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### Derivatives and Global Capital Flows: Applications to Asia

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#### I. Introduction: Four Puzzles

There are four factors involved in the current financial crisis in Asia that have caused surprise. Since the Latin American debt crisis was thought to have been aggravated by the dominance of syndicated private bank lending, borrowers were encouraged to increase private direct investment flows. The stability of capital flows to Asia was used as an example. Yet, the Asian crisis appears to have been precipitated by the reversal of short-term private bank lending.

Second, the flows of capital to Asia have been used as example of the benefits of free international capital markets in directing resources to the most productive uses. Yet, in the aftermath of the crisis it appears that total returns on equity investments in Asia have in fact been lower than in most other regions throughout the 1990s.

Third, it appears that in a number of Asian countries, the majority of the international lending was between foreign and domestic banks. It has been suggested that the major cause of the crisis is unsafe lending practices by the Asian banks permitted by inadequate national prudential supervision. Yet, these economies were the most advanced on the road to market liberalisation. One of the cardinal principles of financial liberalisation, formed in the aftermath of the Chilean crisis, is that the creation of institutional structures ensuring the stability of the financial system should precede financial market liberalisation. Indeed, many countries were following this advice. It is interesting to note that the lending banks were generally large, global banks who employ highly sophisticated risk assessment procedures. Yet, they appear to have continued lending well after the increased risks in the region were generally apparent. This suggests that even the most sophisticated operators in global financial markets have difficulties in assessing risk, and that their regulators were no more successful in imposing prudent limits.

Finally, private portfolio and direct investment flows were considered to be preferable to syndicated bank lending because they were thought to segregate the problem of foreign exchange instability from asset market instability. Syndicated lending was denominated in the currency of the lending bank, and the exchange rate risk was borne by the borrower; but direct equity investors purchase foreign financial assets denominated in foreign currency and thus bears the currency risk. It was suggested that in a crisis the foreign investor would suffer first from a fall in asset prices, and second from a decline in the exchange rate, which would discourage him from liquidating the investment and reduce selling pressure in the foreign exchange market. Yet, the linkage between the collapse in exchange rates and equity markets appears to have been even closer in Asia than in other experiences of financial crisis.

One explanation of the crisis in foreign exchange markets is that a large proportion of foreign borrowing by corporates and banks was unhedged because of prevailing expectations of stable exchange rates. When these expectations were disappointed, the scramble to repay these foreign currency loans created a massive market imbalance and a collapse of the foreign exchanges. This absence of generalised hedging of foreign borrowing has been interpreted to mean that financial derivative contracts played little or no role in the crisis. This position has been reinforced by the repeated references to an IMF study which suggests that global hedge funds were

not active catalysts in the Asian crisis.<sup>1</sup> However, the recent quarterly reports (for the 4<sup>th</sup> quarter of 1997 and 1st quarter of 1998) of US money-centre banks reflecting the initial impact of the Asian crisis on their lending to the area suggest that most of their initial losses have been related to derivative-based credit swap contracts. Thus, at least in the case of US banks, certain types of derivative contracts appear to have played some role in the flows of funds to Asia and thus in the instability of these flows. While bank derivatives are "tailored-to-the-client" "over-the-counter" contracts, and as such are not generally public knowledge, the experience of such contracts in the Tequila crisis earlier in this decade provides some indication of the kinds of contracts that might have been involved. This short note thus suggests ways in which bank derivative contracts may have been linked to the rise in short-term bank lending to Asia and contributed to the four puzzles noted above concerning capital flows to the region.

## II. Structured Derivatives

Most people are now familiar with standard derivative contracts used in hedging risk, such as forwards, futures and options. While foreign-currency forwards remain the province of bank foreign exchange dealers, most basic futures and options contracts are standardised and traded in organised, regulated markets. Banks also offer derivative contracts to their clients in what is termed the "over-the-counter" (OTC) market. But, there is no market involved in these contracts, which may involve the stipulation of standard futures and options contracts outside of the organised market on a bilateral basis with individual clients. However, the majority of OTC activity involves individually tailored, often highly complex, combinations of standard financial instruments packaged together with derivative contracts designed to meet the particular needs of clients. These contract packages involve very little direct lending by banks to clients, and thus generate little net interest income. However, they have the advantage, given the necessity of meeting the Basle capital adequacy requirements, of requiring little or no capital, or of being classified as off-balance sheet items because they do not represent a direct risk exposure of bank funds. In addition, they generate substantial fee and commission income. Rather than committing own capital, the banks serve in these transactions as intermediaries whose services involve not only matching borrowers and lenders, but as market innovators creating investment vehicles that attract lenders and borrowers. This activity often requires banks to accept some of the risks associated with the derivatives in order to produce packages that permit them to intermediate between independent borrowers and lenders. These derivative risks may or may not be hedged by the bank, depending on its own proprietary investment strategy. When hedging does occur it can be done either by physical hedging (i.e. the actual purchase of an offsetting position in the underlying financial asset), through the purchase of derivative contracts in organised markets, or by producing a package which involves risks which offset those involved in other packages (cross hedging or risk matching across clients).

