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Abstract: Considerable attention has been paid to the possibility that large-scale IMF-led financing packages may have distorted incentives in international financial markets, leading private investors to provide more credit to emerging market countries, and at lower interest rates, than might otherwise have been the case. Yet, prior attempts to identify such distortions have yielded mixed evidence, at best. This paper makes three contributions to our ability to assess the empirical importance of moral hazard in international financial markets. First, it is argued that because large international "bailouts" did not commence until the 1995 Mexican crisis, financial indicators prior to that time could not have reflected a significant degree of this type of moral hazard. Therefore, one test for the existence of moral hazard is that the access of emerging markets to international credit is significantly easier than it was prior to 1995. Second, the paper argues that because private investors expect large-scale IMF-led packages to be extended primarily to economically or geo-politically important countries, moral hazard, if it exists, should lead these countries to have easier terms of access to credit than smaller, non-systemically important countries. Finally, in addition to looking at bond spreads, the focus of earlier empirical analyses of moral hazard, the paper also examines trends in capital flows to gauge the access of emerging market countries to external finance. Looking at the evidence in light of these considerations, the paper concludes that there is little support for the view that moral hazard is significantly distorting international capital markets at the present time.

Keywords: moral hazard, spreads, capital flows, emerging markets

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I. Introduction

In recent years, considerable attention has been paid to the topic of moral hazard in international financial markets. Moral hazard, at the most general level, refers to the possibility that the provision of insurance, by diminishing the incentives to prevent a particular outcome, may actually lead to a rise in the incidence of that outcome. In the context of international financial markets, the provision of large IMF-led funding packages to emerging market countries experiencing financial crises is argued, by some, to have undermined efforts to forestall such crises. Table 1 summarizes the exceptional IMF-led arrangements that have been provided by the official international community from the inception of such packages during the Mexican crisis through 2001. On the one hand, the possibility of recourse to such credits may have diminished the incentives for emerging market governments to have followed prudent policies–this is typically referred to as "debtor moral hazard". On the other hand, prospects of international bailouts in the event of difficulties may have led creditors to be less discriminating, leading to larger credits at lower spreads: "creditor moral hazard". (See Lane and Phillips, 2000)

Proponents of the view that moral hazard has been important in emerging market finances point to the sharp reduction in spreads on emerging market credits in 1996 and 1997, and the sharp upswing in capital flows to emerging market countries during this period, as reflective of the relaxed attitude of investors toward risk that followed the exceptionally large support package for Mexico in 1995. In their view, the failure of the IMF to prevent the Russian

default and devaluation crisis of 1998 significantly reduced the degree of moral hazard in the system, leading to substantial increases in spreads and declines in capital flows to emerging market countries, but did not eliminate moral hazard entirely.

Concerns about moral hazard continue to be cited by critics of large IMF lending programs as a reason why exceptional financing packages for emerging market countries need to be severely curtailed, with private creditors accordingly being forced to bear more of the burden of resolving emerging market crises by rolling over, rescheduling, and/or reducing the value of their credits. In a recent speech promoting an international bankruptcy approach to resolving sovereign debt crises, IMF Deputy Managing Director Ann Krueger noted:

> Moral hazard remains a concern. Private institutions may be encouraged to lend and invest recklessly by the belief that the Fund will ensure that their creditors can repay them.[1]

Similarly, a recent paper by officials of the Bank of Canada and Bank of England promoting standstills on debt-service payments and limits on IMF lending argues:

> ...a related benefit of lending limits is that they would guard against moral hazard. Moral hazard applies to both debtors (by blunting incentives to undertake the necessary adjustment and reform) and creditors (by blunting incentives to undertake effective risk management)...the empirical evidence on the moral hazard effects of official lending is not conclusive. Nevertheless, anecdotal evidence of the importance of moral hazard is widespread.[2]

Hence, the existence of moral hazard in international financial markets is more than a mere curiosity–at least from the perspective of some observers, it has important implications for

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[1]Krueger (2001).

[2]Haldane and Kruger (2001).

international economic policy.[3] Yet, as acknowledged in the above quote, to date it has been difficult to muster unambiguous evidence regarding the prevalence of moral hazard in international financial markets. Most of the recent work on this topic focuses on creditor moral hazard, in part because this is the type of moral hazard most likely to show up in international financial market indicators. Zhang (1999) finds that, controlling for fundamental determinants of emerging market credit spreads, there was no evidence of downward pressures on spreads following the Mexican financial crisis and IMF bailout. Lane and Phillips (2000) study the response of spreads of a large array of events related to IMF financing that might have been expected to either raise or lower the degree of moral hazard in the system; they find little systematic response of spreads to such events. Tillmann (2001) analyzes the response of time-varying risk premia to relevant IMF-related events in a Markov-switching GARCH-M model, and also gets ambiguous results.

Dell'Ariccia, Schnabel, and Zettlemeyer (2002) study the response of several aspects of spreads–their level, relation to risk, and dispersion–to the Russia crisis, as well as the Mexican and Asian crises. They find that the evidence, on balance, is quite supportive of the view that the Russia crisis, by reducing the degree of moral hazard in the system, led to increases in the level and dispersion of emerging market spreads. However, as the authors acknowledge, it is difficult to distinguish this interpretation from the so-called "wake-up call" hypothesis, in which the Russia crisis focused the attention of investors on the possibility of default in a much sharper

[3]The view that, at least in principle, large-scale IMF financing packages should cause significant moral hazard is not universally held. Jeanne and Zettelmeyer (2001) and Mussa (2002) argue that the subsidy element in IMF lending is too low for this lending to induce substantial debtor or creditor moral hazard, as these are usually defined, although they agree that inappropriately designed programs could lead to distortions in crisis-country policies.

fashion than had been the case before the crisis. Perhaps more important from the standpoint of the policymaker, even if one is convinced that the Russia crisis was a moral-hazard reducing event, it is not clear how much moral hazard remained in its aftermath. After all, as shown in Table 1, several exceptional IMF-led financing packages have been provided in the years since the Russia crisis.

Building on the important research that precedes it, this paper attempts to make several contributions to our understanding of the role of moral hazard in the financing of emerging market countries. First the paper posits, in essence, a benchmark against which the level of moral hazard can be gauged. Previous analyses of this subject have generally sought to identify whether particular events–e.g., the Mexican crisis, the Russian crisis, or particular IMF programs–have either raised or lowered the extent of moral hazard in international finances. However, those analyses have not attempted to assess whether the level of moral hazard at any one time was particularly high or low relative to some objective standard. By contrast, in this paper we suggest a means of gauging the extent of moral hazard at a point in time. We start with the proposition that the IMF programs of the 1980s and early 1990s did not offer enough financing to substantially bail out foreign investors, and that large international bailouts did not commence until the Mexican crisis in 1995. Hence, financial indicators prior to 1995 most likely did not reflect a significant degree of moral hazard, and can be used as a benchmark against which to gauge the extent of moral hazard in subsequent periods.

A second contribution of this paper to the debate over moral hazard is to augment the traditional focus on debt spreads with an analysis of the behavior of capital flows to emerging markets. Because movements in capital flows are determined by changes in the demand for as

well as the supply of capital, it is obviously difficult to make concrete inferences about moral hazard from trends in capital flows. However, to the extent that moral hazard is considered to play an important role in influencing the supply of capital, we would expect significant shifts in the extent of moral hazard to be associated with discernable shifts in capital flows. Moreover, the priority one should place on addressing the problem of moral hazard may well depend on conditions in international credit markets–limiting bailouts to reduce moral hazard, for example, may be less imperative in an environment where, for whatever reason, capital flows to emerging markets already are quite depressed.

A final contribution of this paper is an alternative test for moral hazard in international financial markets, based on the likelihood that different countries will be treated differently by the official international community. Even after the success of the Mexican program, there was never a presumption that all countries running into problems in the future would be likely to receive exceptional financing packages. Such packages generally were thought to be appropriate only for large and/or systemic countries with the potential to destabilize the international financial system. To the extent that market participants understood that the scope for bailouts was limited, this should have shown up in lower spreads and greater capital inflows for the countries most likely to be bailed out. Some rudimentary tests of this hypothesis are described in the paper.

Based on these analyses, our primary conclusion is that, at present, international financial markets do not appear to be unduly distorted by moral hazard considerations. Compared with prior to the Mexican crisis, spreads in recent years have been relatively high and appear to be very sensitive to differences in perceived creditworthiness. Moreover, capital flows to emerging

market countries are very depressed relative not only to their peak in early 1997, but also compared with their level before the Mexican crisis. Finally, there is no evidence that, controlling for fundamental determinants of creditworthiness, countries that are more likely to receive large IMF-led financing packages pay lower spreads for their debt or receive greater inflows of capital.

The plan of this paper is as follows. Part II fleshes out the proposition that financial conditions prior to the Mexican crisis constitute an appropriate no-moral-hazard benchmark, and then compares subsequent developments in spreads and capital flows with pre-Mexican crisis conditions. Part III describes our tests to identify whether investors have discriminated among countries, based on the likelihood that they would be eligible for bailout funding. Part IV concludes.

II. Comparisons with the no-moral-hazard benchmark

II.1 The no-moral-hazard benchmark

Many observers speak of the need for a radical change to the current regime, as if it had long been the practice of the official international community to provide large-scale IMF support packages to countries experiencing financial crises. Yet, the practice of providing such packages is comparatively recent. During the debt crisis of the 1980s, IMF programs were for the most part limited to providing funds to cover short-falls in the current account, and generally did not provide enough funds to finance repayments of maturing principal as well. Preventing default required a coordinated effort among lenders (primarily banks), creditor-country governments, and debtor-country governments, the result of which was that creditor banks refinanced and/or restructured most debt coming due, and occasionally provided "new money" lending as well to

cover interest payments on the debt.

By the end of the 1980s, it had become apparent that this approach was not leading to a definitive solution to debt problems in developing countries. While default was, for the most part, being averted, continued debt problems and uncertainty about how these problems would be resolved remained important impediments to a restoration of growth. The solution to these problems, however, was not a bailout of private investors by the IMF, but rather a restructuring and reduction in their face value of bank loans under the Brady Plan. This involved some official support to purchase the U.S. Treasury bonds used to collateralize the Brady bonds, but otherwise represented an important degree of involvement by private creditors in the resolution of developing country debt problems.

Against this background, the official support package provided to Mexico in 1995, involving a "headline" total of $48.8 billion, including $17.8 billion in IMF funds, was unprecedented. There was no basis for private investors, prior to 1995, to have anticipated that Mexico would have received an IMF program equal to nearly 700 percent of its quota, nor that other countries subsequently would receive programs exceeding 500 percent of quota by large margins.

With investors having little reason to anticipate they would be substantially bailed out by the official international community in the event that debtors ran into trouble, it seems likely that creditor moral hazard, whether or not it was very significant after the Mexican crisis, was not much of a factor before that crisis. Therefore, credit spreads prior to 1995 probably were not artificially depressed by moral hazard, nor were capital flows artificially elevated. Accordingly, to assess whether financial conditions in later periods were affected by moral hazard, it may be

reasonable–after controlling for changes in creditworthiness and other relevant factors–to compare those conditions with those prevailing in the pre-1995 period.

II.2 Comparisons involving bond spreads

In their comprehensive and insightful paper, Dell'Ariccia, Schnabel, and Zettelmeyer (2002) argue that moral hazard, if it exists, should influence debtor country bond spreads in three ways. First, it should lower spreads, since all else equal, the prospect of being bailed out reduces the risk to investors. Second, it should diminish the responsiveness of spreads to differences in creditworthiness among countries, since if the international community is providing bailouts to good and poor credit-risk countries alike, this reduces the differences in risk ultimately faced by investors. Finally, and as a related point, the presence of moral hazard should reduce the dispersion of spreads across countries, for given dispersions in creditworthiness.

Utilizing all three criteria, we now compare emerging market bonds spreads to those prevailing prior to 1995, when as argued above, moral hazard would presumably have been relatively unimportant, at least compared with the post-1994 period.

Levels of spreads Chart 1 plots different versions of the J.P.Morgan's EMBI measure of emerging market bond spreads. It plots data through late November 2001; subsequent data have been excluded in this analysis, and other analyses below, to avoid complications stemming from Argentina's default and, more recently, the onset of financial pressures in Brazil. As indicated by the dashed horizontal line, which indicates the average EMBI spread over the period 1992 through November 1994, prior to the Mexican crisis, spreads averaged about 700 basis points. This level has been continuously exceeded, and by a large margin, by emerging market bond spreads ever since the Russia crisis. The run-up to default in Argentina, which accounts for a

substantial fraction of the EMBI aggregates, lifted aggregate bond spreads well above their pre-1995 level in late 2001. Yet, even if Argentina debt is excluded from the aggregate bond spread index, these spreads remained at or above their pre-1995 level.

This evidence suggests that, if moral hazard has ever been a factor in emerging market financing, this was only the case from about mid-1996 through July 1998, when emerging market spreads were below their pre-1995 level. There is little *prima facie* evidence in aggregate levels of spreads that moral hazard has been an important consideration either before or after that relatively limited period.

