study, therefore, better fundamentals cause both a higher

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[33] "*The evolution over the 1990s of emerging market credit spreads can be compactly described by a time trend and a level effect associated with the Mexican financial crisis whose magnitude depends on the credit rating of the instrument*". Kamin and von Kleist (1999, p. 16).

[34] "*We see evidence of growing bullishness in the first half of the 1990s by bank lenders to East Asia, which may reflect moral hazard. But on this issue it is fair to say that the jury remains out*". Eichengreen and Mody (2000, p. 37).

[35] This distortion arises from the fact that the conditions needed to obtain an unbiased estimate of the assumed relation between spreads and explanatory variables (the pricing equation) cannot in practice be fulfilled as not all the potential issuers belong to the sample in the time interval under consideration; as a consequence, the sample is not random and this implies a selectivity bias problem for the coefficients, arising from the existence of an omitted variable. For this reason, the expected value of the error term in the pricing equation differs from zero because it is correlated with the error term in the equation determining the decision to issue a bond (the selection equation). Eichengreen and Mody address this problem by using the two-step method developed by Heckman (1979). In the context under examination, this amounts to assuming that spreads will be observed when a latent variable β crosses a threshold value β' which represents the dichotomous dependent variable of a probit regression (the selection equation) on a vector of variables determining the demand and supply of bonds. By assuming that the error terms ε_1 and ε_2 of the previous equations have a bivariate normal distribution with standard deviations s_1 and s_2, covariance s_{12}^2 and correlation coefficient $\rho = \frac{s_{12}^2}{s_1 s_2}$, from the selection equation one obtains an estimate of the inverse Mills ratio, which represents the above mentioned omitted variable, to be included in the pricing equation as an added regressor. The coefficient

probability of extending a loan and lower spreads.[36]

6. The nature of the borrower and the evolution of spreads on syndicated loans to emerging markets

As far as we know, the current literature lacks any studies explicitly investigating the relation between moral hazard and spreads on syndicated loans to emerging countries. Kamin and von Kleist's work, indeed, although they include time dummies among the regressors, does not examine loan spreads separately from bond spreads. In this section we extend the results of previous empirical analyses in two main ways:

- borrowers are divided into three categories (banks, corporates and financial firms) with the purpose of seeing whether the evolution of spreads differs according to the nature of the borrower;

- the nationality of the loan arranger[37] is included in the independent variables, with the objective of appraising more precisely the pricing behaviour of lending banks, particularly in Japan.

The study uses the same Capital Data *Loanware* database used in previous works (Eichengreen and Mody, 1998 and 2000; Kamin and von Kleist, 1999), with a sample of over 2360 term loans in dollars with spreads (in basis points) calculated on the London Inter-

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of this regressor represents an estimate of ρ, the correlation coefficient between the two error terms. Despite the widespread use of this standard model of sample selection, there is not complete agreement on the magnitude of the selectivity bias and the need to use Heckman's method (see par. 13.12.2 in Johnston and DiNardo, 1997 and ch. 16 in Kennedy, 1998). In particular, this latter method, in solving the omitted variable problem, would bring in a measurement error, as in the second step it uses an estimate of the expected value of the error term (the inverse Mills ratio). Furthermore, the procedure generating the selection equation adopted by Eichengreen and Mody (1998, p. 17) appears questionable: "*Estimating the probit requires information on those who did not issue bonds. To address this problem we used the following approach. For each country we allowed for three types of issuers: sovereign, public, and private. For each quarter and country where one of these issuer types did not come to the market, we recorded a zero*".

[36] With regard to the problem of the selectivity bias, the authors consider the coefficients obtained to be strong in comparison with the selectivity correction, whose presence is seen only by disaggregating the analysis for macro-regions. Furthermore, according to the authors, unlike the international bond market, the syndicated loans market demonstrates a lower interregional and, above all, intertemporal instability.

[37] The Capital Data *Loanware* database defines "arranger" *as* "*the mandated bank or banks responsible for originating, structuring, and syndicating a transaction*".

Bank Offered Rate (LIBOR), licensed to 23 emerging markets[38] in the period January 1991-November 1997. Contrary to other studies, we restrict the analysis only to a particular category of contracts, the so-called ”term loans”, in order to avoid distortions arising from having different types of credit contracts in the same sample.[39]

Moreover, some counterintuitive results obtained for banks in a preliminary regression (the coefficient on the dummy variable identifying the public or private nature of the borrower was found to be positive and statistically significant) suggested we should examine the data more closely in search of possible outliers.

We found that four out of six banks classified with Hong Kong or Singaporean nationality were actually branches of one of the main Indonesian banks; consequently, we corrected the rating for these observations, by attributing them the lower BBB-minus of Indonesia instead of the A or AA-plus of Hong Kong and Singapore, respectively.

We also faced the same problem for a number of corporates and financial firms to which the *Loanware* database originally attributed the Hong Kong nationality, while they were actually foreign branches of Chinese and Korean entities. In this case, the lower differences among ratings did not imply important changes in the regression results.

The sample is described in Tables 6a, 6b and 6c, with loans classified according to both the geographical region and the type of the borrower, with the indication of average ratings and spreads.

[38] Argentina, Brazil, Chile, China, Colombia, Czech Republic, Hong Kong, Hungary, India, Indonesia, Malaysia, Mexico, Pakistan, Peru, the Philippines, Poland, Singapore, South Africa, South Korea, Taiwan, Thailand, Turkey and Venezuela.

