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The Falsification of Four Popular Hypotheses
about International Financial Behavior
during the Asian Crisis

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Abstract

Various claims have been made about the causes of the Asian crisis and its spread. Here, we use data on the behavior of capital flows during the crisis to test the strong forms of four such hypotheses, including the dominant role of portfolio investors and hedge funds in initiating and spreading the crisis; moral hazard; and, finally, the role of Japanese banks in spreading the trouble to countries in which they were the largest source of funds. All are falsified as monocausal explanations. For example, portfolio investments that could not have been subject to substantial moral hazard continued to flow into Asia until very shortly before the crisis. Likewise, contrary to common expectations banks were a much larger source of capital outflows during the crisis than were portfolio investors. While falsified in their strongest forms, several of these hypotheses in less strong form should play a role in a more nuanced analysis. It is time to move past simple single-factor approaches in order to produce a more complete, synthetic explanation of this episode.

1. Introduction

Many observers have focused on skittish international capital flows as a primary cause of the recent Asian crisis. While some have focused on perceived panic by investors or plots by investors to bring down the rapidly growing economies of Asia, a number of economists have tried to explain imperfections in the behavior of international financial markets in terms of rational responses to socially sub-optimal incentive structures. While applauding such efforts, we believe that the continued advancement of this research strategy requires the early testing of such theoretical analysis (whether formal or heuristic) against the data.

This paper undertakes such testing of the strong forms of four such hypotheses which have received considerable attention. These are

1. The Mahathir hypothesis

   Hedge funds and other portfolio investors were the primary cause of the crisis. We term this the Mahathir hypothesis in honor of the prime minister of Malaysia who is perhaps its most prominent exponent.

2. The Calvo-Mendoza Herding hypothesis

   Once the crisis started in Thailand, herding by portfolio investors was the primary cause of contagion to much of the rest of Asia[1]. Often asserted in the

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[1] One of the major causes of the wide divergences in analysis of the Asian crisis is the frequent lack of clear delineation of the concepts being applied. Thus to some contagion means any spread of crises from one country to another, while to others it refers only to an unjustified spread. Likewise, there is often a failure to distinguish between relative mild form of contagion such as increases in risk premium and stronger forms such as capital flight and speculative attacks. For a useful delineation of different types of contagion see Masson (1998). For discussion and references to the herding literature see Bikhchandani and Sharma (2000).

popular press, this hypothesis can be rationalized by the Calvo and Mendoza (2000) analysis which argues that the combination of costly information and diversified portfolios generate incentives for rational herding by international portfolio investors.

3. The International Moral Hazard Hypothesis

Moral hazard generated by the prospects of government guarantees and/or international bailouts was the primary cause of the disruptive pattern of large capital inflows and subsequent outflows during the Asian crisis; and

4. The Lead Lender Hypothesis

The initial pattern of lending by Japanese banks determined the degree of severity with which various Asian countries were hit during the crisis. This hypothesis is derived from the specific lead banking country formulation by Kaminsky and Reinhart (2000) of the more general hypothesis that the common lender is an important part of the explanation for the patterns of contagion found during the Asian crisis, specifically that this explains why the Philippines was less hard hit than many other Asian economies.

In each case, we find that specific formulations of the hypotheses in question are falsified by the available data on the behavior of international financial flows associated with the Asian financial crises. However, our negative conclusions on the strong forms of the hypotheses tested need not imply that the analyses considered are not part of a progressive research strategy. Indeed only in the case of the Mahathir hypothesis do we read the evidence as suggesting that the propositions put forward are fundamentally

wrong-headed; with respect to the other hypotheses we see the evidence as suggesting that further refinements are required. In some cases such as proposition 4 on bank lending, the major problem is just that the specific formulation was too narrow.

Often the problem in specific application is that a correct partial explanation is wrongly taken to be a virtually complete explanation. This is clearly the case with respect to the moral hazard explanation. There can be no question that moral hazard considerations were important. However, the data is not consistent with the extreme view that private financial markets were fully efficient and that moral hazard was the sole cause of financial instability. We conclude in section V with a brief discussion of some of the implications of our falsifications for further research.

II. Methodology

The common theme in the empirical analysis that follows is that each of the hypotheses briefly presented in the introduction has implications for differential behavior of the various categories of international capital flows. This section lays out these testable implications.

The Calvo-Mendoza (2000) model lays out cogent reasons why investors may quite rationally pay limited attention to monitoring a diversified set of international investments and that in consequence, they may not provide good signals of the risks of future crisis. Furthermore, when a crisis does hit, portfolio investors may exacerbate it by swiftly pulling their investments out of a region as a consequence of herding behavior. Thus, international portfolio investors may generate contagion not justified by the fundamentals. These conclusions generate two easily testable propositions.

Those who argue that hedge funds and other portfolio investors were the primary villains in the Asian contagion should expect the data to show that such types of investment would be in the lead in pulling out of Asia (this is also a testable implication of the first proposition – the Mahathir hypothesis). The Calvo-Mendoza analysis, on the other hand, suggests that portfolio investors would be laggards rather than leaders in pulling out of Asia. This view was refined in Calvo (1998), which describes a world in which emerging market fund managers are reasonably well informed, but other investors are not. To get other investors to buy when liquidity problems force the emerging market funds to sell assets, a deep discount is needed. In this insider-outsider type model, you could still have contagion, but emerging market funds would not necessarily be laggards in anticipating the crisis.

The Calvo-Mendoza analysis also suggests, however, that once the crisis hits, outflows of portfolio investment should be especially large. We take for comparison the behavior of loans from commercial banks. Information and monitoring costs, as well as incentives, are at the heart of the Calvo-Mendoza model. Commercial bank loan officers should have lower information costs. And by being more concentrated, bankers should also have greater monitoring incentives than would many international portfolio investors.

The view that portfolio flows are likely to be particularly unstable appears to be widely held. For example, Sarno and Taylor (1999a, p. 340) argue that "a priori…we might expect portfolio-bond and equity flows – and FDI flows to define the most volatile or temporary and least volatile or permanent capital account items respectively." They place bank loans in an intermediate position, arguing, "because of the illiquidity of

commercial loans to developing countries once they are made, one might expect commercial banks to look more closely at the underlying economic fundamentals before committing funds and therefore be less prone to sudden changes of heart. Moreover, once funds are committed in this way, it may seriously jeopardize a bank's chances of recovering its investment if lending is suddenly withdrawn."