It is possible, of course, that other factors affecting emerging market spreads have pushed up spreads in recent years, offsetting the depressive effect of moral hazard. Chart 2 plots the EMBI spread against several factors often cited as positively influencing emerging market spreads: U.S. Treasury bond yields, U.S. high-yield corporate spreads, and the perceived riskiness of emerging market bonds (as measured by a capitalization-weighted average of Moody's sovereign credit ratings for countries included in the EMBI index).[4] The evidence here is mixed: U.S. 3-month Treasury and 10-year Treasury yields are now well below their average in the 1992-94 period, which should have held down spreads; U.S. high-yield corporate spreads clearly have risen since then, likely pushing up spreads; and average credit ratings have deteriorated a bit on balance, also posing some upward pressure on spreads.

To get a better sense of how movements in these factors may have affected emerging market spreads, we estimated an OLS error-correction equation linking the monthly change in

[4]This average was constructed by Ammer (2000) using market value country weights provided courtesy of JP Morgan. Note that movements in this average may reflect either changes in countries' ratings or changes in the set of countries included in the EMBI index.

the EMBI spread to (1) the lagged level of the EMBI spread, (2) the lagged levels of U.S. Treasury yields, high-yield corporate spreads, and average credit ratings,[5] and (3) contemporaneous changes in U.S. Treasury yields, high-yield spreads, and average credit ratings. We also added separate dummy variables for each of the four major emerging market crises of the 1990s–Mexico, developing Asia, Russia, and Brazil–equal to one for six months starting with the month the exchange rate was initially devalued, and zero otherwise; the purpose of this dummy is to contribute to the explanation of large swings in the EMBI that the other variables, by themselves, are unlikely to explain.

Table 2 presents the estimation results for the equation. The statistically significant negative coefficient on the lagged level of the EMBI points to a strong mean-reverting tendency of the EMBI. The coefficient on the lagged level of the U.S. corporate high-yield spread is marginally significant, while that on the contemporaneous change in high-yield spreads is highly significant. The lack of significance of the coefficients on the U.S. Treasury yields, however, points to at best a weak long-run impact of these rates on the EMBI.[6] The coefficients on average credit ratings, too, are insignificant, although this may reflect their relatively small variation over time from 1995 on; as discussed further below, spreads certainly vary across bonds with different credit ratings at a given point in time.

Notwithstanding the statistical insignificance of several of the coefficients, to give the

[5]The ratings variable was constructed by assigning numerical values to Moody's ratings, ranging from 1 for a C rating to 24 for an Aaa rating.

[6]The finding that spreads are not strongly or significantly linked to U.S. interest rates is consistent with several other studies on this topic, including Cline and Barnes (1997), Eichengreen and Mody (1998a, b), and Min (1998).

benefit of the doubt to the possibility that there were factors at work pushing EMBI spreads up and offsetting the effect of moral hazard, we computed the long-run value of the EMBI implied by the values of U.S. Treasury yields, corporate spreads, and average credit ratings at each point in time, based on model's estimated parameters.[7] In principle, it would have been desirable to estimate the model only through 1994 and then to simulate the model for the period of 1995-2001, when IMF-linked moral hazard is most likely to have been present; then, actual spreads could have been compared with a genuine no-moral-hazard benchmark. However, the paucity of pre-1995 observations does not permit the estimation sample to be so truncated. Instead, we calculated the model's long-run predictions based on estimation over the entire period. Presumably, if moral hazard was not important before 1995 but depressed spreads substantially after that period, the estimated model–whose parameters would reflect the average behavior of spreads over the entire period–would tend to under-predict spreads pre-1995 and over-predict spreads post-1994.

Chart 3 plots the simulated long-run EMBI against the actual EMBI. The model certainly predicts increases in spreads over the past several years, primarily because U.S. corporate high-yield spreads have risen. Even so, actual spreads last year were fairly close to their predicted value. Moreover, actual spreads prior to 1995 were generally below predicted levels, the opposite of what should have been the case had the model's estimation been significantly affected by moral hazard in the post-1994 period. Hence, there is no evidence that, controlling for relevant

[7]This was calculated by setting the differenced variables to zero, along with the emerging market crisis dummies, and then inverting the equations to solve for the EMBI spread as a function of the constant, the U.S. Treasury yields, the U.S. corporate high-yield spread, and the average credit rating.

factors, moral hazard has depressed spreads in recent years significantly below the level at which they would have been otherwise.

In the equation described above, the creditworthiness of emerging market bonds is controlled for by inclusion of the average credit rating for countries in the EMBI index. Additional evidence on changes in spreads, controlling for a broader array of emerging market bond characteristics, is provided by earlier work by this author and Karsten von Kleist. Chart 4 presents updated results from research described in Kamin and von Kleist (1999), in which new-issue bond spreads for a wide range of developing countries were regressed on various characteristics of the bonds, including maturity, currency-denomination, credit rating, and annual dummy variables to allow the model's predicted value to change over time. The model can be used to simulate the evolution of spreads for a bond of given characteristics, including credit rating, and hence can control for changes in creditworthiness over time. Chart 4 indicates quite clearly that, relative to 1993 and 1994, bond spreads for all credit-rating categories have been quite elevated in the past few years, again casting doubt on the proposition that moral hazard exerts an important influence in international bond markets at present.

It is possible, of course, that in response to the potential for large-scale IMF-led bailouts, credit ratings themselves have shifted to indicate less risk, for given levels of underlying creditworthiness. Hence, if Chart 4 had indicated relatively flat trends in spreads over time, this might indeed be consistent with an enhanced degree of moral hazard. However, the upward swings in spreads between 1993-94 and the present indicated in the chart are so large as to contradict any view that, on balance, financing conditions for emerging markets might have loosened over time.

Responsiveness of spreads to creditworthiness As noted above, all else equal, moral hazard should diminish the sensitivity of spreads to differences in creditworthiness among different countries. Hence, if moral hazard represents an important factor in international financial markets, we should see the sensitivity of spreads to creditworthiness diminish over time, relative to in the 1992-94 period.

In Chart 4, the sensitivity of spreads to creditworthiness can be read off the vertical distance between the lines for different credit-rating categories.[8] For example, in 1994, new issues of 10-year, dollar-denominated BBB-rated bonds would have paid a spread of about 200 basis points, compared with a spread of 300 basis points for BB-rated bonds; hence, the sensitivity of spreads to a downgrade in rating from BBB to BB was 100 basis points. In 2001, BBB-rated bonds would have paid an average of about 350 basis points compared with about 520 basis points for a BB-rated bond, a (much larger) difference of 170 basis points. Similar increases in differences in spreads may be observed for other ratings categories. Hence, between 1994 and 2001, the sensitivity of spreads to differences in perceived creditworthiness appears to have increased substantially. Investors appear to be discriminating among credit risks more carefully than ever, contradicting the proposition that moral hazard remains an important consideration at present.

Dispersion of spreads As noted above, one would expect that in a context where moral hazard was important and spreads were less responsive to credit risk, the dispersion of spreads across countries should decline, all else equal. This prediction clearly is contradicted in Chart 4,

[8]In an earlier draft, Dell'Ariccia, Schnabel, and Zettlemeyer (2002) recognized that our prior work in Kamin and von Kleist (1999) could serve as a test of moral hazard around the same time as we did!

measuring dispersion as the difference between the line for A+ rated spreads and the line for B rated spreads. Not only is the dispersion wider in 2001 than in 1994, but interestingly, it is a bit wider in 1997 than in 1994, suggesting that even in the heyday of emerging market flows, no moral hazard was present.

Of course, the annual averages plotted in Chart 4 may be a bit misleading, as they obscure relatively large swings in spreads within years. As another cut at this issue, the top panel of Chart 5 plots EMBI spreads for a wide array of developing countries during the 1990s. The bottom panel plots, on a quarterly basis, the cross-sectional standard deviation of these spreads. These standard deviations are a bit difficult to compare with each other, as the number of available spreads grows over time, while changes in creditworthiness are not being controlled for. Nonetheless, two points are clear. First, by 1997, spreads had become unusually concentrated, possibly reflective of moral hazard. Second, since the Russia crisis spreads have remained about as dispersed as in the 1992-94 period, again suggestive of the likelihood that moral hazard has not been important in recent years.

II.3 Comparisons involving capital flows

Ultimately, moral hazard is a concern primarily if distortions in credit pricing lead to distortions in credit allocation, that is, if capital flows to emerging market countries are affected. Given the volatility of capital flows and the many factors that influence them, it probably is impossible to construct a rigorous test of the existence of moral hazard based on capital flows data. Yet, the flows plotted in Chart 6 are instructive. As indicated in the top panel, gross fixed income (bonds and loans) flows to emerging market countries, after rising steadily through the third quarter of 1997, diminished substantially since then and as of the third quarter of 2001, were

only a bit higher than their pre-1995 peak. The bottom panel presents these capital flows as a share of the GDP of the recipient countries; by this measure, recent flows have been slightly below their pre-1995 peak. By comparison, global gross fixed income flows, which also include flows among industrial countries, have risen considerably over the entire period (both measured in dollars and as a share of global GDP), suggesting, in relative terms, a substantial decline in the developing countries' participation in global financial intermediation.

This point is even more evident when net capital flows are considered. Chart 7 plots net private capital flows to emerging market countries, excluding foreign direct investment, over the past decade, along with the aggregate current account deficit of these countries. It highlights a substantial and sustained reversal of the heavy net flows of capital to emerging markets that took place in the first two-thirds of the 1990s.

These data cannot prove that moral hazard is unimportant at the current time, since it is possible that other factors–for example, global risk aversion or the global slowdown in economic activity–may be operating to depress capital flows to emerging market countries, even as moral hazard is operating to boost those flows. Yet, it is difficult to conclusively identify the role of such other factors, particularly as they would have had to be operating nearly continuously since August 1998. Moreover, from the standpoint of public policy, it may not matter very much whether moral hazard does not exist, or does exist but is being overwhelmed by other factors. In either case, given the difficulties that developing countries are having accessing international credit markets, policy actions designed to reduce moral hazard in order to eliminate artificial inducements for capital flows to emerging markets would seem less imperative at the present

time.[9]

Nevertheless, as an initial stab at controlling for other external factors to identify an impact of moral hazard on capital flows, we estimated a rudimentary OLS equation relating quarterly log-changes in our measure of gross fixed-income capital flows to emerging market countries (as a share of their GDP) to (1) the lagged level of this measure, (2) the lagged levels of 3-month and 10-year U.S. Treasury yields, U.S. high-yield corporate spreads, and a GDP-weighted average of G7 GDP growth,[10] (3) contemporaneous quarterly changes in those explanatory variables, and (4) the same crisis dummies (lasting 2 quarters each) as in the EMBI spreads regression. We found all of the coefficients on the contemporaneous changes to be statistically insignificant, and hence dropped them from the equation. Additionally, the coefficients on the lagged levels of the 3-month and 10-year Treasury yields were estimated as having nearly identical absolute magnitudes but opposite signs–therefore, the 10-year yield minus the 3-month yield was substituted for those two variables in the equation.

The resultant model is shown in the first column of Table 3. As with EMBI spreads, capital flows appear to be mean-reverting, as indicated by the significant negative coefficient on the lagged level of flows. Additionally, U.S. corporate high yields spreads exert a strongly significant negative effect on capital flows to emerging market countries, consistent with their

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[9]As pointed out in the conclusion, however, there may still be a rationale for policies designed to curb moral hazard, were moral hazard expected to emerge at some future date.

[10]These variables were suggested by previous research on the determinants of capital flows to emerging market countries, including Calvo, Leiderman, and Reinhart (1993), Fernandez-Arias (1996), Chuhan, Claessens, and Mamingi (1998), and Montiel and Reinhart (1999). We do not include measures of the economic performance of the emerging market countries themselves, as these are likely to be highly endogenous with respect to the capital inflows themselves.

positive effect on EMBI spreads. On the other hand, and for reasons that remain unclear, the difference between the 10-year and 3-month U.S. Treasury yield–i.e., the slope of the yield curve–also exerts a significant negative effect on emerging market flows; no such effect was discernable in the equation for EMBI spreads. Finally, the coefficient on G7 GDP growth is negative, albeit not significant, consistent with the view that higher growth in industrial countries may divert capital from investment opportunities in emerging market countries.

As in the analysis of EMBI spreads, to examine the impact of the explanatory variables on emerging market capital flows, we invert the equation to express the long-run level of capital flows as a function of U.S. high-yield spreads, the U.S. Treasury yield curve, and G7 growth. Again, it would have been desirable to estimate the model only through 1994 and then simulate the 1995-2001 period out-of-sample, but this was precluded by the limited estimation sample. Therefore, as in the EMBI spreads analysis and as shown in Chart 8, we compare actual capital flows with those predicted by the model as estimated through the entire sample: if moral hazard had boosted capital flows only from 1995 onwards, we would expect the model to overpredict flows during 1992-94 and underpredict them, on average, from 1995-2001.