[39] Apart from term loans, the database includes other contractual forms such as export credit, bridge facilities, revolving credit, and co-financing facilities.

Table 6a

NUMBER OF LOANS BY GEOGRAPHICAL REGION

Region	Number	Average spread	Average rating
	January 1991 – November 1997		
Latin America	190	177	BB+
ASEAN 5	1130	80	A
Eastern	63	109	BBB-
China	493	90	BBB
Turkey	132	95	BB
Others	356	93	BBB+
Total	2364	93	BBB+
	pre-Mexico		
Latin America	14	179	BB
ASEAN 5	328	83	A
Eastern	17	188	BB+
China	194	92	BBB
Turkey	69	93	BBB
Others	82	108	A-
Total	704	94	BBB+
	post-Mexico		
Latin America	176	177	BB+
ASEAN 5	802	79	A+
Eastern	46	80	BBB-
China	299	89	BBB
Turkey	63	96	B+
Others	274	88	BBB+
Total	1660	93	A-

Table 6b

NUMBER OF LOANS BY BORROWER TYPE

Borrower	Number	Average spread	Average rating
	January 1991 – November 1997		
Banks	409	71	BBB
Corporates	1490	104	A-
Fin. Firms	465	80	A-
Total	2364	93	BBB+
	pre-Mexico		
Banks	179	76	BBB+
Corporates	397	104	BBB+
Fin. Firms	128	88	BBB+
Total	704	94	BBB+
	post-Mexico		
Banks	230	67	BBB-
Corporates	1093	104	A-
Fin. Firms	337	78	A
Total	1660	93	A-

Table 6c

NUMBER OF LOANS BY BORROWER TYPE AND GEOGRAPHICAL REGION

Region	Number	Average spread	Average rating
		banks	
Latin America	33	103	BBB
ASEAN 5	159	59	A
Eastern	37	74	BBB-
China	41	61	BBB
Turkey	107	89	BB
Others	32	49	BB+
Total	409	71	BBB
		corporates	
Latin America	154	193	BB+
ASEAN 5	714	86	A
Eastern	24	165	BBB-
China	293	100	BBB
Turkey	21	116	BB+
Others	284	97	BBB+
Total	1490	104	A-
		financial firms	
Latin America	3	174	BB+
ASEAN 5	257	77	A+
Eastern	2	78	BBB-
China	159	79	BBB
Turkey	4	138	BBB-
Others	40	96	A-
Total	465	80	A-

As in Eichengreen and Mody (1998), the sample is dominated by Asian, followed by Chinese and Latin American borrowers, the latter concentrated in the corporate segment. Turkish borrowers represent more than one-fourth of total banks, while the number of borrowers from China is particularly significant among financial firms. The average spreads above LIBOR is 93 basis points,[40] virtually unchanged in the years before and after the Mexican crisis; on the contrary, the average rating improves by one notch following the crisis itself. In this regard, it is worth noting that this improvement applies to borrowers belonging

[40] In Eichengreen and Mody's sample of loans the average spread is 112 basis points.

to the corporate and financial firm sectors: for banks, indeed, the average rating worsens by two notches (from BBB-plus to BBB-minus) at the same time as their average spread decreases (from 76 to 67 basis points).

For the entire sample, we first estimate the regression[41] equation:

$$\text{SPREAD} = \beta_0 + \beta_1 \text{RATING} + \beta_2 \text{RATING-SPEC} + \beta_3 (\log) \text{MATUR}$$

$$+ \beta_4 (\log) \text{AMOUNT} + \beta_5 \text{PUBLIC} + \beta_6 \text{LATIN} + \beta_7 \text{ASEAN5} + \beta_8 \text{EASTERN}$$

$$+ \beta_9 \text{TURKEY} + \beta_{10} \text{OTHERS} + \beta_{11} \text{BANK} + \beta_{12} \text{FINANCE} + \beta_{13} \text{CONTAGIO}$$

$$+ \beta_{14} \text{D91} + \beta_{15} \text{D92} + \beta_{16} \text{D93} + \beta_{14} \text{D95} + \beta_{17} \text{D96} + \beta_{18} \text{D97} + \varepsilon$$

where the variables used as regressors are specified as follows:

- *rating*: the rating, at the signature date of the loan, attributed by Standard & Poor's to the long-term foreign currency sovereign debt issued by the borrower's country.[42] It has values ranging between a minimum of 1 (equivalent to B-minus) and a maximum of 16 (equivalent to AAA);

- *rating-spec*: an interaction dummy obtained by multiplying the rating for a dummy which assumes a value of one for borrowers with a rating lower than A-minus;[43]

- *(log) matur*: the maturity of the loan (in months);

- *(log) amount*: the amount of the loan (in millions of U.S. dollars);

- *public:* a dummy assuming a value of one if the borrower is a public body;

- *Latin*: a dummy identifying borrowers from Latin America countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela);

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[41] In the estimate procedure we prefer not to consider the selectivity bias problem for the reasons discussed in footnote 35 above.

[42] The use of sovereign instead of debtor ratings lowers to some extent the precision of the estimates but this is justified by the need to increase the sample size, since the database has a limited number of debtors with a specific rating assigned.