The third hypothesis is that without moral hazard problems, the Asian crisis would not have occurred. This can be tested by examining the behavior of portfolio investment during the crisis. It is clear that different types of capital flows should be subject to different degrees of moral hazard. International investors in Mexican government securities were bailed out during the Mexican crisis, but portfolio investors took large hits. Commercial banks loans should fall somewhere between these extremes in terms of their expectations of being made whole in the event of a crisis. Thus, if moral hazard were the predominant factor generating the huge capital inflows into Asia before the crisis then those categories of flows with the least hope of a bailout should have been the first to decline[2].

Such a test is in line with the spirit of the first test of the Calvo-Mendoza analysis. One might argue that the existence of the Calvo-Mendoza information argument contaminates our experiment such that the failure of declines in portfolio inflows to precede those of bank loans does not present strong evidence against the strong form of the moral hazard argument. We propose a second test, however, that is not subject to this problem. If expectations of being made whole by government bailouts were a dominant

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[2] See Willett (1999).

consideration, then we would not expect a rush for the exit by moral hazard investors once the crisis hit[3].

The fourth hypothesis concerns Kaminsky and Reinhart's (2000) very plausible argument that patterns of financial intermediation are an important determinant of the patterns of international contagion in a currency crisis. This is undoubtedly true. Kaminsky and Reinhart also formulate in much more specific version of this broad hypothesis, the lead lender hypothesis, and conclude that the Asian crisis supports this

hypothesis. Their basic argument is that when a crisis hits, there will be stronger contagion to countries whose bank borrowing is dominated by banks from the same home country, i.e. those who dominated lending to the first crisis country.

They present facts for the Asian crisis which are consistent with this hypothesis. Japanese banks dominated bank lending to all of the Asian countries except for the Philippines, where American banks were dominant. It is generally agreed that the Philippines was the least hard hit of the Asian crisis countries. Thus, there is evidence consistent with Kaminsky and Reinhart's hypothesis. However, this is a very weak test. There could be many other reasons why the Philippines was hit less hard than the other Asian countries. A more demanding test of the Kaminsky-Reinhart hypothesis would

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[3] We should note that such a rush would falsify only simple versions of the moral hazard hypothesis. In more sophisticated versions such as Dooley (2000), the market is seen as constantly estimating the reserve backing for an implicit and explicit government guarantee such that when contingent liabilities rise above the level of actual and prospective borrowed reserves then a rush for the exit would be generated. This interpretation would argue that the earlier capital inflows were generated by credible moral hazard and that it was the diminished credibility of the guarantee that lead to the sharp reversal in capital flows. We think that there is clearly some truth to Dooley's interpretation although it fails as a complete explanation.

look to see whether there were systematic differences in the behavior of the Japanese banks from those based in other industrial countries.

III. Data

We use two sources of data, namely International Financial Statistics (IFS)[4] and Bank for International Settlements (BIS)[5]. IFS data is used to analyze the empirical findings on the first three hypotheses, while the BIS data is used for the fourth hypothesis (this is consistent with the data used by Kaminsky and Reinhart)[6]. The IFS data has annual and quarterly frequency while BIS data is semi-annual. Because quarterly data are not available for Malaysia, we limit the analysis using IFS data to four countries: Indonesia, Korea, Philippines and Thailand. For the fourth hypothesis we use all five crisis countries.

Another important issue involves a recording problem of bank flows data, especially in its relationship with DI flows. Despite the widely held belief that DI is the

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[4] We have taken IFS data from the components of Financial Account (part of Balance of Payments Statistics), particularly the net flows of direct investment or DI (54278bdd and bed), portfolio investment or PI (54278 bfd and bgd), and bank flows or B (54278bqd and bud). Portfolio Investment comprises debt and equity. Based on IFS classification, banking flows (B) is a part of Net Other Investment (NOI), which comprises four sectors: Monetary Authority, General Government, Banks, and Other Sectors. Type of transactions in NOI are of Trade Credits, Loans, Currency and Deposits, and Others.

[5] BIS data is extracted from 'The Maturity, Sectoral, and Nationality Distribution of International Bank Lending". Bank Statistics are derived from the international positions of all reporting banks on countries outside the reporting area table. In this analysis, the European banks' data consist of the combined total for the three major lenders: the U.K., France, and Germany. These constitute 50 to 60 percent of total European data.

[6] It should be noted that there is a basic difference between bank flows in the IFS and BIS data. IFS uses a flow concept and measures net flows. BIS uses a stock concept, with a consolidated basis for banks with head offices in the reporting area. Therefore, using changes in the BIS stock data to calculate flows does not give the same figures as the IFS data. However, this difference does not substantially affect the results during the observation period. The comparison is available upon request. Another important difference between IFS and BIS data is the size of the sample. BIS data only covers "a reporting area", consisting G-10 countries plus Austria, Denmark, Finland, Ireland, Luxembourg and Spain.

most stable form of capital flow, the debate in the literature about whether short-term flows are more volatile than DI and other long-term flows still remains[7]. In fact recent analysis of DI flows suggests that DI investors were able to pull out money by borrowing from the domestic banking system, using their DI as collateral[8]. Such outflows would be recorded as banking flows rather than DI flows. This is also in line with the IMF finding (1999) that in the five Asian crisis countries, the increases in the shares of DI coincided with increases rather than decreases in the volatility of total net flows. Further, other short-term outflows increased in this region. This combination of findings suggests that DI flows maybe correlated with more volatile "other short-term" flows because foreign investors are hedging their investments. Just as a greater volume of trade allows greater short-term capital movements through variations in the leads and lags of trade financing, higher levels of direct investment would likely be associated with greater variability in short-term capital flows when currency parities become suspect. It is, of course, a matter of semantics, not economics, whether such flows are referred to as speculation or hedging.

IV.   Empirical Analysis

1. Did hedge funds and portfolio investments cause the Asian crisis?

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[7] Sarno and Taylor (1999) and IMF (1999) are among those who have found greater stability of DI flows. On the contrary, Claessens, Dooley and Warner (1995) found that in most cases DI and long-term flows are as volatile and unpredictable as short-term capital flows.

[8] For discussions of the inappropriateness of considering FDI as only "bolted down" physical capital see Claessens et al. (1995), Bird and Rajan (2000), and Fernandez-Arias (2000). As the latter author says, what comes in through the door may go out through the window.