As may be seen in Chart 8, the results suggest that external factors may help to explain both the runup in capital flows to emerging market countries prior to 1998 and the reduction in those flows thereafter. Yet, the results do not make a compelling case for the role of moral hazard. Taking into account their high volatility, actual capital flows were only slightly below predicted levels on balance in the pre-1995 period and generally in the neighborhood of predicted levels in the past several years. As in the analysis of EMBI spreads, the only period where moral hazard may have been evident is in 1996 and 1997, when capital flows rose well above predicted

levels on a sustained basis. In sum, even controlling for other factors affecting capital flows, there is no evidence of an important effect of moral hazard on these flows in the past several years.

III. Does moral hazard lead to discrimination in favor of systemic countries?

Even if moral hazard has not significantly boosted the access of developing countries to international capital markets in aggregate, it may have played a role in influencing the relative access of different types of countries to international capital markets. In particular, perceptions that some countries might be more likely than other countries to receive large IMF-led financing packages could in principle be serving to shift private financing from the latter to the former.

To develop this point somewhat further, even in the aftermath of the Mexico crisis, it is doubtful that a presumption ever existed among private investors that *all* countries would be likely to receive large IMF-led financing packages. It was generally recognized that Mexico's size, close relationship with the United States, and dominant position in emerging market finances probably gave it an unusually strong claim to substantial official financing–it was not clear how many other countries would enjoy similar support were they to run into trouble. Moreover, after the Asian crisis, concerns mounted over the financial capacity of the IMF to respond to the numerous financial crises that seemed inevitable in a world of rapid capital mobility, suggesting there might be limits to large-scale bailouts. At the same time, critics of IMF-led bailouts became increasingly vocal, and calls for greater "private sector involvement", or PSI, received greater attention.

Partly in consequence of these developments, the official community supported the rescheduling of sovereign bonds in three high-profile cases: Pakistan (1999), Ukraine (2000), and

Ecuador (2000). Because these economies were relatively small and their defaults, implicit or explicit, were unlikely to cause serious spillovers to other economies, these cases fed the perception among private investors that only large, systemically important countries were likely to receive large IMF-led bailout packages, i.e., be too big to fail, while smaller countries would have to restructure their debts in the event of trouble.

If this perception were actively influencing investors, we would expect to see indications that, all else equal, countries perceived to be more economically or geo-politically important had better access to international credit markets than smaller and/or less important countries. Below, we first consider whether potentially systemic countries have been able to pay unusually low spreads, compared to what one might expect based on their fundamentals. We then consider whether capital flows to potentially systemic countries have exhibited different trends than smaller countries more likely not be considered systemic.

III.1 Do systemic countries pay lower spreads?

To answer this question, we first assembled spreads on sovereign, dollar-denominated bonds issued by 29 countries at two dates: September 30, 1997 and September 29, 2000.[11] We then estimated separate regressions for each date of the log of these spreads on several variables[12] likely to reflect the country's degree of creditworthiness:[13]

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[11]These spreads were derived for bonds of different maturities and then adjusted to a common 10-year maturity. See Appendix Tables 1 and 2 for details.

[12]In practice, industrial countries are much higher rated than developing countries; their spreads are accordingly much lower, and hence less likely to vary in response to many of the creditworthiness variables listed. Therefore, all the variables in the list except growth and GDP per capita are pre-multiplied by the developing country dummy.

[13]These variables are generally similar to those employed in other analyses of the determinants of sovereign spreads, including Cantor and Packer (1996), Cline and Barnes

- GDP per capita,
- average growth in the preceding three years,
- a dummy variable equal to one if the country is a developing economy,
- average inflation in the preceding three years,
- the ratio of short-term external debt to international reserves,
- the ratio of total external debt to exports,
- the ratio of total external debt to GDP,
- the ratio of the fiscal balance to GDP,
- the ratio of the current account balance to GDP,
- a dummy variable if the country is in Latin America,[14]
- a dummy variable if the government defaulted on (or instigated a coercive restructuring of) its external debt within the preceding five years.

Columns 1 and 3 of Table 4 present regression results for these equations. Given the large number of variables and likely collinearity between many of them, it is not surprising that few of the coefficients are statistically significant. Columns 2 and 4 show estimation results, after the initial models were reduced by sequentially removing the least significant variables and re-

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(1997), Ammer (1998), Eichengreen and Mody (1998a, b), Min (1998), Zhang (1999), and Dell'Ariccia, Schnabel, and Zettelmeyer (2002). In principle, we could have added credit ratings to the list of explanatory variables, as do some of the above studies, or even merely have regressed spreads on credit ratings alone, as in Kamin and von Kleist (1999). However, we wanted to abstract from the possibility that credit ratings themselves might reflect differences in probabilities of receiving IMF bailouts.

[14]Kamin and von Kleist (1999) show that, all else equal, Latin American countries seem to pay higher spreads on their debt, perhaps reflecting their more turbulent macroeconomic histories.

estimating the equations. These results show that somewhat different variables were important in influencing spreads in the two periods. This is not necessarily surprising, given that (1) relatively small samples are being used, and (2) at different points in time, the market may focus on different considerations. Even so, both equations explain about 85 percent of the variation in spreads across countries, consistent with other studies–Cantor and Packer (1996), Ammer (1998)–that present estimates of cross-section equations in which ratings variables are not included as explanatory variables.

We now consider whether, controlling for creditworthiness variables, certain types of economies exhibit lower spreads than others. Charts 9a and 9b show, for each of these two "reduced" equations: (1) a comparison of the equation's predicted spreads (once transformed from logs) with actual spreads for each country, (2) the prediction error (actual minus predicted), and (3) the prediction error as a fraction of the actual spread.

The charts present no evidence that countries more likely to receive exceptional IMF financing pay lower spreads–i.e., have more negative residuals–than countries less likely to receive such financing. For the September 30,1997 results shown in Chart 9a, for example, actual spreads for Mexico, Turkey, and Argentina were higher than their predicted values, while spreads for Colombia, Uruguay, and China were below their predicted values.[15] Similarly, for the September 29, 2000 results shown in Chart 9b, actual spreads for Argentina, Turkey, Brazil and Mexico exceeded predictions, while spreads for South Africa, Uruguay, Chile, and China came in below predictions.

[15]Uruguay, while quite small and unlikely to have been seen by market participants as systemic, actually received an exceptional-access IMF program in 2002.

III.2 Do systemic countries enjoy higher capital inflows?

Chart 10 takes the gross private fixed-income capital flows to developing countries plotted in Chart 6 and divides them into flows to two groups: (1) potentially large and systemic countries,[16] and (2) all others. Obviously, choosing a convincing list of countries that would most likely to be eligible for large-scale official support is not easy, and reasonable people will be able to differ on this–yet, it is doubtful that any alternative list would be substantially different from the one we used.

The key point of the chart is that capital flows to both sets of countries, measured in dollars or as a share of recipient country GDP, have shown broadly similar trends during the past decade: rising on balance from 1992 through part-way into 1997, collapsing from late 1997 through 1998, and then stabilizing somewhat since then. If private investment decisions had been influenced by the likelihood that the larger, potentially systemic countries would more readily receive large-scale official support than other countries, one should have seen a shift in financing toward the systemic countries. Yet, there is no evidence of this having taken place. Capital flows to the systemic countries did rise more rapidly than those to non-systemic countries, but this trend already was in effect even before 1995, and hence does not appear attributable to IMF-linked moral hazard. Capital flows to both sets of countries have been substantially depressed since the Russian crisis. Relative to their 1997 peak, capital flows to the systemic group have been, if anything, somewhat more depressed than those to the remaining countries.

These observations remain valid when capital flows to the systemic and non-systemic

[16]These include Argentina, Brazil, Indonesia, Korea, Mexico, Malaysia, Philippines, Poland, Czech Republic, Hungary, Thailand, and Turkey.

countries are compared with their predicted values derived from econometric models similar to that estimated for total emerging-market capital flows (described in Section II.3) above. The second and third columns of Table 3 present estimation results for a regression of quarterly log-changes in capital flows (as a share of recipient-country GDP) to systemic and non-systemic countries, respectively, on the same explanatory variables that entered into the equation for total flows to emerging markets (the first column). As with the equation for total flows, the equations for capital flows to systemic and non-systemic countries were then inverted to calculate the long-run level of capital flows as a function of U.S. high-yield spreads, the slope of the U.S. Treasury yield curve, and G7 growth.

Chart 11 compares these predicted capital flows with their actual values. If moral hazard were shifting capital flows from non-systemic to systemic countries after 1994, this would have had the following implications for predicted flows, which are based on estimations over the entire 1992-2001 period: (1) for systemic countries, predicted flows would likely have exceeded actual flows pre-1995, before moral hazard kicked in, but would have fallen below actual flows on balance after 1994; (2) for non-systemic countries, predicted flows would have followed the opposite pattern, being below actual flows 1992-94 and above actual flows 1995-2001. In fact, as indicated in Chart 11, no such patterns arise. For both systemic and non-systemic countries, actual values are generally in the neighborhood of predicted values both prior to 1995 and in the most recent several years. For both sets of countries, moreover, actual flows rise well above predicted in the 1996 and 1997 period, when capital flows were at their height and EMBI spreads most depressed. This suggests that capital flows to both sets of countries were influenced by common factors other than moral hazard, possibly including a bout of "exuberance" in the mid-

1990s and the collapse of that exuberance thereafter.

IV. Conclusion

This paper presents additional evidence on the question of whether anticipations of IMF bailouts by investors have significantly distorted the price and quantity of private capital offered to emerging market countries. The paper first establishes that prior to the Mexican crisis, investors had no reasonable expectation that large-scale IMF-led financing packages would be provided to countries in financial crisis–therefore, financial conditions in the pre-1995 period represent a benchmark for what these conditions should be in the absence of moral hazard. The paper then compares recent measures of spreads and capital flows to emerging market countries with those prevailing in the pre-1995 period. It finds no evidence that access to credit by emerging market countries in the past few years has eased relative to the pre-1995 period, even after controlling for movements in U.S. financial variables and changes in the creditworthiness of the emerging market countries themselves. There is some evidence that access to credit was exceptionally easy during the mid-1996 through mid-1998 period, but this was relatively short-lived and may have been attributable to a bout of financial market exuberance as much as to moral hazard.

The paper then considers an alternative test for moral hazard: do countries that might be considered more likely to receive large-scale IMF-led financing packages have easier access to credit than other countries? However, controlling for fundamental determinants of creditworthiness, there was no evidence that countries thought to be more geo-politically or economically important pay lower spreads than countries thought to be less important. Moreover, there was no evidence that countries thought to be more likely to receive IMF funding have

maintained their levels of capital inflows better than other countries.

In sum, and consistent with some prior research on this topic, little support was found for the hypothesis that moral hazard has represented an important factor in international financial markets in recent years. This does not necessarily undermine arguments that limits on IMF funding are necessary to improve the architecture of the international financial system. Proponents of such limits have cited other rationales for access limits, such as improving the governance of official international lending. Moreover, it is possible that moral hazard only asserts itself when credit markets already are quite exuberant, as arguably was the case in 1996-97–therefore, moral hazard could become important during some future emerging markets boom, even if it is not important at present. Nevertheless, our findings certainly diminish the immediate urgency of imposing binding access limits on IMF financing in order to curtail moral hazard.

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Table 1: Exceptional IMF-led Support Packages – 1995 - 2001

Mexico 1995:
Headline Package – $48.8 billion
IMF Loan – $17.8 billion (690 % of quota)

Thailand 1997:
Headline Package – $17.2 billion
IMF Loan – $3.9 billion (500 % of quota)

Indonesia 1997*:
Headline Package – $33.0 billion
IMF Loan – $10.1 billion (490 % of quota)

Korea 1997:
Headline Package – $55 billion
IMF Loan – $21.0 billion (1,940 % of quota)

Russia 1998:
Headline Package – $22.6 billion
IMF Loan – $11.2 billion (210 % of quota)

Brazil 1998:
Headline Package – $41.6 billion
IMF Loan – $18.1 billion (600 % of quota)

Argentina 2000:**
Headline Package – $39.7 billion
IMF Loan – $13.7 billion (500 % of quota)

Turkey 2000*:**
Headline Package – $13.8 billion
IMF Loan – $10.4 billion (830 % of quota)

* Package was significantly enhanced in mid-1998.
** Does not include $8 billion augmentation in August 2001.
***Does not include roughly $8 billion augmentation in May 2001.