The major objective of the active global financial institutions is thus no longer the maximisation of profits by seeking the lowest cost funds and channeling them to the highest risk-adjusted return, but rather in maximising the amount of funds intermediated in order to maximise fees and commissions, thereby maximising the rate of return on bank capital. This means a shift from continuous risk assessment and risk monitoring of funded investment projects that produce recurring flows of interest payments over time, to the identification of riskless "trades" that produce large, single payments, with all residual risks the responsibility of the purchasers of the package. This process has been accelerated by the introduction of risk-weighted capital requirements. As a result, banks have come to play a declining role in the process of the efficient international allocation of investment funds. Rather, they serve to facilitate this process by linking primary lenders and final borrowers. This means that the efficient allocation of funds to the highest risk-adjusted rate of return depends increasingly on assessment of risks and returns by the lender. Yet, it is the role of most derivative packages to mask the actual risk involved in investment, and to increase the difficulty in assessing the final return on funds provided.<sup>2</sup> As a result, certain types of derivatives may increase the difficulties faced by private capital markets in effectuating the efficient allocation of resources. By extension, if they make investment evaluation more difficult for primary lenders, they may also create difficulties for financial market regulators and supervisors.

These particular aspects can be most clearly seen by reference to structured credit derivative contracts that expanded dramatically during the 1990s. Most US institutional investors do not face unlimited investment choices. Standard limitations restrict investments to assets with a minimum of risk given by an "investment grade" credit rating on the issue, and many also preclude certain types of risk, such as foreign exchange risks, or foreign credit risk (these often are simply the result of the application of the investment grade restriction).

This means that a large proportion of professionally managed institutional investment funds cannot be invested in emerging markets or in particular asset classes such as foreign exchange. Structured derivative packages, created by global investment banks, have often provided the means by which these restrictions could be overcome.

Structured derivatives have been used in two ways. In 1992 and 1993, in a falling interest rate environment, they provided a means to increase returns for money managers and then when rates started to rise to provide borrowers with below market borrowing rates. They usually involved structured credit notes with imbedded options. "These notes only carried a higher coupon because they contained an embedded short position in interest rate options. In other words, often when an investor bought a structured note, he simultaneously sold an interest rate option. ... There is no doubt that some less knowledgeable investors did not realize that by buying these securities, they were selling options or engaging in leveraged bets, because some of these features were quite cleverly concealed" (Chew, p. 54-5). The assumption behind such contracts is that the price of the instrument underlying the contract would not change sufficiently to produce a loss that completely eliminated the premium earned from selling the option. The famous Procter and Gamble and Gibson cases involved contracts of precisely this type. The interest costs to the borrower were reduced by the amount of the option premium gained from writing a put option on interest rates with a highly levered payoff profile.

An example closer to the present context might involve US government agency dollar denominated structured notes with the interest payment, or the principal value, linked to an index representing some foreign asset. The return to these notes would be higher than US domestic rates, but the increased yield would be accompanied by the increased risk due to foreign exchange exposure. Such an asset might be a one-year dollar-denominated note paying a guaranteed above-market interest rate, but with the amount of repayment of principal linked to an index, say the Thai baht/dollar exchange rate. Since the asset is denominated in US dollars, and the interest is guaranteed and paid in US dollars, the notes carry a top investment grade credit rating and would be carried on the balance sheets of investors as the equivalent of a US Treasury bill, not as a foreign investment subject to foreign exchange or country risks. Yet, the above market interest rate on the note is generated by the sale of a put option on the Thai baht at a strike price just above the current market rate that is in fact imbedded in the contract. This is equivalent to the buyer having purchased the Thai currency. If the baht remains constant, the written put is not exercised and the option premium received is retained by the writer to augment the interest rate. However, if the baht were to depreciate to a value below the strike price, then the buyer of the put will exercise his right under the option to sell baht at a price higher than the market price. The writer of the option incurs a loss determined by the difference between the strike price and the market price for baht. Since the interest rate is guaranteed, the loss will not cause a reduction in the rate of interest. However, the margin over the market interest rate and any loss on the option position will be recovered through a reduction in the amount of principal returned at maturity. An investor seeking to maximise yield may be attracted by the guarantee on the interest rate, and underestimate or even ignore the risk of loss in capital value. Since the writer of an option has an unlimited exposure, a large change in the exchange rate could cause a total loss of capital invested.