Falsification of the Mahathir hypothesis can be seen in an IMF analysis on Hedge Funds and Financial Market Dynamics (1998). Unlike the 1992 ERM crisis, this study found that it was not obvious that hedge funds were the leaders in taking positions against Asian currencies or that their trades were taken as a signal for other investors to follow. Even though some hedge funds had large short positions in Thailand, it was not clear that they were earlier than other investors in building up those positions. The IMF study reports that the bulk of the hedge funds' forward sales to the Bank of Thailand appeared in May when the crisis was already well underway. Thus hedge funds appear to have been near the rear, not the front of the herd. Particular to the country of Mahathir, the IMF found that only a few hedge funds took modest positions on the Malaysian ringgit, and they incurred losses from the ringgit's depreciation. Further, the initial pressure on ringgit was initiated from the closing out of long equity positions, reflecting the concern about stock market overvaluation, rather than a build up of speculative short positions.

George Soros (1998) reported that his fund was short on the Thai baht and Malaysian ringgit in early 1997 with maturities ranging from six months to a year. Thus, he was required to buy, rather than to sell, the domestic currencies during the crisis. Contrary to the analysis offered by Malaysian Prime Minister Mahathir, Soros' fund provided some support to the ringgit during the crisis. The first half of the Calvo-Mendoza analysis also implies that portfolio investors were not the main trigger in the Asian crisis[9].

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[9] Note again that we could not extend the empirical analysis using Malaysian data because of the frequency of their data.

We find that the data does fit the first half of the Calvo-Mendoza analysis as shown in figure 1[10]. International portfolio investors tended to be laggards rather than leaders in pulling out of Asia for the four large Asian countries strongly hit by the crisis (Indonesia, Korea, Philippines and Thailand). Net direct investment (DI) was the most stable flows compared to net portfolio investment (PI) and net bank flows (B). During the second quarter of 1997, bank inflows decreased and then plummeted substantially up to the end of 1997. Meanwhile, portfolio investment increased during the second quarter of 1997, before dropping considerably through the end of 1997.

[Figure 1 about here]

The laggard behavior of portfolio investment and the substantial drop in bank flows also hold for the first country hit by the crisis (Thailand -- see figure 2).

[Figure 2 about here]

2. Was herding behavior by portfolio investors the major cause of contagion?

The second half of the Calvo-Mendoza prediction is falsified by the data. Outflows by the commercial banks were much larger than those of portfolio investors in both absolute and proportional terms (see table 1)[11]. During the inflow period (1990-96), the average annual portfolio investment inflows to these four countries amounted to $12.8 billion compared to $7.4 billion for bank flows. The relative magnitude of these flows reversed dramatically during the crisis period (average of second half of 1997-98). The

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[10] This evidence is also confirmed by the findings of Borensztein and Gelos (2000). They found that the regional or single country funds preceding flows of global/international funds into the same country and the open-ended funds' flows Granger-caused closed-end funds investment.

absolute size of the outflows from the international banks was much greater than that of portfolio investors. For the six quarter period from 1997Q3 through the end of 1998 the net outflow of portfolio investment was only a little over $2 billion, while bank outflows exceeded $45 billion. For the second half of 1997 alone, the figures were $2.6 billion net inflow of portfolio investment and $28.9 billion net outflow of bank flows. The reversal as a proportion of previous inflows was even more dramatic. Bank outflows more than tripled compared to the previous annual inflows (note this figure only some 5 percent for PI outflows). The total bank outflows during the second half of 1997 and 1998 was 88 percent of the cumulative inflows over the 1990 to 1996 period compare to some 2 percent of PI outflows.

[Table 1 about here]

Thus the popular view that portfolio investment is the most dangerous type of hot money clearly needs modification[12]. It is important to recognize, however, that pattern nay differ importantly across countries. In the Mexican crisis, which provided the context for the development of the Calvo-Mendoza model outflows of PI were much greater than for bank lending[13]. However, in the Asian crisis the contagion considered in the Calvo-Mendoza model only explains the "mild" type of financial market contagion that raises

[11] This point has also been made by Baily et al. (2000). Note that while this holds in aggregate, the data for Indonesia and the Philippines do not confirm to this pattern. Indonesia does not have data for the assets side of PI and B.

[12] Sarno and Taylor (1999) and to a lesser extent Word Bank (1997) are among others who found PI as the most volatile flows.

[13] For discussion regarding the composition of capital flows in American Latin countries see Fernandez-Arias (2000) and IMF (1998).

risk premia on international borrowing and reduces stock prices, not the strong type that results in major speculative attacks[14].

Borensztein and Gelos (2000) found that mutual funds withdrew a substantial amount from the affected countries, on average, one month prior to the crisis, which is particularly visible in the cases of Brazil and Russia. Clearly there were some portfolio investors who foresaw the crisis in Thailand, but the number of them not big enough too dominate the behavior of total portfolio flows.

A possible explanation for the lack of strong predictive power for the Calvo-Mendoza analysis is that a good deal of international portfolio investments in emerging markets takes place through mutual funds and the managers of those funds should have much stronger incentives for investing   in information than would   most individual investors. This cannot present a complete explanation, however, because it would suggest that prediction two should have been falsified, i.e., portfolio investment should have done a better job of seeing the crisis coming.

A second possible explanation, toward which we are inclined, is that the Calvo-Mendoza analysis is basically correct, but that its quantitative importance is swamped by another consideration, the comparative flexibility of pricing between portfolio investments and bank loans. When a crisis hits, the value of equity portfolio investment

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[14] On the behavior of risk spreads during the Asian crisis see Baig and Goldfajn (1998). Note that in terms of contagion the major speculative attacks in Korea were stimulated by devaluation in Taiwan and the stock market crash in Hong Kong in October 1997, not the fall of the Thai Baht in July see Jo (2000) and Willett (2000).

immediately drops[15]. Likewise, the resale value of bonds plummets. The investor has been burned, but it is too late to avoid the hit. In a relatively efficient market there is no reason to think that further declines are more likely than future appreciation. Of course outflows still can be generated by liquidity restraints, portfolio re-balancing, and momentum trading in emerging markets, but the combined effects were apparently not large[16].