Table 2: Determinants of EMBI spread
Dependent variable: Δ EMBI spread

Constant	2.84 (0.01)
EMBI (-1)	-0.17 (-3.66)
US 3-month yield (-1)	-0.03 (-0.23)
US 10-year yield (-1)	0.18 (0.92)
US high-yield corporate spread (-1)	0.13 (1.72)
Average credit rating (-1)	-3.65 (-0.13)
Δ US 3-month yield	0.15 (0.29)
Δ US10-year yield	0.59 (1.19)
Δ US high-yield corporate spread	0.89 (4.01)
Δ Average credit rating	-45.35 (-0.60)
Mex Crisis Dummy	133.76 (2.79)
Asia Crisis Dummy	-3.86 (-0.08)
Russia Crisis Dummy	142.62 (3.22)
Brazil Crisis Dummy	35.59 (0.83)
Corrected R^2	.24
Durbin-Watson Statistic	1.89
Date range	3/1992 - 11/2001
# monthly observations	117

t-statistics in parentheses

Table 3: Determinants of Capital Flows to Emerging Market Countries
Dependent variable: Δ log(capital flows/GDP)

	Total flows	Systemic countries	Non-systemic countries
Constant	1.49 (4.22)	1.85 (4.56)	1.35 (2.85)
log(capital flows/GDP) (-1)	-0.66 (-4.01)	-0.74 (-4.60)	-0.69 (-4.01)
US 10-year yield (-1) minus 3-month yield (-1)	-0.22 (-3.57)	-0.23 (-3.64)	-0.30 (-3.40)
US high-yield corporate spread (-1)	-0.11 (-2.97)	-0.12 (-3.02)	-0.11 (-1.84)
G7 GDP Growth (-1)	-0.22 (-1.54)	-0.12 (-0.73)	-0.43 (-1.72)
Mex Crisis Dummy	-0.53 (-2.43)	-0.51 (-2.24)	-0.70 (-2.09)
Asia Crisis Dummy	0.10 (0.52)	-0.09 (-0.42)	0.43 (1.30)
Russia Crisis Dummy	-0.42 (-2.65)	-0.48 (-2.71)	-0.39 (-1.40)
Brazil Crisis Dummy	0.27 (1.33)	0.36 (1.77)	0.09 (0.28)
Corrected R^2	.42	.44	.34
Durbin-Watson Statistic	1.94	1.80	2.02
Date range	1/92-3/01	1/92-3/01	1/92-3/01
# quarterly observations	38	38	38

t-statistics in parentheses

Table 4: Determinants of emerging market bonds spreads
Dependent variable: Log(spread)

	Sept. 30, 1997	Sept. 30, 1997	Sept. 29, 2000	Sept. 29, 2000
	(1)	(2)	(3)	(4)
GDP per capita	-0.35 (-2.76)	-0.42 (-4.97)	-0.33 (-2.22)	-0.24 (-3.26)
GDP growth	0.01 (0.17)		-0.06 (-0.95)	-0.08 (-2.21)
Inflation	0.01 (1.97)	0.02 (3.34)	0.00 (0.34)	
Developing country (DC)	-0.09 (-0.15)		-0.25 (-0.52)	
DC*(short-term debt/reserves)	0.001 (1.01)	0.002 (2.32)	0.003 (0.78)	0.004 (2.04)
DC* (debt/exports)	0.001 (0.66)		0.00 (1.05)	
DC*(debt/GDP)	0.008 (0.87)		-0.00 (-0.43)	
DC*(fiscal balance)	-0.03 (-0.52)		-0.04 (-0.98)	-0.05 (1.47)
DC*(current account balance)	-0.02 (-0.50)	-0.06 (-1.85)	0.02 (0.78)	
Latin America	0.61 (1.54)	0.74 (4.08)	0.32 (1.20)	0.30 (1.68)
Default			0.70 (1.70)	0.77 (2.58)
Corrected R^2	0.85	0.86	0.81	0.83
# observations	29	29	29	29

t-statistics in parentheses

Appendix Table 1
Spreads For Emerging Market Countries - September 30, 1997

Country	Year of Maturity	Spread*	Spread adjusted to 10-year maturity**	Rating***
Argentina	06	2.54	2.46	B1/BB
Brazil	07	1.79	1.86	B1/BB-
China	06	0.96	1.02	A3/BBB+
Colombia	04	1.74	2.13	BBB-
Ecuador			4.52	B1
Hungry	03	0.85	1.06	BBB-
Indonesia	06	1.60	1.69	Ba1/BBB
Israel	05	0.67	0.67	A2/A-
Korea	06	1.23	1.38	AA-
Malaysia	00	0.40	0.61	A+
Mexico	07	2.51	3.67	BB
Pakistan	99	2.97	5.51	B2/B+
Peru			3.15	
Philippines	16	2.48	2.79	BB+
Poland	04	0.81	0.96	BBB-
Thailand	07	1.80	1.80	A-
Turkey	07	3.42	3.42	B1/B
Uruguay	27	1.34	1.13	BBB-
Venezuela	07	2.75	2.78	Ba2/B+
Australia	06	0.37	0.33	AA
Austria	08	0.23	0.23	AAA
Belgium	05	0.30	0.36	AA+
Denmark	04	0.19	0.25	AA+
Finland	06	0.35	0.40	Aa1/AA
Italy	03	0.17	0.23	Aa3/AA
New Zealand	06	0.37	0.39	AA+
Spain	01	0.25	0.33	AA
Sweden	10	0.39	0.15	Aa3/AA+
UK	02	0.09	0.10	AAA

* Source: Database compiled by John Ammer, derived from Bloomberg.

** Actual spread adjusted to 10-year maturity as follows: for each emerging market bond, the U.S. corporate yield curve for the same rating was identified and the ratio between the 10-year spread and the spread for the original emerging-market bond's maturity was calculated. This was then multiplied by the original emerging market spread to calculate the adjusted spread.

*** Rating for Moody's and S&P, expressed in S&P rating terminology. When ratings differ, the Moody's rating is shown first, followed by the S&P rating. For Ecuador no S&P available until 7/31/00.

Appendix Table 2
Spreads For Emerging Market Countries - September 29, 2000

Country	Year of Maturity	Spread*	Spread adjusted to 10-year maturity**	Rating***
Argentina	10	7.05	7.05	Ba3/BB
Brazil	09	6.62	6.65	B2/B+
Chile	09	2.00	2.06	Baa1/A-
China	08	1.53	1.61	A3/BBB
Colombia	08	7.42	7.50	BB
Ecuador	12	12.13	12.20	Caa3/B-
Hungry	03	1.03	1.31	BBB+
Indonesia	06	6.61	6.78	B-
Korea	08	2.12	2.26	BBB
Malaysia	09	2.03	2.09	Baa3/BBB
Mexico	10	2.98	2.98	Baa3/BB+
Pakistan	05	19.16	19.86	Caa1/B-
Philippines	10	5.10	5.10	BB+
Poland	04	1.08	1.51	BBB+
South Africa	09	3.31	3.33	BBB-
Thailand	07	1.52	1.69	BBB-
Turkey	10	5.96	5.96	B+
Uruguay	09	2.35	2.38	BBB-
Venezuela	07	7.17	7.28	B
Australia	03	0.84	1.34	Aa1/AA+
Austria	09	1.02	1.05	AAA
Belgium	05	0.80	1.03	AA+
Denmark	05	0.80	1.01	Aaa/AA+
Finland	06	0.75	0.89	Aaa/AA+
Italy	08	1.00	1.07	Aa3/AA
New Zealand	04	0.85	1.16	Aa2/AA+
Spain	08	0.96	1.03	Aa2/AA+
Sweden	10	1.19	1.19	AA+
UK	02	0.52	1.11	AAA

* Source: Bloomberg.

** Actual spread adjusted to 10-year maturity as follows: for each emerging market bond, the U.S. corporate yield curve for the same rating was identified and the ratio between the 10-year spread and the spread for the original emerging-market bond's maturity was calculated. This was then multiplied by the original emerging market spread to calculate the adjusted spread.

*** Rating for Moody's and S&P, expressed in S&P rating terminology. When ratings differ, the Moody's rating is shown first, followed by the S&P rating.

Data Appendix

EMBI Spread: JP Morgan.

Individual Sovereign Spreads: See Appendix Tables 1 & 2.

3 month Treasury Yield: Federal Reserve databases.

10 year Treasury Yield: Federal Reserve databases.

Merrill Lynch High-Yield Spread: Merrill Lynch.

Moody's Sovereign Credit Ratings (Weighted Average): Constructed by Ammer (2000) using market value country weights provided courtesy of JP Morgan.

Capital Flows: BIS, CapitalDATA Bondware/Loanware.

U.S. Real GDP Growth: Federal Reserve databases.

Nominal GDP Levels in $U.S.: World Bank Development Indicators. GDP converted to $U.S. at market exchange rates. Because these data were available only through 2000, we used 2000 levels for 2001; this assumption is justified, as the world GDP data in the IMF April 2002 WEO is roughly unchanged between 2000 and 2001.

G7 Real GDP Growth (Weighted Average): IMF World Economic Indicators.

Emerging Market Dollar-denominated Bond Spreads: JP Morgan.

GDP per capita: World Bank Development Indicators.

GDP Growth: Federal Reserve databases, World Bank Development Indicators, Penn World Tables, Consensus Economics and IMF.

Inflation: Federal Reserve databases, IFS.

Short-Term Debt: World Bank Development Indicators, Joint IMF-BIS-OECD-World Bank statistics on external debt, Institute for International Finance, BIS.

Reserves: Federal Reserve databases, IFS.

Exports: Federal Reserve databases, CEIC database, IFS, World Bank Development Indicators and IMF.

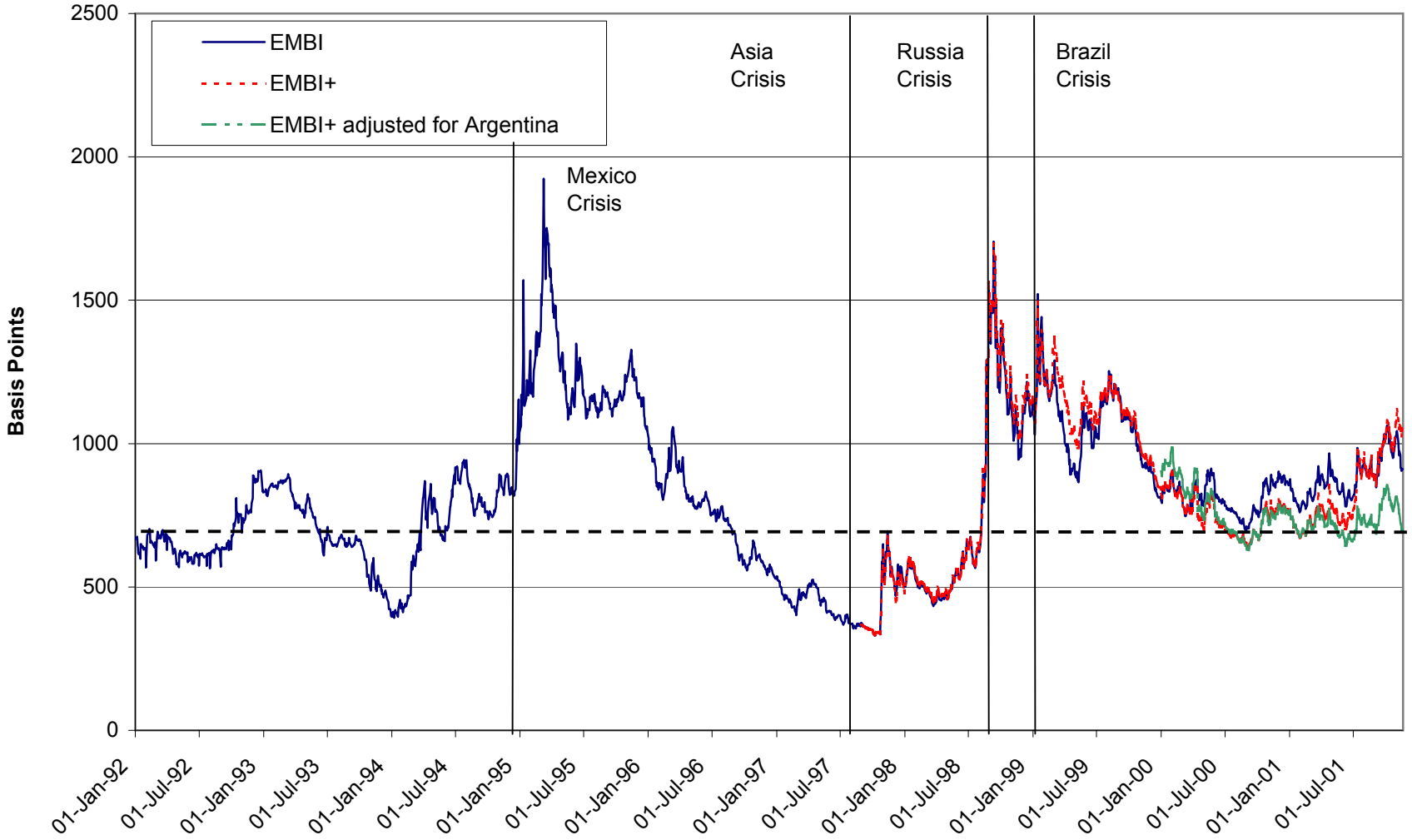
Nominal GDP: Federal Reserve databases, IFS, World Bank Development Indicators, IMF,

Consensus Economics and CEIC database.

Fiscal Balance: Federal Reserve databases, IFS, World Bank Development Indicators and IMF.

Current Account Balance: Federal Reserve databases, IFS, World Bank Development Indicators and IMF.