- *Asean-5*: a dummy identifying borrowers from countries hit by the Asian crisis of 1997-98 (South Korea, the Philippines, Indonesia, Malaysia and Thailand);

- *Eastern*: a dummy identifying borrowers from European transition countries (Poland, the Czech Republic and Hungary);

- *Turkey*: a dummy identifying Turkish borrowers, justified by the relatively high number of loans contracted by them in the whole sample (Table 6a);

- *Others*: a dummy identifying borrowers from Hong Kong, India, Pakistan, South Africa, Singapore and Taiwan, all with investment-grade ratings, apart from India and Pakistan, with ratings BB and B-plus respectively. China is the country used as a benchmark.

- *bank* and *finance*: dummy variables assuming a value of one if the borrower is, respectively, a bank or a financial firm;

- *contagio*: a dummy assuming a value of one in the period October 1994 - March 1995, the six-month period including the Mexican crisis;

- *D91-D97*: temporal dummies for each year of the considered interval, excluding 1994.

The choice of 1994 as the benchmark year arises directly from the objective of the analysis, i.e. to test the hypothesis of the Mexican crisis of December 1994 - January 1995, and of the subsequent IMF intervention, as a structural break for the evaluation of counterpart risk in international lending to emerging markets.[44]

Moreover, this choice allows an immediate comparison between our results and those obtained by Zhang for secondary market bond spreads and Kamin and von Kleist's for a joint sample of bond and loan spreads at launch. In section 7, however, we test for the robustness of the results obtained for the bank sub-sample by using 1997 as an alternative benchmark

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[43] Actually, Standard and Poor's classifies a rating as "speculative" if it is lower than BBB-minus. Our slightly different classification is justified by the numerosity of the sample.

[44] Kamin *et al.* (2000) support the use of the pre-1995 period as a benchmark against which financial conditions in subsequent years should be measured.

year.

We also estimate the above equation in a second version, which substitutes the dummies for each year of the period under consideration for a single dummy (*Mexico*) assuming a value of zero before the Mexican crisis period (January 1991-December 1994) and a value of one after it (January 1995-November 1997).

The inclusion of specific dummy variables both per year and per geographical region of the debtor, and the use of the ordinary least squares method for the estimate of coefficients cause the model to approach the fixed effects panel model, also known as the least square two-way dummy variables model (Baltagi, 1995).

6.1 Results for the entire sample

The results for the entire sample (eq. 1 and 2, Table 7), which has not been disaggregated according to the type of the borrower, confirm the findings of previous studies, according to which the spread is considerably lower if the debtor:

- has a relatively higher rating;
- belongs to the public sector (the coefficient on the *public* variable has the expected negative sign);
- belongs to the financial sector (in particular if it is a bank).

In addition, the interaction variable *rating-spec*,[45] which captures the sensitivity of spreads to changes in the rating for speculative grade borrowers, indicates that the reduction in spreads following an upgrade is lower for debtors with a relatively lower creditworthiness. Besides, the positive coefficient on the maturity[46] (*matur*) of the loan claims a well-behaved yields curve, while the insignificance of the coefficient on the *amount* variable suggests us

[45] In using this variable we follow Kamin and von Kleist (1999).

[46] Although there may be a potential problem of endogeneity between this regressor and the dependent variable, we include it to allow comparisons with the results of other studies.

Table 7

DEPENDENT VARIABLE: SPREAD OVER LIBOR AT LAUNCH ON TERM LOANS IN U.S. DOLLARS

Time period: January 1991 - November 1997; t-statistics in parentheses; White's heteroskedasticity consistent standard errors. The symbol *** indicates a significance level of 1% or less; ** between 1 and 5%; * between 5 and 10%.

	eq. 1 All types	eq. 2 All types	eq. 3 Banks	eq. 4 Corporates	eq. 5 Fin. Firms
INTERCEPT	79.89	79.49	90.09	81.45	54.28
	(6.72)	(6.62)	(5.91)	(4.10)	(1.97)
RATING	**-5.51*** **	**-5.65*** **	**-8.17*** **	**-5.09*** **	**-4.96*** **
	(-8.29)	(-8.52)	(-9.83)	(-4.30)	(-2.96)
RATING-SPEC	**4.71*** **	**4.51*** **	**4.48*** **	**4.84*** **	**6.12*** **
	(6.91)	(6.53)	(5.75)	(3.85)	(3.28)
(log) MATUR	**11.62*** **	**11.66*** **	4.42	**11.95*** **	**17.17*** **
	(7.73)	(7.86)	(1.48)	(5.84)	(8.36)
(log) AMOUNT	1.63	1.61			
	(1.31)	(1.29)			
PUBLIC	**-22.14*** **	**-21.75*** **	-1.50	**-25.52*** **	**-34.12*** **
	(-8.10)	(-8.00)	(-0.37)	(-7.25)	(-3.38)
LATIN	**87.12*** **	**85.35*** **	**76.16*** **	**95.34*** **	
	(10.00)	(9.94)	(7.08)	(7.49)	
ASEAN-5	**28.15*** **	**27.50*** **	**57.48*** **	**23.69*** **	20.31
	(5.34)	(5.19)	(7.09)	(2.94)	(1.48)
EASTERN	**31.63*** **	**30.74*** **	**19.75** **	**59.44*** **	
	(3.43)	(3.30)	(2.19)	(3.39)	
TURKEY	**27.10*** **	**25.94*** **	**24.99*** **	15.40	
	(4.96)	(4.81)	(3.85)	(1.08)	
OTHERS	**15.48*** **	**14.27*** **	-6.89	**15.44** **	**27.69** **
	(3.24)	(2.95)	(-0.99)	(2.07)	(2.15)
BANK	**-39.60*** **	**-39.28*** **			
	(-13.58)	(-13.50)			
FINANCE	**-7.33*** **	**-6.69*** **			
	(-3.23)	(-2.98)			
CONTAGIO	4.65	**11.05*** **			
	(1.03)	(2.70)			
MEXICO		**-12.27*** **			
		(-6.07)			
D91	**-11.80*** **		**-16.14** **	**-11.46** **	**-23.50** **
	(-3.02)		(-2.30)	(-2.10)	(-2.24)
D92	-2.46		-6.46	-0.82	**-13.99** *
	(-0.58)		(-0.87)	(-0.14)	(-1.74)
D93	1.21		-10.17	2.88	4.19
	(0.31)		(-1.51)	(0.50)	(0.55)
D95	-5.30		**-15.53** **	0.88	**-14.67*** **
	(-1.39)		(-2.12)	(0.16)	(-2.85)
D96	**-17.70*** **		**-27.90*** **	**-17.53*** **	**-13.99*** **
	(-4.83)		(-3.63)	(-3.58)	(-2.66)
D97	**-18.21*** **		**-34.44*** **	**-19.74*** **	-3.37
	(-4.66)		(-4.40)	(-3.93)	(-0.59)
Adj. R-squared	0.35	0.34	0.47	0.33	0.30
No. obs.	2364	2364	409	1490	465