On the other hand, as Baily, Farrell, and Lund (2000) argue, "bank loans are mostly illiquid, fixed-price assets…because the 'price' of a loan – the interest rate – does not -automatically adjust to changing market conditions, banks adjust the quantity of lending instead" (p. 103). From this perspective we should not be surprised to see that in response to the crises, the quantity adjustments for banks were far larger than for portfolio investors in both absolute and proportional terms.

3. Was international moral hazard the main cause of the Asian Crisis?

The issue of moral hazard as a key factor affecting the behavior of international investors continues to be a subject of considerable debate[17]. There can be little doubt that it played a role but some commentators have suggested that it is a virtually complete explanation –that international financial markets are highly efficient and that without

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[15] Part of the explanation for the small size of the portfolio outflows is the sharp decline in stock prices (refer to figure 3), which of course greatly reduced the value of repatriation. Even if we double the nominal value of PI outflows to give an upper bound estimate of the effect, the PI outflows remain quite small relative to outflows through the banking system. In fact, during the last half of 1997 the net outflows of B amounted up to 11 times of the PI flows, which still recorded as net inflows).

moral hazard there would have been no Asian crisis. This type of argument is frequently made by those who blame the Mexican bailout for the Asian crisis. A little reflection suggests that it is very hard to defend this hypothesis as a complete explanation, however. As is pointed out by Wilcox (1999): "There is little doubt that moral hazard.....was a factor in the banking system.....However, very few equity and currency traders of my acquaintance ever put much faith in the power of governments to avoid catastrophe in the open securities markets".

The failure of portfolio investment to anticipate the crisis provides a stark falsification of the hypotheses that it was only because of moral hazard that the Asian crisis developed (the first test of moral hazard) [18]. It also forces us to consider the hypothesis that international financial markets were not fully efficient[19]. Further, the findings that commercial bank outflows far exceeded those of portfolio investments, offers strong evidence against the extreme moral hazard hypothesis (the second test), since if they had been confident of being bailed out they would have felt no need to flee[20].

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[16] For evidence of momentum trading in Latin American funds see Kaminsky, Lyons and Schmukler (2000). However, they found that such trading was less strong during crisis periods, and this source of analysis was due primarily to the behavior of investors rather than fund managers. This latter finding is consistent with the Calvo-Mendoza analysis.

[17] See, for example Ito (1999), Dell'Ariccia et al. (2000), Dooley (2000) and Lane and Phillips (2000).

[18] See also Willett (1999).

[19] For discussion of the degree of efficiency of financial markets during the Asian crisis see Willett (2000).It is interesting that this implication seems to be ignored in Sarno and Taylor (1999). On the basis of finding evidence of bubbles in the crisis countries' stock markets and high variability in U.S. portfolio flows to Asia, they conclude that "the widely held moral hazard interpretation may be seen to have passed these first tests" (p.655). Their analysis does present important evidence against the hypothesis of fully efficient international financial markets, but for the reason discussed in the text, rather than supporting the moral hazard interpretation, their results show that it cannot be a complete explanation of the failure of the simple efficient market hypothesis.

[20] For a more subtle formulation of the role of moral hazard, see Dooley (2000).

One could object that in a fully efficient market expectations of a crisis could be fully reflected in a decline in equity prices without a concomitant decline in equity flows. We found evidence consistent with the hypothesis that the private sector anticipated the crisis in the Philippines, Malaysia and Thailand as prices showed a declining trend before the crisis in these countries but not in the others (refer to figure 3). Thus, taking price data into account, the rejection of the extreme moral hazard view is not as sharp. We are still inclined, however, to read the evidence as speaking against the likelihood that the extreme hypothesis is correct.

4. Did the common lender hypothesis the pattern of contagion during the Asian crisis?

Kaminsky and Reinhart concluded that this pattern existed for the Asian crisis. Japanese bank domination in lending to Thailand (the first country hit by the crisis) and to other countries in the region, with the exception of the Philippines, has been used to explain why the Philippines was the least hard hit of the Asian crisis countries. This was strengthened by the view that the problems of the Japanese banks were the largest source of the regional liquidity crunch. This can give a misleading impression, however, for the Japanese banks also had the most money invested in the Asian countries[21].

While it is true (as argued in Kaminsky and Reinhart) that the bank flows from Japan decreased during the crises, the bank flows from the US and Europe also declined

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[21] This can be shown from the borrowers' and lenders' point of view. The average annual share of total liabilities of these five countries to Japan during 1994 to 1997 amounted to 40 percent, while Europe and the US reached 25 and 9 percent, respectively (table 2). During the same period, the average annual share of these countries from Japanese banks' perspective amounted up to 50 percent of its lending. Meanwhile from the US and European banks point of view, the figures were much smaller, i.e., 17 and 13 percent, respectively.

during the same period. In fact, when we look at the behavior of bank flows in proportional terms, we find, perhaps surprisingly, that the behavior of the Japanese and American banks were quite similar[22]. For example, the total stock of loans to the five countries from Japan dropped by 33 percent, while the decline from U.S. was somewhat larger, i.e., 38 percent (table 2). On the other hand, European lending dropped by only 19 percent. Thus, while there was differential behavior by banks from different countries, this does not appear to have been an important explanation for why the Philippines was the least hard-hit country. It is true that the Philippines was the only country with a higher level of stock of bank liabilities after the crisis (table 3). Yet, contrary to the common lender hypothesis, this higher bank lending was not from US banks, but instead from Japanese and European banks[23]. Thus, while financial interdependence is clearly a part of the Asian crisis story, the simple lead lending country version needs modification[24].

[Table 2 about here]

[Table 3 about here]

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[22] The similarity between Japanese and American banks could be also shown from the decline of the share of the two countries to the total bank liabilities before and after the crisis in these five countries.

[23] In fact, since June 1997 the dominance of European banks was even higher than Japanese banks in Korea and Malaysia. The dominance of European to Japanese banks was even earlier in the Philippines (since June 1996).

V. Concluding Remarks

We find that a number of popular hypothesis about the Asian financial crises do not hold up in the face of the data on the behavior of capital flows. Typically, this is not because they were fundamentally wrong headed, but rather because more nuance is needed in the analysis of international financial behavior. Most hypotheses need to be considered as candidates for partial rather than complete explanations and most of the simple hypotheses need to be further refined. This is particularly true about the moral hazard explanation. There can be little doubt that moral hazard problems at the national level led to substantial inefficiencies in lending patterns within countries[25] or that moral hazard had some influence on international capital flows. What is open to question is how much influence. We believe that we can safely conclude that it offers neither zero nor one hundred percent of the explanation, but where within this range the importance of international moral hazard explanation lies will require a good deal more research.