Chart 1: EMBI and EMBI+ Spreads, 1992 - November 19, 2001*



* Source: JP Morgan Website.

Chart 2: EMBI Spreads and External Factors

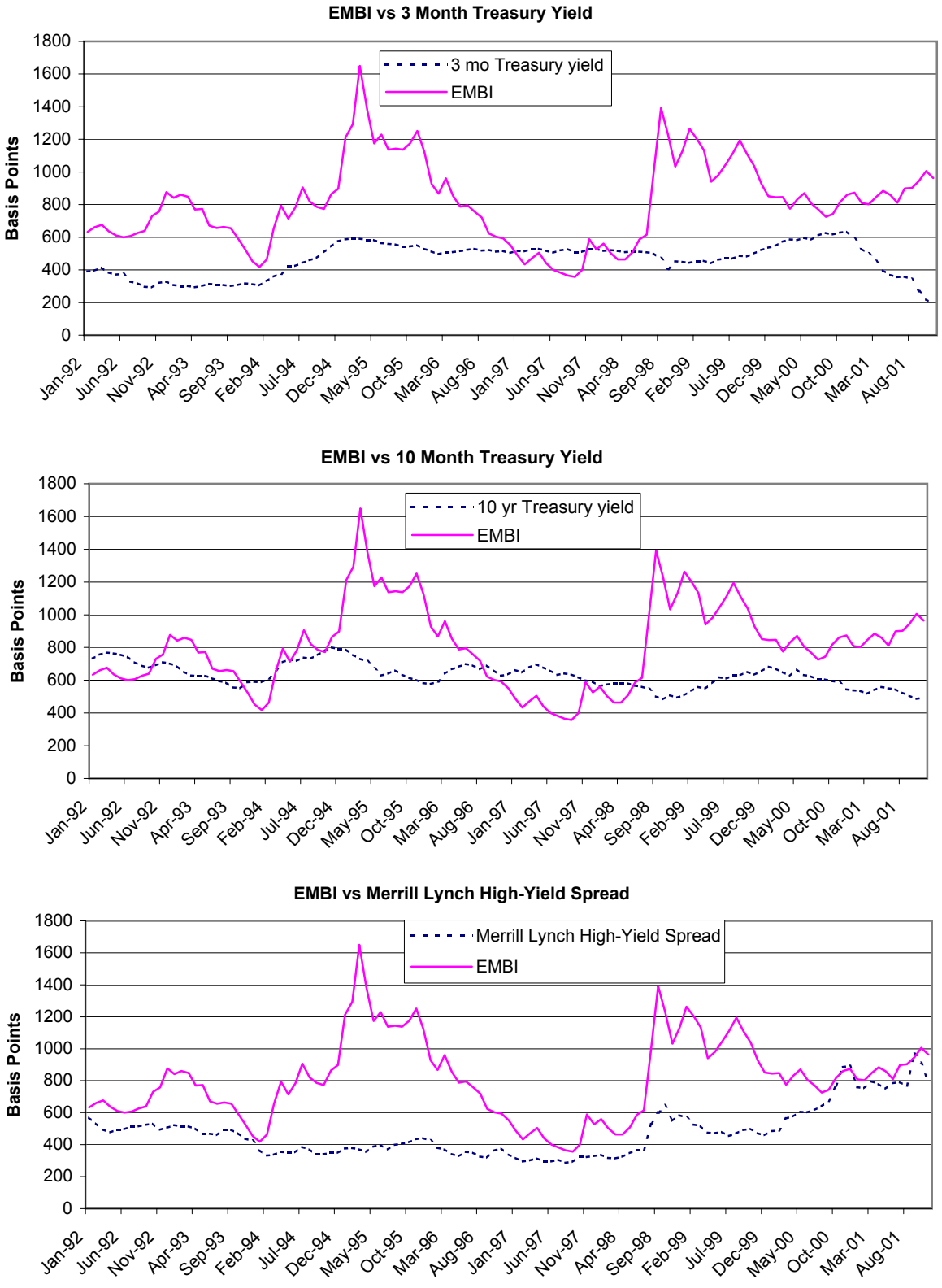


Chart 2 (continued): EMBI Spreads and External Factors

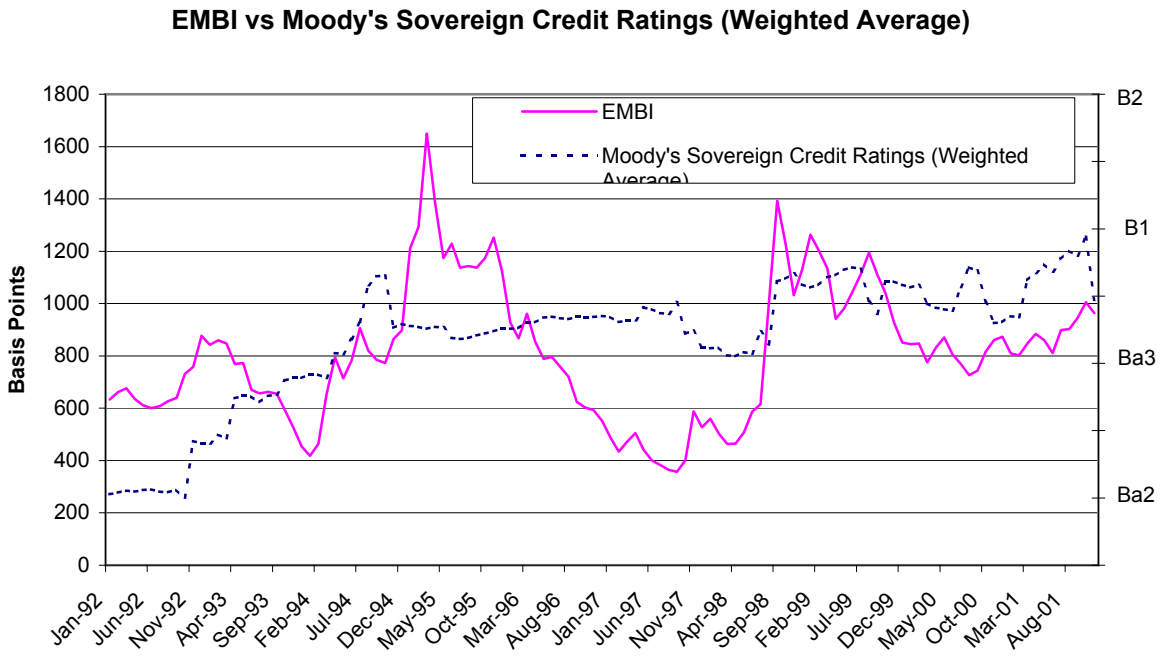


Chart 3: Model-Based Predictions of EMBI Spreads (Jan. 1992-Nov. 2001)

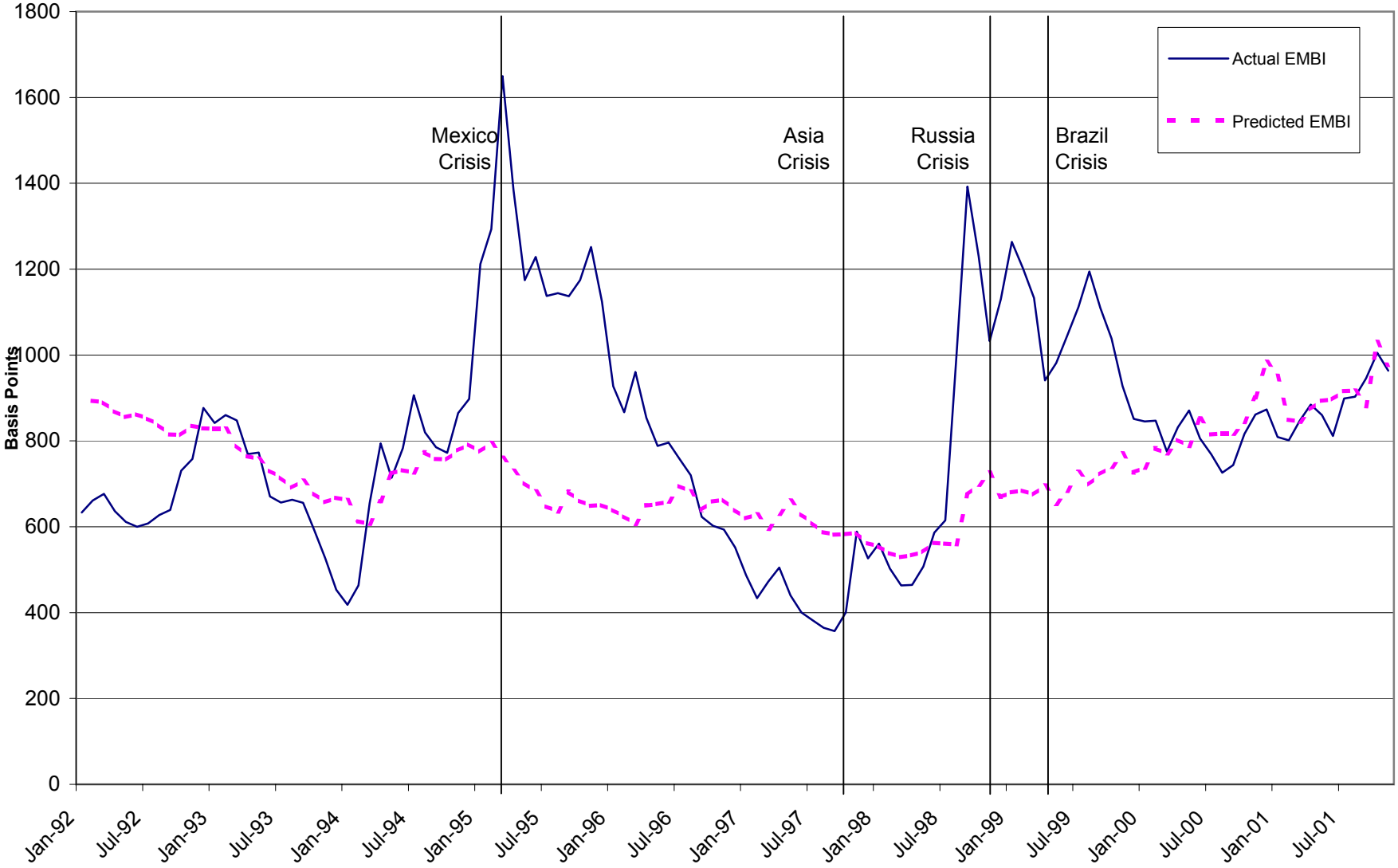
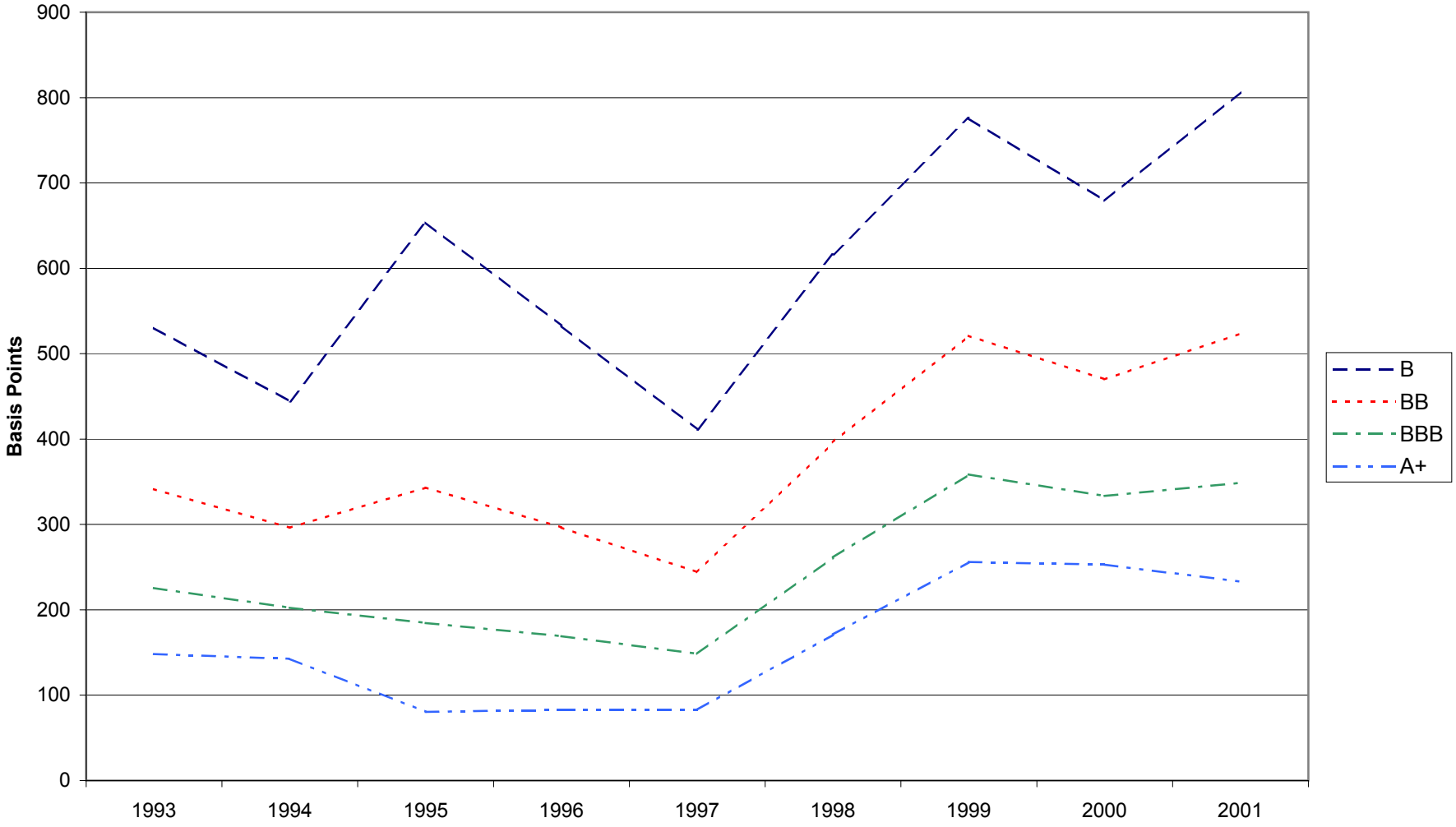
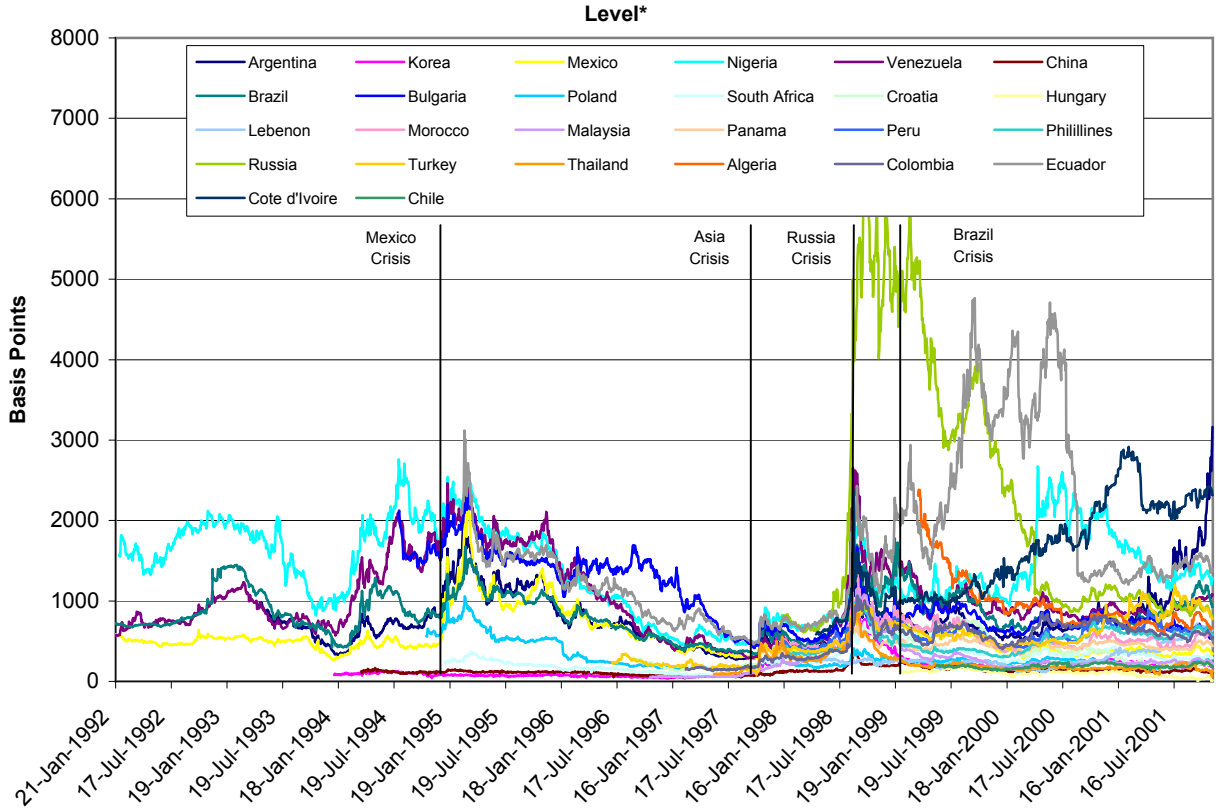