we should drop it in what follows.

With respect to the geographical location of the borrower, similar to previous studies the spread on loans to Latin American debtors is considerably higher than the benchmark, whereas it is slightly higher for ASEAN-5, Eastern European and Turkish borrowers.

As regards the evolution over time, the coefficients on both the single time dummy (*Mexico*) and the per-year dummies show a decline in spreads following the crisis and the rescue of Mexico (eq. 1 and 2), in particular in the years 1996 and 1997 (eq. 1). This result is the opposite of Zhang's analysis on secondary market bond spreads, for which the coefficient on the dummy variable separating the pre- and post-Mexican crisis periods has a positive sign and is not statistically significant.[47]

Finally, the *contagio* variable, measuring the possible short-term effects of the Mexican crisis, has the expected positive sign, but is significant only in the second version of the general equation (eq. 2). For this reason, in the analyses which follow we drop the above-mentioned variable and adopt the first version of the regression equation, which includes separate dummy variables for each year of the period under consideration except 1994.

6.2 Results for the disaggregated sample

The disaggregation of the sample according to the nature of the borrower (banks, corporates and financial firms) underlines significant differences in the evolution of spreads that have not been pointed out in the literature so far. In particular, the direct proportionality between loan maturity and spreads is particularly noticeable for corporates and financial firms (eq. 4 and 5); for banks, the lower importance of maturity (the coefficient is not statistically significant in eq. 3) may be due to the shorter maturity of interbank loans.

These latter, however, show peculiar characteristics because the coefficient on the *Public* dummy variable (eq. 3), which identifies the nature (public or private) of the

[47] "*For the key variable for testing moral hazard, the post-crisis period dummy variable, both regressions fail to find a significant negative coefficient in support of the moral hazard hypothesis, but rather find the coefficients to be positive…..This result strongly rejects the view that the Mexican rescue caused significant moral hazard in emerging markets lending*". Zhang (1999, p. 12).

borrowing bank, is not at all statistically significant. This is strongly different with respect to corporates and financial firms, for which the affiliation to the public sector implies significantly lower spreads.

The possible irrelevance of a bank's nature to the spread is one of the main findings of the disaggregation of borrowers into different categories and can be interpreted as giving some support to the hypothesis of the "speciality" of the international interbank market, according to which it is implicitly perceived by participants as protected by national (government and central bank) and international (IFI) safety nets, because of the potentially systemic nature of any crises that may erupt.

With respect to regional differences, Latin American borrowers again pay spreads substantially higher than do the benchmark group, both as regards banks and corporates (eq. 3 and 4). Quite surprisingly, the riskiness of banking systems in ASEAN-5 countries does not seem to have been undervalued by the market, since Asian banks pay higher spreads than either Turkish or Eastern European ones. In particular, transition economies may have benefited from the progress made in strengthening national banking systems[48] and the prospect of admission to the European Union. Besides, transition economies are characterised by strong differences among domestic borrowers, in that corporates pay spreads which are three times higher than those charged to banks.

With reference to the temporal evolution, the disaggregation of the sample allows us to discover how the reduction of spreads after 1995, recorded for the general sample, appears to be of a greater magnitude for interbank loans (eq. 3). For corporates, indeed, the international financial intervention in Mexico seems to have determined lower spreads only from 1996 on, whereas for financial firms, after a decline following the Mexican crisis, in 1997 spreads show an increase with respect to the previous year (although the dummy year is not statistically significant), which could be attributed to growing fears, ever since the pre-Asian crisis period, regarding the solvency of the Chinese (International Trust and Investment

[48] "*The Hungarian and Polish banking systems have strengthened considerably in the last few years and are viewed by market participants as among the strongest in the region. In the Czech Republic, the improvement of bank balance sheets has been lower*". IMF (1998a, p. 5).