One of our key findings is that the role of international banks in the Asian crises has typically been underemphasized, while the role of portfolio investment has been

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[24]Using disaggregated bank flows data, Van Rijckeghem and Weder (2000) provide evidence that supports the view that spillovers through common bank lenders were important in transmitting the recent Mexican and Thai financial crisis. However, the common bank lender effect was not statistically significant in the Russian case. Caramazza, Ricci, and Sagaldo also (2000) found that the common lenders are important in explaining the contagion effect during the Mexican, Asian and Russian crises. Lucca Ricci has pointed out to us that there could be two versions of the common lender hypothesis. The first one, which is used in this paper, hypothesizes a larger percentage cutback of the center country lending because of its being harder hit while a second less stringent version, relies only on scale effects such that equal percentage cutbacks for all countries imply larger absolute cutbacks for the lead country lending.

[25] See Dooley and Shin (2000).

overemphasized[26]. While a great deal of literature has emphasized the general trend away from bank toward portfolio lending, it was through the banking sector that the largest outflows occurred. The simple lead bank analysis of Kaminsky and Reinhart (2000) was not fully consistent with the Asian data, but this only suggests that there is a good deal of work to be done to develop a better understanding of the decision making process of the multinational banks[27]. Particularly interesting here are issues of risk management systems and internal incentive structures, evolution of implicit and explicit government guarantees, and analysis of the role of portfolio rebalancing in contributing to contagion. Such issues need further analysis for portfolio investment as well.

Another area that needs more attention is the role of domestic residents, both national and multinational, in generating capital outflows. While measured direct investment was the category of capital flows least subject to reversal, it is clear that multinationals often moved out money that was not recorded in the direct investment account. Likewise we know that there was a good deal of capital outflow generated by national residents. Indeed we considered adding a fifth hypothesis to falsify –that one needs only to focus on foreign investors during crisis periods- but preliminary investigation found that not enough data is available to test this systematically. We will probably never have a completely accurate picture of just how quantitatively important these channels are because so much of the outflows go unrecorded in the balance of

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[26] Important exceptions are Baily et al. (2000) and Kaminsky and Reinhart (2000).
[27] For a discussion on the decision making process of international bankers, see Thomas (2001).

payments accounts, but the of informed observers suggest that this channel is often quite important[28].

Finally, there are two straightforward types of extensions to the analysis presented here. One is to undertake the same manner of testing for other major crisis episodes, such as the Mexican and Russian crises[29]. A preliminary analysis of the effects of the Mexican crisis on Latin America shows a quite different pattern of capital outflows. Their largest outflows were often portfolio investment (primarily bonds rather than stocks)[30].

A second extension is to combine the analysis of the behavior of quantities with the behavior of prices. For example, recent studies by Lane and Phillips (2000) and Dell'Ariccia, Gödde, and Zettelmeyer (2000) have tested hypotheses about moral hazard using data on sovereign risk spreads on bonds and Kho et al. (2000) and Thomas (2001) have looked at effects on the stock prices of major banks. Combining price and quantity data is often a fruitful way of reducing the problem of observational equivalence that so often plaques hypotheses testing[31].

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[28] For recent analysis of the Asian crisis, which stress the role of capital outflow by residents, see Gabriele et al. (2000) and Wincoop and Yi (2000).

[29] Baig and Goldfajn (2000) find that the behavior of American and Japanese banks was also quite similar during the Brazilian crisis. The roll over rates were 60 and 58 percent respectively. There was considerable variability in the roll over rates for European banks ranging from 31 and 41 percent for the Netherlands and Spain to 79 and 93 for Germany and Portugal. They note that since the German banks were the most exposed to Russia, their high roll over rate is not consistent with the hypothesis that contagion was driven primarily by liquidity constraint.

[30] Ramos, Cesar (2002).

[31] A valuable analysis that looks at both price and quantity effects is Eichengreen, Hale and Moody (2001).

REFERENCES

Baig, Taimur and Ilan Goldfajn. 2000. "The Russian Default and The Contagion to Brazil". IMF Working Paper 160. Washington D.C.: International Monetary Fund.

----------. 1998. "Financial Market Contagion in The Asian Crisis". IMF Working Paper 155. Washington D.C.: International Monetary Fund.

Baily, Martin N., Diana Farrell, and Susan Lund. 2000. "The Color of Hot Money". *Foreign Affairs* Vol.79 (2), p99-109.

Bikhchandani, Sushil and Sunil Sharma. 2000. "Herd Behavior in Financial Markets-A Review'. IMF Working Paper 48. Washington D.C.: International Monetary Fund.

Bird, Graham and Ramkishen S. Rajan. 2000. "Financial Crises and The Composition of International Capital Flows: Does FDI Guarantee Stability? CIES Discussion Paper No.044. (http://www.adelaide.edu.au/CIES)

Borensztein, Eduardo R. and R. Gaston Gelos. 2000. "A Panic-Prone Pack? The Behavior of Emerging Market Mutual Funds". IMF Working Paper 198. Washington D.C.: International Monetary Fund.

Calvo, Guillermo. 1998. "Understanding the Russian Virus- with special reference to Latin America". Paper presented at the Deutsche Bank's Conference on Emerging Markets: Can They Be Crisis Free?, Washington D.C., October 3, 1998.

---------- , and Enrique G. Mendoza. 2000. "Rational Contagion and the Globalization of Securities Markets". *Journal of International Economics*, No 51, p79-113.

Claessens, Stijn, Michael P. Dooley, and Andrew Warner. 1995. "Portfolio Capital Flows:Hot or Cold?". *The World Bank Economic Review* Vol.9 No.1, p153-174.

Dell'Ariccia, Giovanni, Isabel Gödde, and Jeromia Zettelmeyer. 2000. "Moral Hazard in International Crisis Lending: A Test". Paper presented at First Annual IMF Research Conference November 9-10, 2000. Washington D.C.: International Monetary Fund.

Dooley, Michael P. 2000. "A Model of Crises in Emerging Markets". *The Economic Journal*, 110, p.256-272.