Chart 4: Estimated developing country bond spreads by credit rating*



*Simulated spreads for 10-year, dollar-denominated bonds based on model described in Kamin and von Kleist (1999).

Chart 5: Emerging Market, Dollar-denominated Bond Spreads
January 1999-November 20, 2001



*Source: JP Morgan Website, EMBI_G.

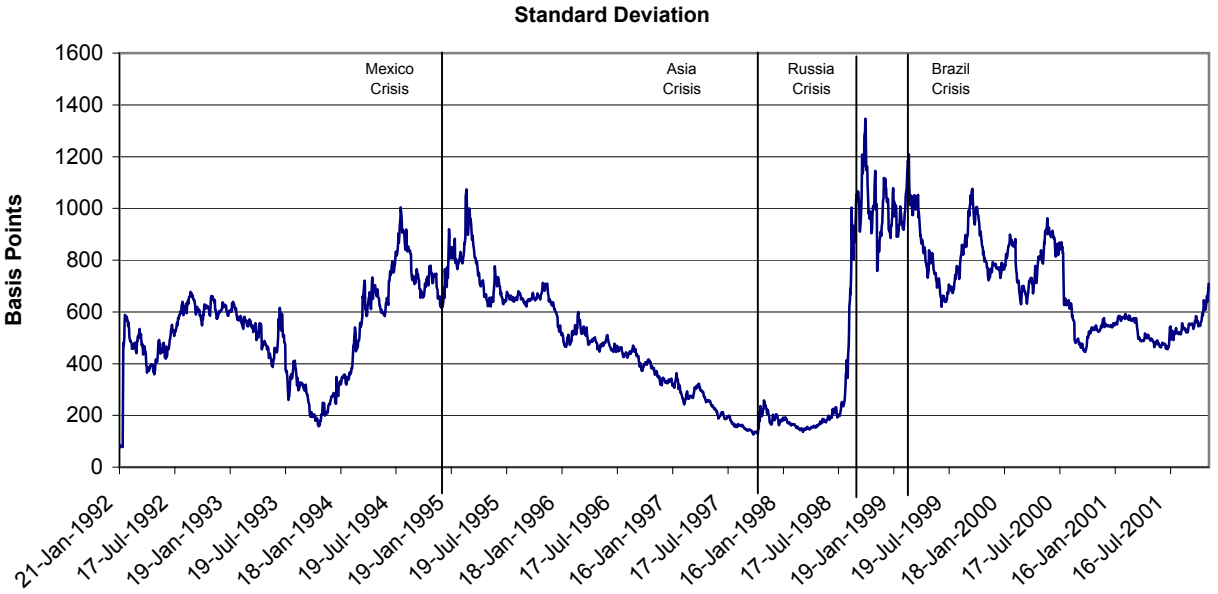
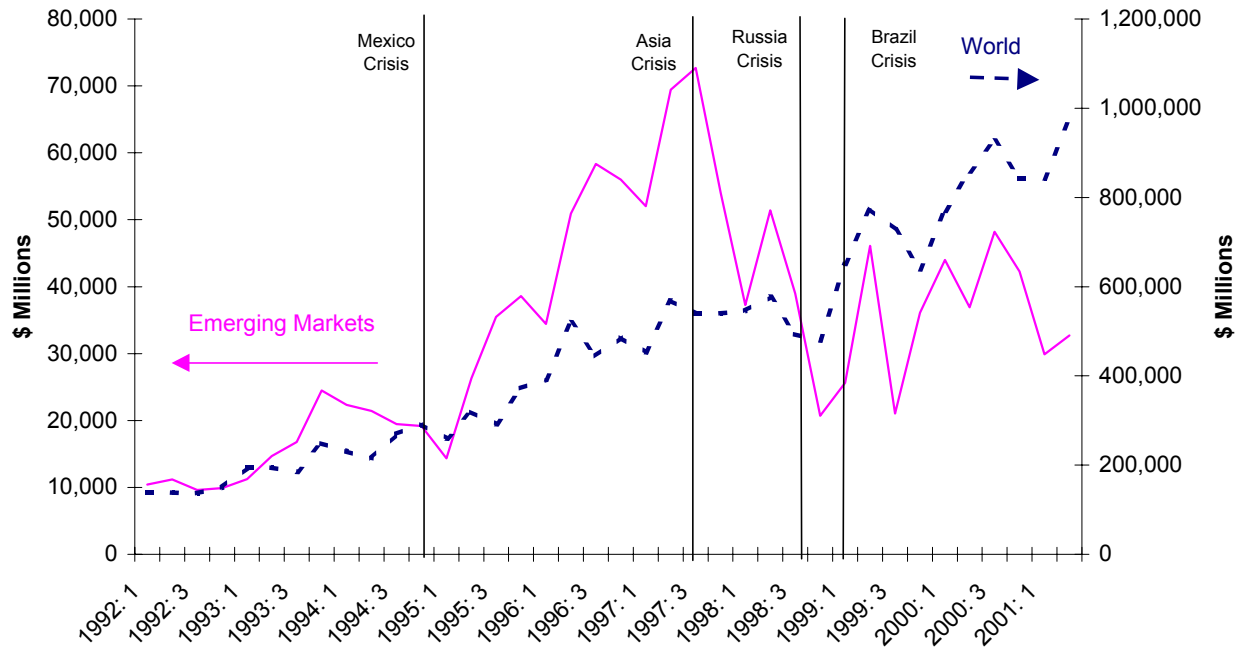


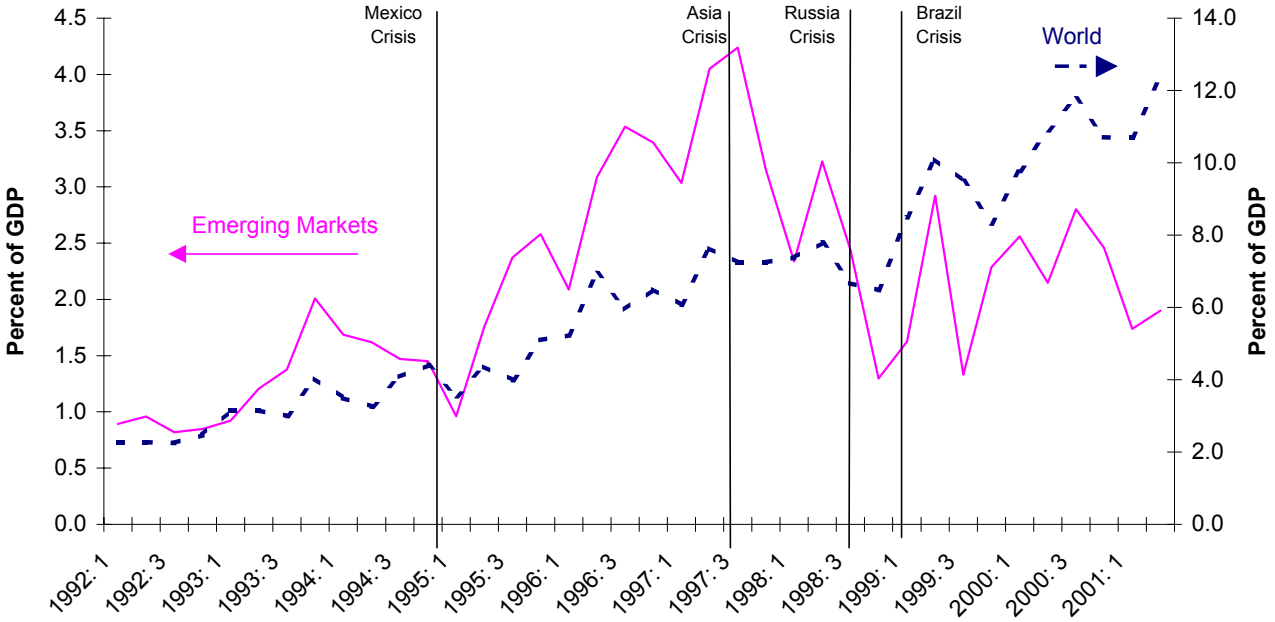
Chart 6: Gross Fixed Income Capital Flows*

Measured in $U.S.