Corporations, s.c. ITIC)[49] and Thai *(*s.c. Finance Company)[50] financial firms and the possibility of public support in their favour.

7. Extensions and sensitivity analyses

In this section we test the robustness of previous results by considering the role of international liquidity in determining the evolution of emerging market spreads. As the discussion in section 2.1 has pointed out, the decline in industrial countries' interest rates occurred in the 1990s, particularly at short maturities, may have played a role in explaining the reduction in risk premia paid by emerging market borrowers.

We conduct the sensitivity analysis in several ways: firstly, in order to investigate the possibility of differences in the pricing of loans according to the nationality of the offering bank, we add to the regression equations three new dummies (*jap-arr*, *eur-arr, usa-arr*) never used before in the literature, which assume a value of one if the nationality of the loan arranger is, respectively, Japanese, European Union or U.S.

Secondly, similarly to other studies on this subject, we extend the regression specification by adding the differential (in percentage points) between the rates on three-month euro-deposits in dollars and yen (*3-m Euro differ*), as a measure of industrial countries' interest rates. Finally, we investigate more closely the evolution of interbank spreads, by separating ASEAN-5 banks from the rest of the sample.

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[49] "*The closure of GITIC has provided a clear indication that creditors of ITICs may not be able to rely on government support. The precise degree of support to ITICs from their owners had long been uncertain, although many provincial governments provided letters of support for foreign loans but not explicit guarantees. For their part, the national authorities had issued several statements in recent years warning investors that unauthorised external borrowings would not be guaranteed by the central government*". IMF (1999, p. 48). The crisis in such companies started in October 1998 with the closure of the Guangdong ITIC by the Chinese central bank because of insolvency. In the sample we use, the Guangdong ITIC appears with 16 loans (US$ 654 mln) out of a total of 144 (US$ 5.5 bn) contracted by Chinese finance companies.

[50] " *..most finance companies were suffering a serious deterioration in asset quality even before the depreciation of the baht on July 2, 1997*". IMF (1998, p. 159). In mid-1997, the Thai financial system included 15 commercial banks, 91 finance companies and other minor non-bank financial intermediaries. Finance companies held 25 per cent of total financial sector assets. IMF (1998, p. 159).

7.1 The role of the Japanese banking system

The importance of Japanese banks in financing emerging markets during the period under consideration is well documented (Bernard and Bisignano, 2000). In particular, during the 1990s low domestic demand and current account surpluses forced Japanese banks to channel funds to emerging markets in order to reduce the excess of liquidity at home.

The results reported in Table 8 confirm this assumption, which is reflected in the lower spreads that Japanese banks charge regardless of the nature of the borrower (the dummy *jap-arr* has a negative sign and is highly statistically significant in eq. 6 to 14); spreads are however still lower for interbank lending (eq. 6, 9 and 12), mirroring the dominant role played by the IIBM in channelling funds to emerging countries.[51] In the case of European Union and U.S. banks, on the contrary, the former seem to reserve more favourable price conditions only for interbank loans (eq. 6, 9 and 12), whereas the latter do not show any particular pricing pattern.

Furthermore, the inclusion of dummies specific to the nationality of the loan arranger may also help capture the effects on the price of lending arising from institutional changes in the banking systems of industrial countries.

Indeed, as reported in section 2.1, between the end of the 1980s and the beginning of the 1990s these countries have recorded far-reaching innovations in the structure, instruments and regulation of their financial sectors, which facilitated the rise in investment flows to emerging markets and led to lower spreads.

7.2 The role of international liquidity

Contrary to previous studies, which usually include the level of some U.S. interest rate,

[51] In addition, in a separate regression we found that the hypothesis of the Mexican rescue as a structural break in determining spreads is further supported by the fact that the improvement of price conditions for interbank loans increased after 1995. In particular, from this year Japanese banks have reduced the spread on loans to emerging market banks. Besides, this supports the "speciality" of the international interbank market, as in the same period an increase of the spread charged by Japanese banks to financial firms has been recorded. Finally, it should be noted that the inclusion of the arranger dummies improves the overall fit of the regression particularly for banks (the adjusted R-squared increases from 0.47 to 0.51).

Table 8

DEPENDENT VARIABLE: SPREAD OVER LIBOR AT LAUNCH ON TERM LOANS IN U.S. DOLLARS

Time period: January 1991 - November 1997; t-statistics in parentheses; White's heteroskedasticity consistent standard errors. The symbol *** indicates a significance level of 1% or less; ** between 1 and 5%; * between 5 and 10%.