Dooley, Michael P. and Inseok Shin. 2000. "Private Inflows When Crises are Anticipated: A Case Study of Korea". Paper presented at Claremont Conference on The Political Economy of International Financial Crisis, December 1-2, 2000. *(http://www.spe.cgu.edu/econ/peifcconference/papers/index.htm)*

Eichengreen, Barry and Donald Mathieson. 1998. *Hedge Funds and Financial Market Dynamics*. IMF Occasional Paper 166. Washington D.C.: International Monetary Fund.

----------, Galina Hale and Ashoka Mody. 2001. "Flight to Quality" in Stijn Claessens and Kristin J. Forbes eds. *International Financial Contagion*. Boston, Kluwer.

Fernandez-Arias, Eduardo. 2000. "Is FDI a Safer Form of Financing?". Paper prepared for the Seminar The New Wave of Capital Inflows: Sea Change or Just Another Tide? In conjunction with the Annual Meetings of the Board of Governors, Inter-American Development Bank and Inter-American Investment Corporation. New Orleans, United States.

----------. 2000. "The New Wave of Capital Inflows: Sea Change or Tide?". Paper prepared for the Seminar The New Wave of Capital Inflows: Sea Change or Just Another Tide? In conjunction with the Annual Meetings of the Board of Governors, Inter-American Development Bank and Inter-American Investment Corporation. New Orleans, United States.

Fernandez-Arias, Eduardo and Ricardo Hausmann, eds., 2000. *Wanted: World Financial Stability*. Washington, D.C.: Inter-American Development Bank.

Gabriele, Alberto, Korkut Boratav and Ashok Parikh. 2000. "Instability and Volatility of Capital Flows to Developing Countries". *The World Economy* Vol 23 (8), August, p. 1031-56.

Ito, Takatoshi. 1999. "Capital Flows in Asia". NBER Working Paper No. W7134. Washington, D.C.: National Bureau of Economic Research.

International Monetary Fund. *International Financial Statistics*. Washington D.C.: International Monetary Fund, various issues.

----------. 1999. *World Economic Outlook: Safeguarding Macroeconomic Stability at Low Inflation*. Washington D.C.: International Monetary Fund (October).

----------. 1998. *International Capital Markets: Developments, Prospects, and Key Policy Issues.* A Staff Team Led by Charles Adams, Donald J. Mathieson, Garry Schinasi, and Bankim Chadha. Washington D.C.: International Monetary Fund.

International Bank Lending Statistics. The Maturity, Sectoral and Nationality Distribution of International Bank Lending. Basle, BIS, various issues.

Jo, Gab-Je. 2000. "The Roles of International Capital Flows and Financial Contagion in the Asian Financial Crises". Claremont, Claremont Graduate University, PhD Dissertation.

Kaminsky, Graciela L., and Carmen M. Reinhart. 2000. "On Crises, Contagion, and Confusion". *Journal of International Economics*, No 51, p145-168.

-----, Richard Lyons, and Sergio Schmukler. 2000. "Managers, Investors, and Crisis: Mutual Fund Strategies in Emerging Markets". NBER Working Paper No. W7855. Washington, D.C.: National Bureau of Economic Research (August).

Kho, Bong-Chan, Dong Lee and Rene M. Stulz. 2000. "U.S. Banks, Crises, and Bailouts: From Mexico LTCM". NBER Working Paper No. W7529. Washington, D.C.: National Bureau of Economic Research (February).

Lane, Timothy and Steven Phillips. 2000. "Does IMF Financing Result in Moral Hazard". IMF Working Paper 168. Washington D.C.: International Monetary Fund.

Masson, Paul R. 1998. "Contagion-Monsoonal Effects, Spillovers and Jumps Between Multiple Equilibria". IMF Working Paper 142. Washington D.C.: International Monetary Fund.

Mohammad, Mahathir. 1997. "Highwaymen of the Global Economy," *Wall Street Journal.* (September, 23).

Ramos, Cesar. 2002. "Volatility Analysis of Various Capital Flow Types and Evaluation of Pressure Indicators: Evidence from Latin America". Claremont, Claremont Graduate University, PhD Dissertation.

Sarno, Lucio, and Mark P. Taylor. 1999a. "Hot Money, Accounting Labels and the Permanence of Capital Flows to Developing Countries: An Empirical Investigation". *Journal of Development Economics*, Vol 59, p337-364.

----------. 1999b. "Moral Hazard, Asset Price Bubbles, Capital Flows, and the East Asian Crisis: The First Test". *Journal of International Money and Finance*, p. 637-657.

Soros, George. 1998. *The Crisis of Global Capitalist.* New York: Public Affairs, NY.

Thomas, Johnny. 2001. "The crisis in International Lending: A Survey of the Practices, Views and Concerns of U.S. Bankers". Claremont, Claremont Graduate University, PhD Dissertation.

Van Rijckeghem, Caroline and Beatrice Weder. 2000. , "Spillovers Through Banking Centers: A Panel Data Analysis". IMF Working Paper 88. Washington D.C.: International Monetary Fund.

Van Wincoop, Eric and Kei-Mu Yi. 2000. "Asia Crisis Postmortem: Where Did The Money Go and Did The United States Benefit?". New York, Federal Reserve Bank of New York Economic Policy Review, September.

Wilcox, Jarrod. 1999. "An Investor's Perspective on the Asian Crisis," in Alison Harwood, Robert E. Litan, and Michael Pomerleano,eds., *Financial Markets and Development: The Crisis in Emerging Markets*. Washington, D.C.: Brookings, p243-67.

Willett, D. Thomas. 1999. "Did the Mexican Bailout Really Cause the Asian Crisis?" Claremont, Claremont Policy Briefs (March).

----------. 2000. "International Financial Markets as Sources of Crisis or Discipline: The Too Much, Too Late Hypothesis". Princeton Essay in International Finance (May).

World Bank. 1997. "Private Capital Flows to Developing Countries: The Road to Financial Integration". Washington, D.C., World Bank.

Table 1. Descriptive Statistics of Different Type of Flows [1]

Type of Flows	Average (mill.US$)		% cum.1997/98 flows to cum.inflows (1990-96)
	1990-96	1997-98 [2]	
Net direct investment	3760.82	7740.06	44.10
Net portfolio investment	12805.13	-1376.91	-2.30
Net bank flows	7382.39	-30441.60	-88.36

Source : IFS

[1] Aggregate figures of 4 countries (Indonesia, Korea, Philippines and Thailand).
[2] For 1997, data is begun from the third quarter.