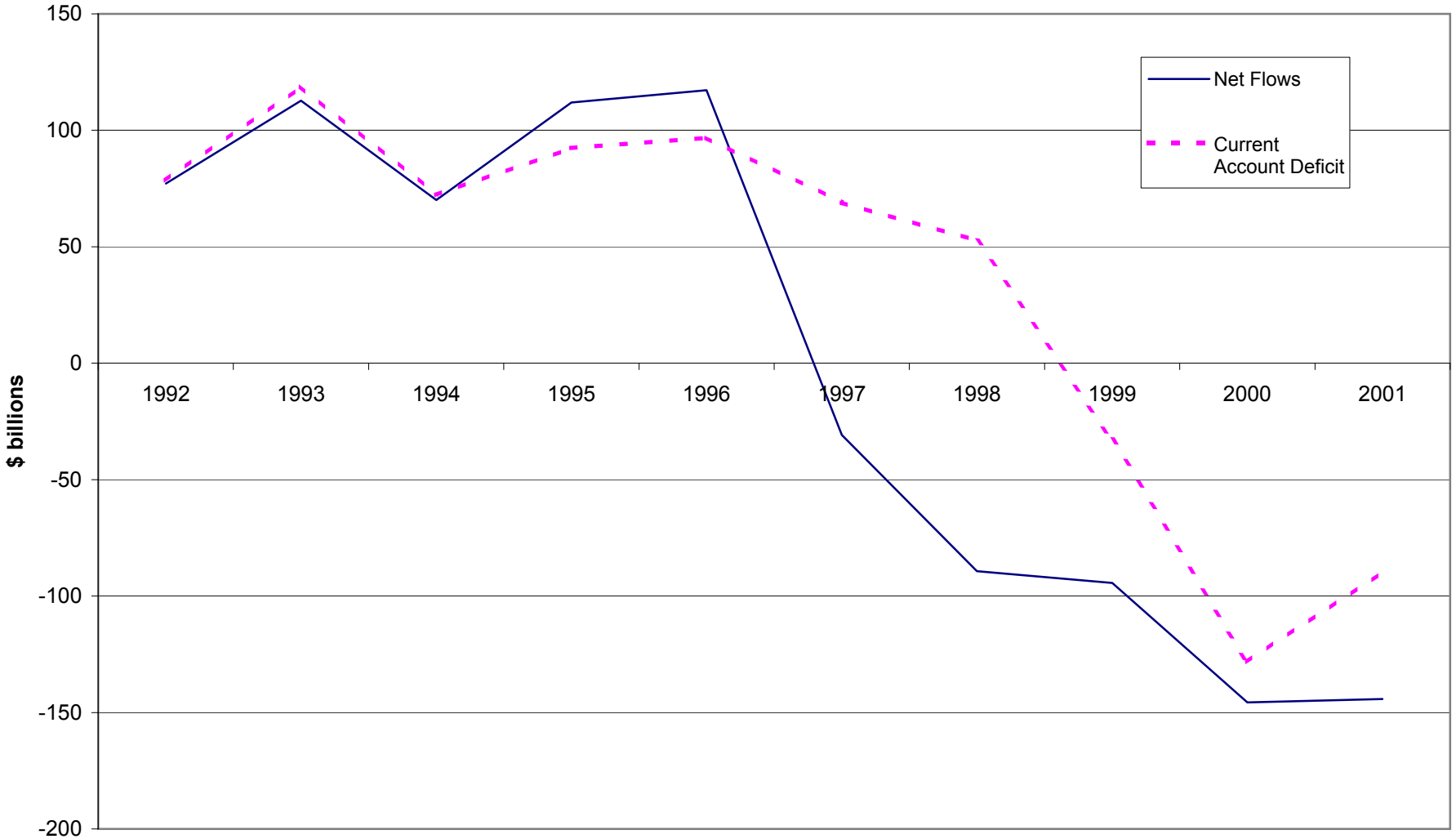
*Source: BIS.

Measured as Percent of GDP**



*Source: BIS.
**Source: World Development Indicators (data for 2001 unavailable, 2001 ratios reflect 2000 GDP data).

Chart 7: Net Private Non-FDI Capital Flows to Emerging Markets*



*Source: IMF April 2002 World Economic Outlook; data for 1992 and 1993 from May 2000 World Economic Outlook.