	eq. 6 Banks	eq. 7 Corporates	eq. 8 Fin. Firms	eq. 9 Banks	eq. 10 Corporates	eq. 11 Fin. Firms	eq. 12 Banks	eq. 13 Corporates	eq. 14 Fin. Firms
INTERCEPT	97.51	78.86	60.45	71.39	86.00	57.90	98.44	91.30	69.06
	(6.28)	(3.93)	(2.15)	(4.68)	(4.31)	(2.00)	(6.23)	(4.37)	(2.43)
RATING	**-8.88*** **	**-5.15*** **	**-5.23*** **	**-8.47*** **	**-5.56*** **	**-5.30*** **	**-8.86*** **	**-5.05*** **	**-5.00*** **
	(-11.26)	(-4.37)	(-3.07)	(-10.88)	(-4.75)	(-3.02)	(-11.17)	(-4.26)	(-2.88)
RATING-SPEC	**4.02*** **	**4.81*** **	**5.41*** **	**4.83*** **	**4.29*** **	**5.62*** **	**4.00*** **	**4.90*** **	**5.56*** **
	(5.42)	(3.84)	(2.80)	(6.39)	(3.39)	(2.80)	(5.39)	(3.89)	(2.85)
3-M EURO DIFF.				-0.82	**-2.30*** **	-1.00	-0.24	**-5.67***	-4.03
				(-1.50)	(-3.44)	(-1.10)	(-0.53)	(-1.70)	(-1.21)
(log) MATUR	**7.16***	**13.26*** **	**17.64*** **	**7.96*** **	**13.07*** **	**17.32*** **	**7.19***	**13.40*** **	**17.40*** **
	(2.36)	(6.23)	(8.46)	(2.77)	(6.25)	(8.16)	(2.37)	(6.32)	(8.27)
PUBLIC	2.06	**-24.65*** **	**-29.53*** **	1.74	**-23.91*** **	**-31.79*** **	1.99	**-24.73*** **	**-30.01*** **
	(0.53)	(-6.87)	(-2.98)	(0.43)	(-6.70)	(-3.14)	(0.51)	(-6.90)	(-3.00)
LATIN	**69.80*** **	**94.56*** **		**61.67*** **	**89.13*** **		**69.81*** **	**95.86*** **	
	(6.74)	(7.39)		(6.05)	(7.10)		(6.73)	(7.50)	
ASEAN-5	**60.83*** **	**24.76*** **	20.76	**65.56*** **	**22.06*** **	19.15	**60.75*** **	**25.05*** **	21.03
	(7.95)	(3.06)	(1.53)	(8.07)	(2.69)	(1.38)	(7.92)	(3.09)	(1.55)
EASTERN	**23.06*** **	**58.50*** **		**21.72***	**59.00*** **		**23.04*** **	**60.07*** **	
	(2.58)	(3.34)		(2.15)	(3.28)		(2.58)	(3.44)	
TURKEY	**28.94*** **	19.20		**29.69*** **	14.63		**29.02*** **	19.87	
	(4.11)	(1.33)		(4.21)	(1.00)		(4.11)	(1.37)	
OTHERS	2.50	**15.96***	**27.35***	-2.34	**13.09***	**26.70***	2.46	**16.75***	**29.90***
	(0.34)	(2.12)	(2.16)	(-0.30)	(1.71)	(2.06)	(0.34)	(2.22)	(2.18)
JAP-ARR	**-18.64*** **	**-8.25*** **	**-11.24*** **	**-17.18*** **	**-8.52*** **	**-10.74*** **	**-18.50*** **	**-8.22*** **	**-11.27*** **
	(-6.52)	(-2.74)	(-3.07)	(-5.60)	(-2.84)	(-2.82)	(-6.44)	(-2.73)	(-3.07)
USA-ARR	1.81	-5.33	5.11	2.17	-4.09	8.25	1.76	-5.28	4.92
	(0.54)	(-1.33)	(0.77)	(0.61)	(-1.00)	(1.33)	(0.52)	(-1.32)	(0.75)
EUR-ARR	**-7.97*** **	2.98	-2.06	**-9.22*** **	2.60	-1.23	**-8.07*** **	3.13	-2.08
	(-2.74)	(0.94)	(-0.54)	(-3.06)	(0.81)	(-0.33)	(-2.76)	(0.98)	(-0.54)
D91	**-19.46*** **	**-12.67***	**-24.45***				**-20.91*** **	**-35.21***	**-40.09***
	(-2.85)	(-2.31)	(-2.17)				(-2.66)	(-2.51)	(-2.36)
D92	-9.93	-2.43	**-13.93***				-11.15	**-20.79***	**-27.10***
	(-1.42)	(-0.41)	(-1.75)				(-1.43)	(-1.72)	(-2.04)
D93	-7.92	1.99	2.03				-8.94	-11.38	-6.65
	(-1.23)	(0.34)	(0.28)				(-1.26)	(-1.20)	(-0.67)
D95	**-16.19*** **	1.35	**-14.65*** **				**-16.08***	13.85	-5.42
	(-2.28)	(0.25)	(-2.88)				(-2.27)	(1.57)	(-0.55)
D96	**-26.52*** **	**-17.28*** **	**-13.74*** **				**-26.40*** **	-3.83	-4.36
	(-3.57)	(-3.53)	(-2.61)				(-3.57)	(-0.39)	(-0.48)
D97	**-34.86*** **	**-19.43*** **	-2.37				**-34.72*** **	-5.14	7.55
	(-4.67)	(-3.86)	(-0.41)				(-4.67)	(-0.49)	(0.75)
Adj. R-squared	0.51	0.33	0.31	0.47	0.32	0.30	0.51	0.33	0.31
No. obs.	409	1490	465	409	1490	465	409	1490	465

we assess the role of international liquidity by including as a regressor the differential between the three-month interest rate on euro-deposit accounts in dollars and yen (eq. 9 to 14). The choice of these yields is justified by the fact that loan spreads are computed over the LIBOR, which is a very short-term rate. As discussed in section 2.1, a possible explanation for the decline in spreads charged on lending to emerging markets in the second half of the 1990s can be found in the evolution of the above differential: starting from 1993, indeed, it has assumed a positive sign, because of the rise in U.S. short-term yields and the significant reduction in Japanese ones, thus favouring the supply of dollar-denominated loans.