Table 2. International Bank Lending to Asia Crisis Countries

Year	Grand Total		Japan				United States				Europe (UK, France, Germany)			
				change		% share		change		% share		change		% share
	mill.US$	%change	mill.US$	mill.US$	%	of total	mill.US$	mill.US$	%	of total	mill.US$	mill.US$	%	of total
1994m	135443		58036			42.8	13652			10.1	31703			23.4
1995m	187524	38.5	81252	23216	40.0	43.3	16231	2579	18.9	8.7	46967	15264	48.1	25.0
1996m	237637	26.7	91219	9967	12.3	38.4	22813	6582	40.6	9.6	55695	8728	18.6	23.4
1997m	275498	15.9	97232	6013	6.6	35.3	23738	925	4.1	8.6	73580	17885	32.1	26.7
1998e	187855	-31.8	64711	-32521	-33.4	34.4	14701	-9037	-38.1	7.8	59405	-14175	-19.3	31.6

Source : Banks for International Settlements

Note :
m : the end of June of that year
e : the end of December of that year

Table 3. International Lending by Nationality of Reporting Banks

	Year	Grand Total mill US$	Grand Total % change	Japan mill US$	Japan change mill US$	Japan change %	Japan % share of total	United States mill US$	United States change mill US$	United States change %	United States % share of total	Europe (UK, France, Germany) mill US$	Europe change mill US$	Europe change %	Europe % share of total
Indonesia	1994 June	30902		16678			54.0	2393			7.7	6441			20.8
	1995 June	40411	30.8	20512	3834	23.0	50.8	2296	-97	-4.1	5.7	9507	3066	47.6	23.5
	1996 June	49306	22.0	21622	1110	5.4	43.9	3551	1255	54.7	7.2	11755	2248	23.6	23.8
	1997 June	58733	19.1	23153	1531	7.1	39.4	4591	1040	29.3	7.8	14729	2974	25.3	25.1
	1998 Dec.	44827	-23.7	16402	-6751	-29.2	36.6	3537	-1054	-23.0	7.9	13326	-1403	-9.5	29.7
Korea	1994 June	48132		14031			29.2	4782			9.9	12147			25.2
	1995 June	71430	48.4	20874	6843	48.8	29.2	7122	2340	48.9	10.0	19063	6916	56.9	26.7
	1996 June	88027	23.2	22512	1638	7.8	25.6	9582	2460	34.5	10.9	19663	600	3.1	22.3
	1997 June	104148	18.3	23732	1220	5.4	22.8	9961	379	4.0	9.6	27647	7984	40.6	26.5
	1998 Dec.	65293	-37.3	16925	-6807	-28.7	25.9	6291	-3670	-36.8	9.6	21226	-6421	-23.2	32.5
Malaysia	1994 June	13874		5570			40.1	1561			11.3	4288			30.9
	1995 June	14722	6.1	6091	521	9.4	41.4	1073	-488	-31.3	7.3	5745	1457	34.0	39.0
	1996 June	20100	36.5	8131	2040	33.5	40.5	1896	823	76.7	9.4	6821	1076	18.7	33.9
	1997 June	28800	43.3	10489	2358	29.0	36.4	2380	484	25.5	8.3	10661	3840	56.3	37.0
	1998 Dec.	20826	-27.7	6623	-3866	-36.9	31.8	858	-1522	-63.9	4.1	8993	-1668	-15.6	43.2
Philippines	1994 June	5990		1016			17.0	2333			38.9	1441			24.1
	1995 June	7357	22.8	1147	131	12.9	15.6	2636	303	13.0	35.8	2205	764	53.0	30.0
	1996 June	10795	46.7	1402	255	22.2	13.0	3351	715	27.1	31.0	3638	1433	65.0	33.7
	1997 June	14442	33.8	2109	707	50.4	14.6	2809	-542	-16.2	19.5	5079	1441	39.6	35.2
	1998 Dec.	16160	11.9	2324	215	10.2	14.4	2657	-152	-5.4	16.4	5846	767	15.1	36.2
Thailand	1994 June	36545		20741			56.8	2583			7.1	7386			20.2
	1995 June	53604	46.7	32628	11887	57.3	60.9	3104	521	20.2	5.8	10447	3061	41.4	19.5
	1996 June	69409	29.5	37552	4924	15.1	54.1	4433	1329	42.8	6.4	13818	3371	32.3	19.9
	1997 June	69375	0.0	37749	197	0.5	54.4	3997	-436	-9.8	5.8	15464	1646	11.9	22.3
	1998 Dec.	40749	-41.3	22437	-15312	-40.6	55.1	1358	-2639	-66.0	3.3	10014	-5450	-35.2	24.6

Source : Banks for International Settlements

Figure 1. The Composition of Capital Flows in Indonesia, Korea, Philippines and
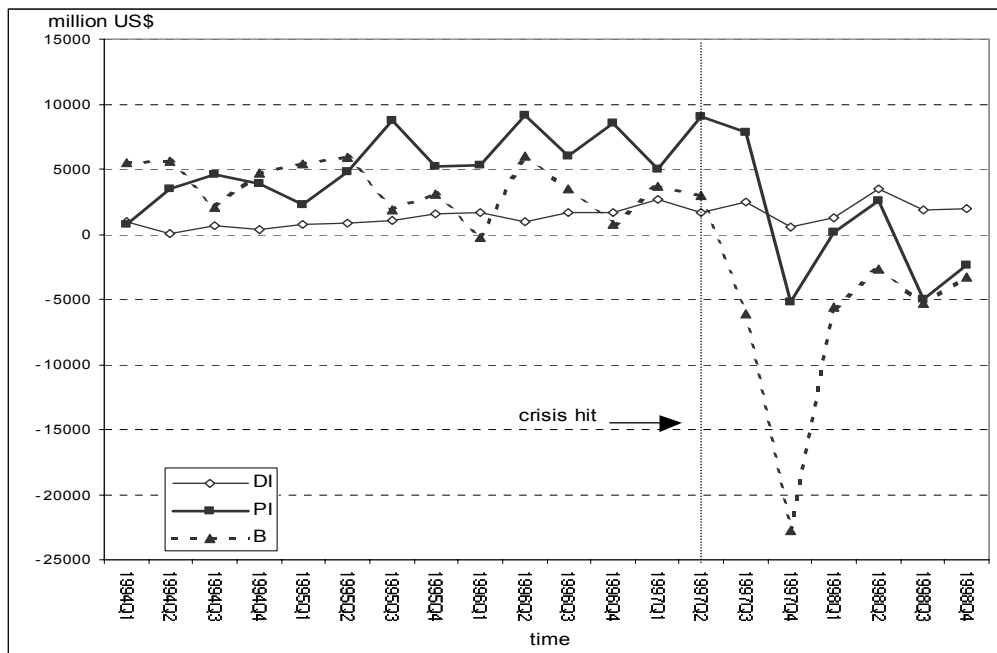Thailand (1994 – 1998)