Chart 8: Model-Based Predictions of Capital Flows

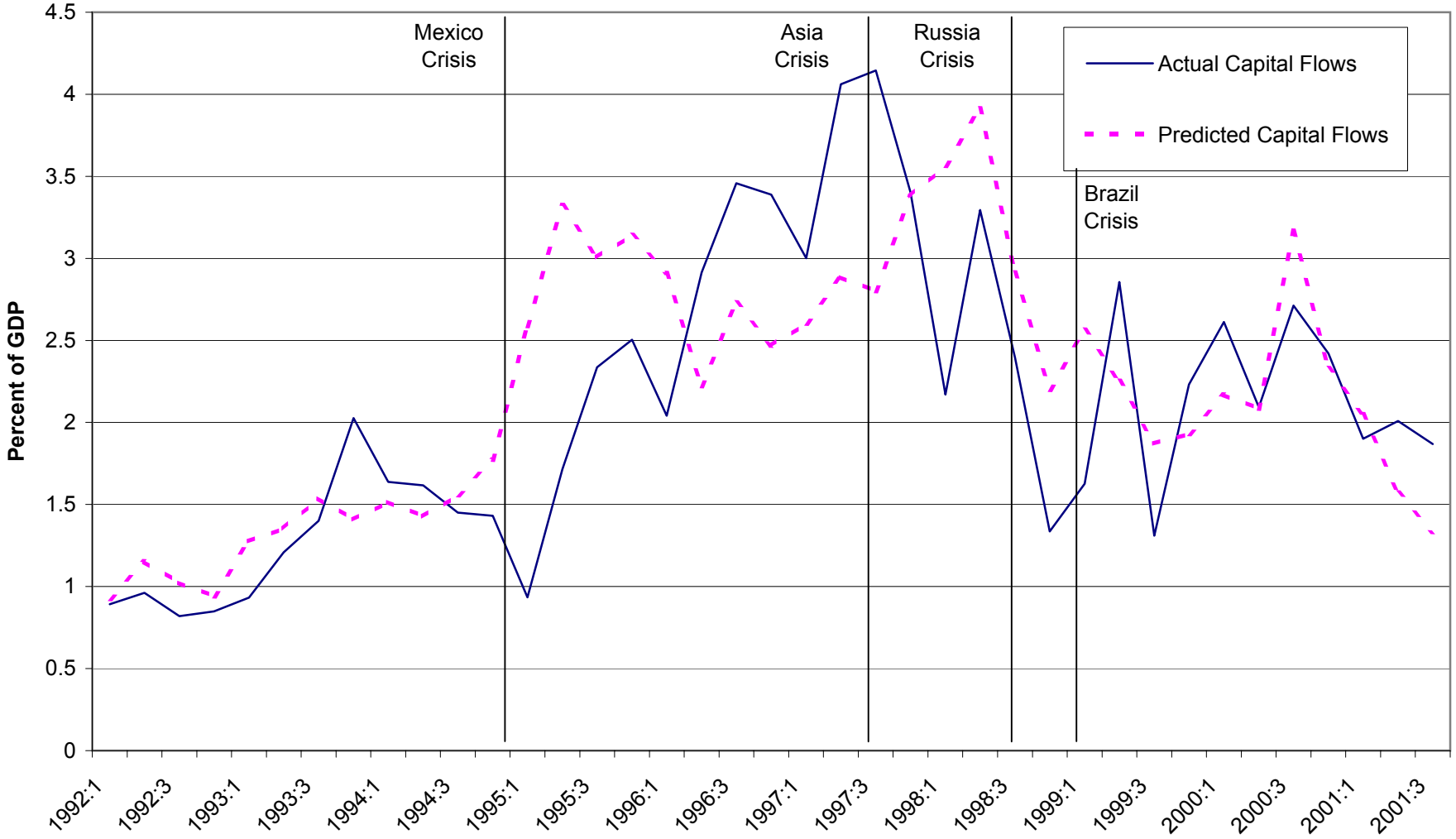


Chart 9A: Actual and Predicted Sovereign Spreads September 30, 1997

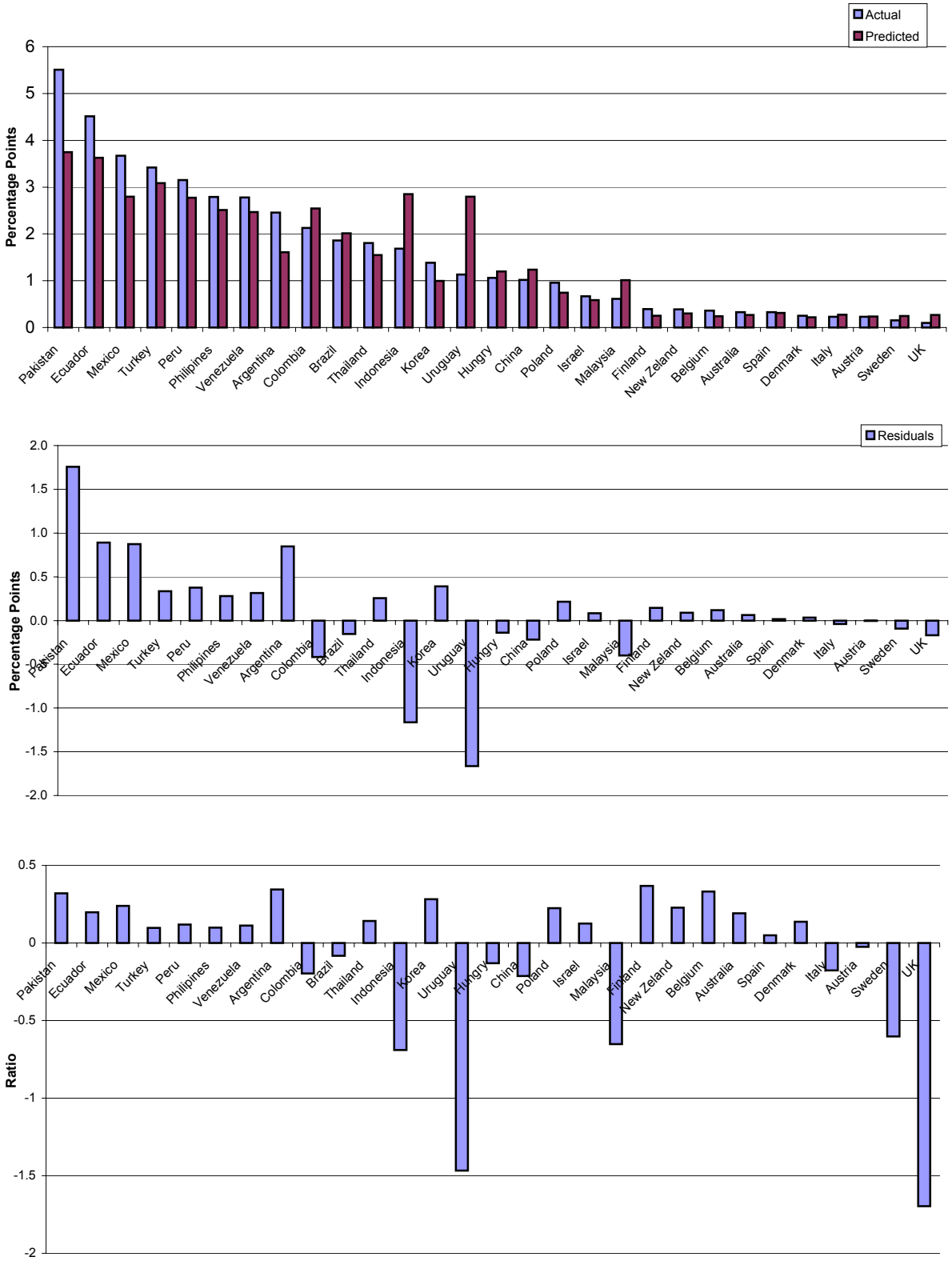


Chart 9B: Actual and Predicted Sovereign Spreads September 29, 2000

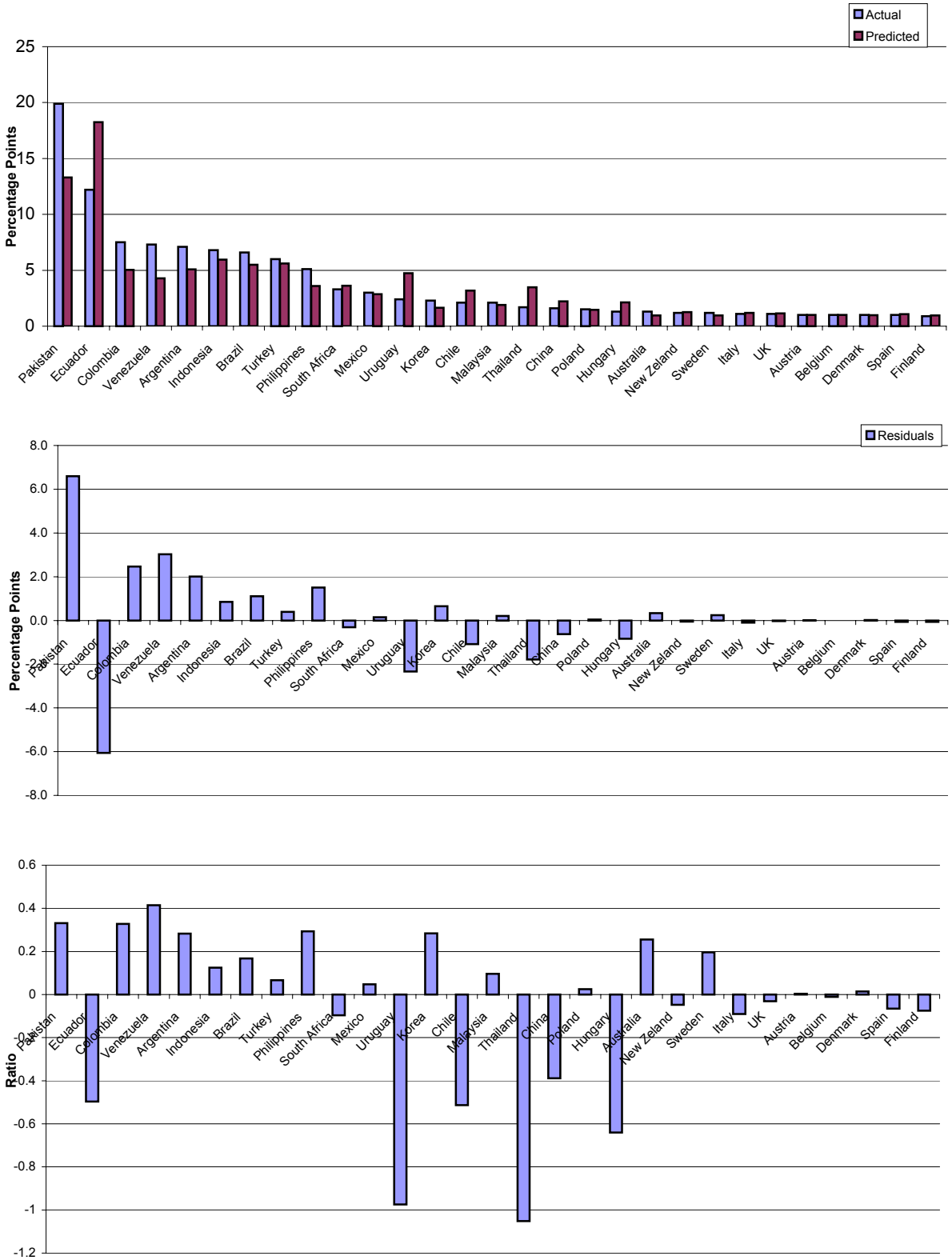
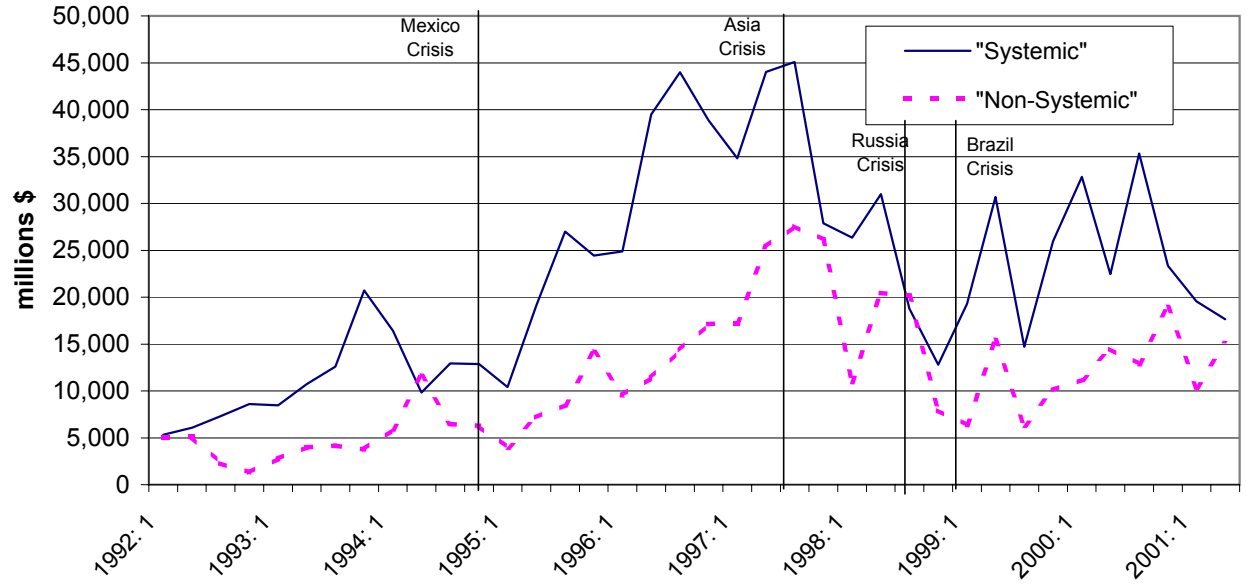


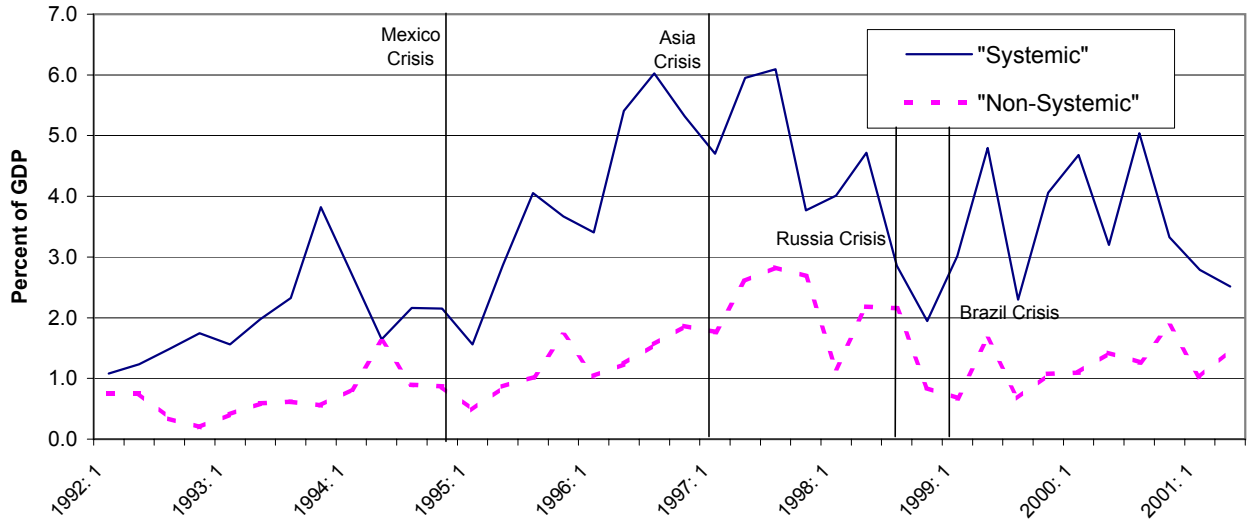
Chart 10: Gross Fixed-Income Capital Flows to Emerging Markets*

Measured in $U.S.



Systemic countries include Argentina, Brazil, Indonesia, Korea, Mexico, Malaysia, Philippines, Poland, Czech Republic, Hungary,Thailand, and Turkey.
Non-systemic countries (39 in total) are equal to total flows minus the sum of the systemic countries.
*Source: BIS.

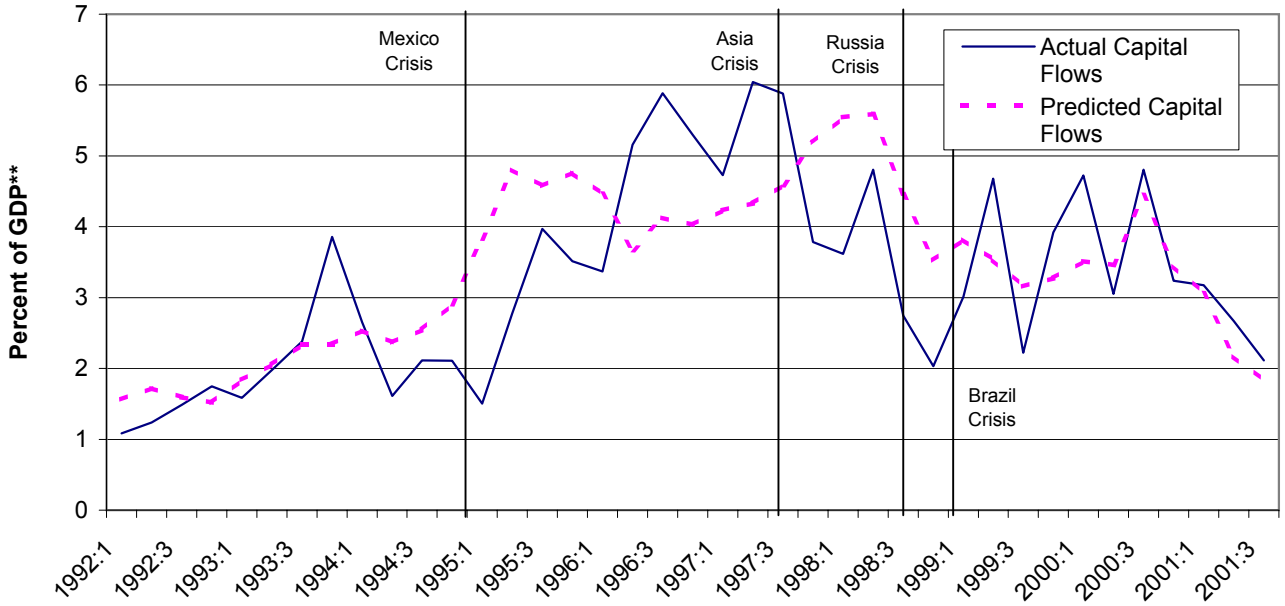
Measured as Percent of GDP**



Systemic countries include Argentina, Brazil, Indonesia, Korea, Mexico, Malaysia, Philippines, Poland, Czech Republic, Hungary,Thailand, and Turkey.
Non-systemic countries (39 in total) are equal to total flows minus the sum of the systemic countries.
*Source: BIS.
**Source: World Development Indicators (data for 2001 unavailable, 2001 ratios reflect 2000 GDP data).

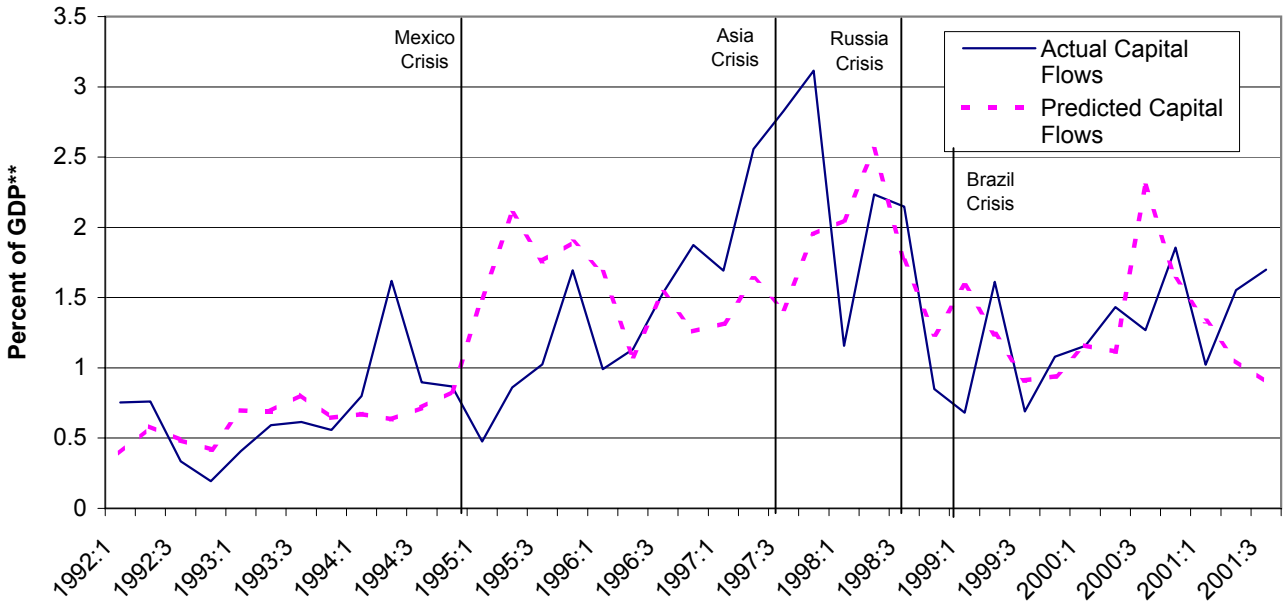
Chart 11: Model Based Predictions of Capital Flows*

"Systemic" Countries



Systemic countries include Argentina, Brazil, Indonesia, Korea, Mexico, Malaysia, Philippines, Poland, Czech Republic, Hungary,Thailand, and Turkey.
*Source: BIS.
**Source: World Development Indicators (data for 2001 unavailable, 2001 ratios reflect 2000 GDP data).

"Non-Systemic" Countries



Non-systemic countries (39 in total) are equal to total flows minus the sum of the systemic countries.
*Source: BIS.
**Source: World Development Indicators (data for 2001 unavailable, 2001 ratios reflect 2000 GDP data).