In the regression specification which excludes the time dummies (eq. 9, 10 and 11), the hypothesis on the relevance of external factors in reducing spreads finds some empirical support: the coefficient on the euro-deposits differential (*3-m Euro differ*) has the expected negative sign but is economically and statistically significant only for corporates, while for banks it has a p-value of 0.134 and a lower magnitude.

However, the inclusion of time dummies (eq. 12, 13 and 14) underscores the weakness of the link between global credit conditions and emerging market spreads, a result common to other studies (Kamin and von Kleist, 1999; Eichengreen and Mody, 2000), strengthening at the same time the asserted speciality of the IIBM.

More precisely, in sharp contrast with other types of borrowers, in the case of banks the inclusion of the euro-deposit differential does not affect the value and statistical significance of the coefficients on time dummies, but for the *3-m Euro differ* variable the coefficient has now a negligible level of statistical and economic significance (eq. 12). Conversely, for corporates this coefficient is still statistically significant (eq. 13), but the inclusion of this liquidity indicator wipes out the coefficients on the 1996 and 1997 dummies, which were significant in previous specifications of the regressions (eq. 4 and 7), thus suggesting that these two dummies were merely proxying for other factors.

Moreover, still for corporates the coefficient on the 1995 dummy, which signals an increase in spreads with respect to 1994, increases now its statistical significance, showing a p-value of 0.117 (eq. 13): a possible explanation of this can be found in the flight-to-quality effect of the Mexican crisis, according to which borrowers with relatively lower

creditworthiness (like corporates with respect to banks) were temporarily rationed by the market or charged with higher spreads. Finally, in the case of financial firms, the inclusion of the *3-m Euro differ* variable makes the 1995 and 1996 dummies statistically insignificant, but the coefficient of the above variable is itself insignificant, as in the first version of the regression equation (eq. 11).

Accordingly, these results suggest overall that only for banks does there seem to have been a clear reduction in spreads not explained by fundamentals following the Mexican crisis, whereas evidence for other types of borrowers does not fully support the hypothesis of a lower level of attention to counterpart risk after this crisis. Furthermore, the evolution of international liquidity conditions shows some influence in lowering spreads only for emerging market corporates.

In this regard, in order to further test the role of industrial countries' interest rates, in separate regressions (not shown) we used the 3-year yield on the U.S. Treasury bond, the 1-year and 10-year yields on Japanese government bonds as indicators of the stance of international credit instead of the euro-deposit differential. In the specification which excludes the time dummies, the signs of the coefficients showed that spreads on interbank loans have a negative relation with the U.S. rate and a direct link with the Japanese rates.

For the first result, which mirrors that of Eichengreen and Mody (1998 and 2000), the explanation could be that an increase in the U.S. rates reduces the demand for loans from emerging markets, to which creditors reply by lowering spreads. In the case of the Japanese rates, on the contrary, supply-side effects seem to prevail, as an increase in Japanese liquidity forces domestic banks to expand their activity abroad, thus lowering the spreads. Furthermore, the 10-year Japanese yield was the only one which seems to affect (positively) spreads charged to corporates, probably because of the longer maturity of loans of such type of debtor.

However, none of the coefficients on the industrial countries' interest rates remained statistically significant in the regression specifications which included the year dummies, thus confirming the poor performance shown by traditional indicators of global credit conditions in explaining the evolution of risk premia in the 1990s.

In the light of this findings, of particular interest is the ability of the *arranger* dummies to capture the relevant role that international liquidity seems to have played in lowering the spreads charged by industrial country banks, particularly the Japanese ones, to emerging market borrowers.

7.3 The interbank market

The peculiar results obtained for banks, showing a strong downward effect on spreads following the Mexican crisis, suggest we should further investigate the origin of this reduction by separating from the rest of the sample the banks of the ASEAN-5 countries,[52] the main suspects in the moral hazard argument. Unlike expectations (table 9), the statistical insignificance of the coefficients on the 1995 and 1996 temporal dummies demonstrates that the post-1995 decline in spreads has not affected loans contracted by ASEAN-5 banks (eq. 15); in addition, the Asian crisis which erupted in the second semester of 1997 seems not to have been entirely unexpected by the market, as signalled by the positive coefficient on the 1997 year dummy (although it has a *p-value* of 0.118).

The reduction of spreads in the post-Mexican crisis period is confirmed (eq. 16) for banks in the rest of the sample (the coefficient on the D95 dummy has a p-value of 0.109), even with 1997 as an alternative benchmark year instead of 1994 (eq. 17).

Some possible explanations for this result may be found by looking at the composition of the sample. In particular, it highlights how for Eastern European and Turkish borrowers, most of which are banks (Table 6c), the evolution of spreads does not seem to follow that of ratings: for Eastern European debtors, indeed, there is a significant reduction (more than 100 basis points) of the average spread in the post-Mexican crisis years (Table 6a), which is contemporaneous to an improvement in the average rating of only one notch (from BB-plus to BBB-minus).

[52] We choose not to split the sample further in order to retain statistical power and avoid spurious results.