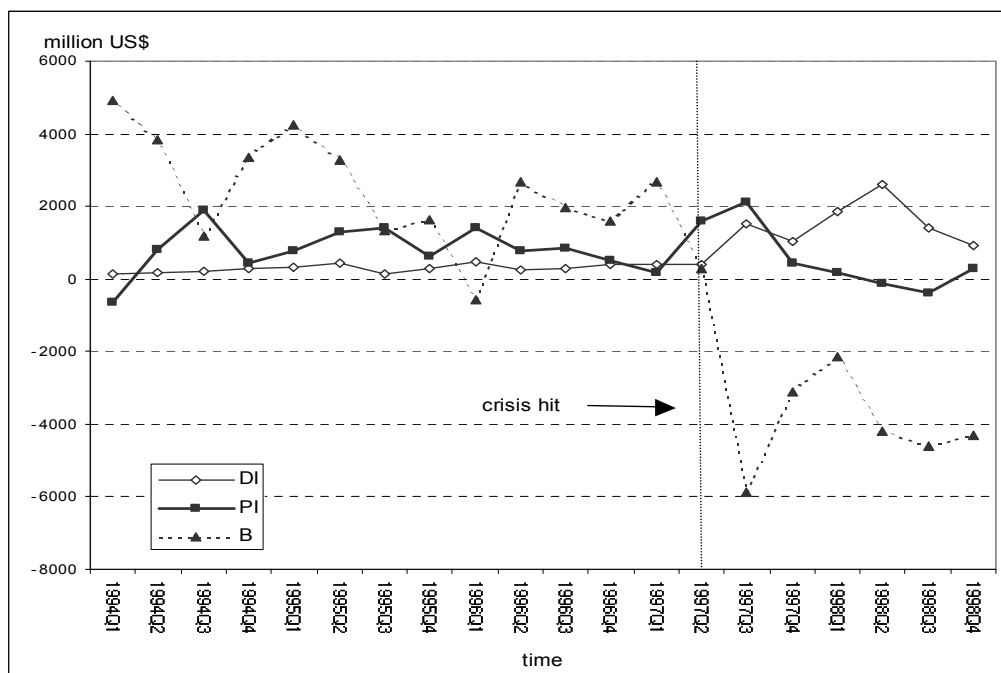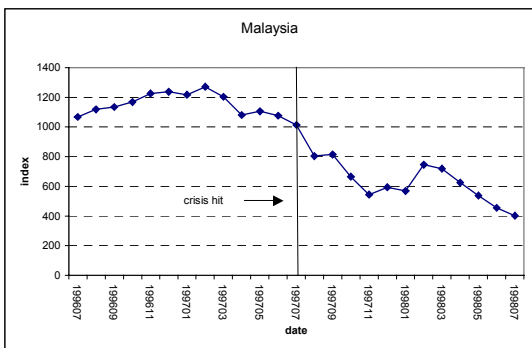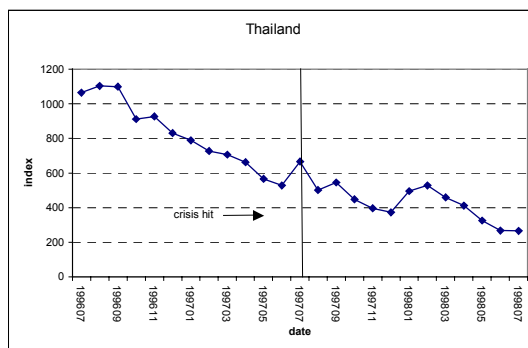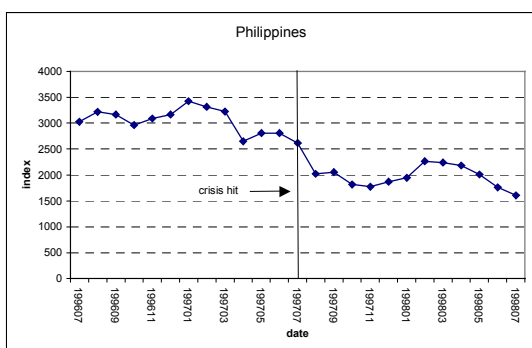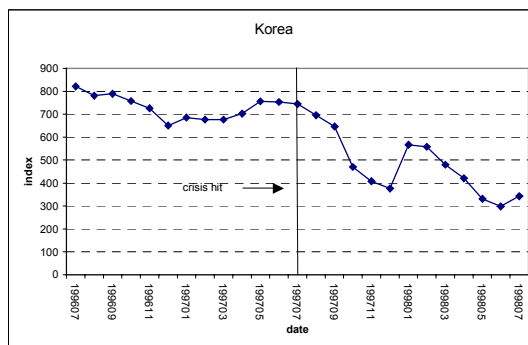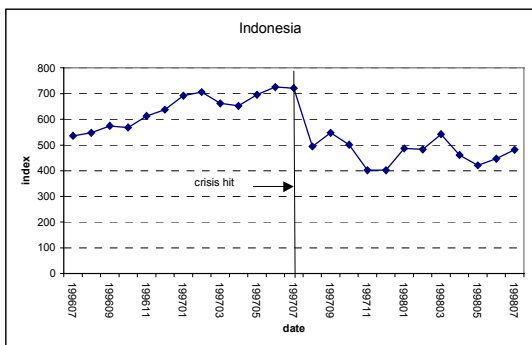Figure 2. The Composition of Capital Flows in Thailand (1994 – 1998)

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Figure 3. Local Stock Market Index (monthly 1996.07 - 1998.07)
(at the end of period)

Source : IFC's Emerging Market Data Base