Table 9

DEPENDENT VARIABLE: SPREAD OVER LIBOR AT LAUNCH ON TERM LOANS IN U.S. DOLLARS

Time period: January 1991 - November 1997; t-statistics in parentheses; White's heteroskedasticity consistent standard errors. The symbol *** indicates a significance level of 1% or less; ** between 1 and 5%; * between 5 and 10%.

	eq. 15 ASEAN-5 Banks	eq. 16 Other Banks - bench. 94	eq. 17 Other Banks - bench. 97
INTERCEPT	234.86	113.83	55.00
	(9.75)	(4.25)	(1.89)
RATING	**-15.12*** **	**-13.45*** **	**-13.45*** **
	(-7.46)	(-9.19)	(-9.19)
RATING-SPEC	-1.54	**5.18*** **	**5.18*** **
	(-0.93)	(3.14)	(3.14)
3-M EURO DIFF.	0.08	-2.07	-2.07
	(0.19)	(-0.58)	(-0.58)
(log) MATUR	2.10	**12.48** **	**12.48** **
	(0.64)	(2.56)	(2.56)
PUBLIC	-3.66	1.17	1.17
	(-0.91)	(0.22)	(0.22)
LATIN		**90.05*** **	**90.05*** **
		(6.89)	(6.89)
EASTERN		**24.55*** **	**24.55*** **
		(2.78)	(2.78)
TURKEY		**25.63*** **	**25.63*** **
		(2.76)	(2.76)
OTHERS		5.92	5.92
		(0.72)	(0.72)
JAP-ARR	**-13.97*** **	**-12.17*** **	**-12.17*** **
	(-4.30)	(-2.78)	(-2.78)
USA-ARR	-1.73	3.08	3.08
	(-0.41)	(0.81)	(0.81)
EUR-ARR	**-9.45*** **	-3.50	-3.50
	(-2.86)	(-0.90)	(-0.90)
D91	-9.78	-23.92	34.91
	(-1.43)	(-1.19)	(1.37)
D92	-0.07	-11.21	**47.62** *
	(-0.10)	(-0.54)	(1.84)
D93	7.49	-16.74	**42.08** **
	(1.18)	(-1.05)	(2.06)
D94			**58.83*** **
			(4.23)
D95	-1.99	-24.03	**34.79*** **
	(-0.28)	(-1.61)	(5.49)
D96	1.49	**-42.30*** **	**16.52*** **
	(0.19)	(-2.99)	(2.85)
D97	12.84	**-58.83*** **	
	(1.57)	(-4.23)	
Adj. R-squared	0.71	0.53	0.53
No. obs.	159	250	250

Furthermore, in the period 1991-97 the average spread charged on loans to borrowers located in Turkey remained essentially the same in spite of a substantial reduction (5 notches) in the average rating following 1995.

Finally, the split of the sample allows us to specify some results arising from previous regressions. In particular, the relatively more favourable pricing by European banks to emerging market banks (eq. 6, 9 and 12 in Table 8) is less common, having been reserved only for ASEAN-5 banks (eq. 15): indeed, the coefficient on the *eur-arr* dummy is not statistically significant for banks of other countries (eq. 16 and 17).

8. Conclusions

Despite the need for care in evaluating moral hazard, a phenomenon which can be detected only indirectly, one of the main conclusions of this paper is that talking about moral hazard in rather general terms may not be the correct approach. Overall, the results obtained suggest a general re-appraising of the moral hazard argument in international lending to emerging countries following the 1995 IMF-led official intervention in Mexico.

The need to analyse moral hazard by introducing further specifications is proved by the fact that, according to our empirical evidence, the evolution of spreads on syndicated loans after the Mexican crisis differs according to the nature of the borrower.

In particular, while the effect of the Mexican intervention on emerging market corporates and financial firms risk premia is rather ambiguous, depending on whether or not one is controlling for industrial countries' interest rates, the decline of spreads on interbank loans is robust to the regression specifications, thus offering a certain support to the hypothesis of the "speciality" of the international interbank market, or at least of some segments of it. In this respect, the Mexican rescue seems to have induced less attention in evaluating counterpart risks.

Clearly, drawing conclusions about moral hazard by using dummy variables inevitably leaves ample room for error; nevertheless, what seems really indicative from our results is the difference in the statistical significance of the time dummies for different borrowers.

This background seems to suggest that the problem of the empirical relevance of

moral hazard is twofold: on the one hand, one needs to assess the presence of moral hazard per se; on the other hand, it is important to mark a clear distinction among the possible sources of the phenomenon.

In this regard, our analysis highlights that forms of moral hazard other than the usual ones attributed to the IMF-led rescue packages but related instead to the existence of guarantees provided by individual governments or central banks, could play a more significant role in international financial markets.

At the same time, however, this argument is not itself of a general nature in the light of the fact that the riskiness of banking systems in ASEAN-5 countries, the main candidates to moral hazard in the policy debate following the 1997-98 Asian crisis, does not seem to have been undervalued by the market. Quite surprisingly, indeed, spreads charged on Asian banks are relatively higher than others, were not affected by the IMF intervention in Mexico and increased in 1997.

Finally, by including the nationality of the loan arranging bank in the regressors, we contributed to identify a channel which enable us to capture the assumed downward effect on spreads arising from the abundance of international liquidity in the period under consideration. This result seems quite valuable in the face of the failure in explaining the reduction in risk premia shown by indicators of international liquidity (such as industrial countries' interest rates) traditionally used in the literature.

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