Alternatively, this contract could have been constructed by lending the principal (less the discounted value of the guaranteed dollar interest payment which is invested in a one-year Treasury bill) directly to a Thai bank by buying a bank acceptance. Again, the implicit assumption is that the baht/\$ exchange rate should remain constant so that the baht interest and principal repayment can be converted at maturity to a dollar value equal to the original investment of principal. If the baht devalues relative to the dollar, then the amount available to repay the principal will be lower. The buyer thus has the entire principal at risk, only the interest is guaranteed. The contract arranged in this way would provide Thai banks with below market rate funds, provide US investors with above market returns (US rates were in decline from 1991 to 1994) and the banks with fees and commissions for arranging the trade, but with no commitment of capital (most US banks were emerging from the experiences of the real estate crisis of the 1980s and were seeking to rebuild capital).

It is virtually impossible for the US investor to evaluate the use of the funds made by the Thai bank, and there is little incentive for the US bank to do so, since once the issue is sold, the foreign credit and foreign exchange risks are borne by the US investor. The investor is not only subverting prudential controls (on its balance sheet these assets would be classified as exposure to a US entity, with investment grade credit risk), but is in all probability evaluating the return without any adjustment for the foreign exchange risk, even if that risk is recognised as such. There is thus little economic interest or possibility for the market to either assess the risk

or the returns of the investment.

### III. Structured Credit Derivatives

Structured products also provided the basis for the growing market in credit derivative contracts. This was usually via credit swaps embedded in structured notes to form credit-linked notes. The objective of a credit swap is for the counterparties to exchange the credit risks associated with an instrument, while retaining the cash flow characteristics. Total return swaps "enable counterparties to swap the total economic risk attached to a reference asset without actually transferring the asset itself. ... Under the terms of the swap, [the first counterparty] pays [the second counterparty] the cashflows generated by the reference asset, including coupon payments and any appreciations in its capital valued calculated on a periodic mark to market basis. [The second counterparty], in exchange, pays a LIBOR-linked margin plus any depreciations in the capital value of the reference asset." (Ghose, p. 3). A credit swap or equity swap, thus transfers the credit risk, including the impact of a credit event on the capital value of the asset.

It was the creation of the Brady Bond that provided the recipe for the extension of many of these structured loans to emerging markets. A Brady Bond is a variety of structured derivative package in which the developing country (Mexico was the first) uses foreign exchange reserves as equity capital to create an investment company. The investment company vehicle then uses the equity (i.e. the foreign exchange) to buy long-term, stripped US Treasury bonds. The investment company also issues its own fixed interest liabilities in the form of long-term bonds (which came to be called Brady Bonds after the US Secretary of the Treasury who held office at the time), which carry a sovereign government guarantee, in an amount equal to the maturity value of the US Treasury discount bonds. The investment vehicle's bonds are in fact only issued in exchange for the debtor country's outstanding foreign bank debt at its current market value (in Mexico's case this represented a discount to its face value of about 35%). The principal of the bonds issued by the investment vehicle (the Brady Bonds) is thus guaranteed by the Treasury bonds held, and repayment in full at maturity is riskless. Additional short-term Treasury coupon strips (which provide only payment of interest without principal) were also purchased by the investment vehicle to provide a guarantee for the interest payments during the first 18 or 24 months of life of the bonds. After that, interest would have to be paid from the underlying loans or other government sources. The interest is thus only partially guaranteed and only riskless for the payments backed by the US Treasury strips. Banks that exchanged their loans to developing countries for these "Brady bonds" could then trade them in the open market, with their values determined by changes in the issuing country's sovereign credit rating and in US interest rates which affect the current value of the underlying collateral -- the Treasury bonds.

Although the maturities of the Brady bonds were usually 20 or more years, in the case of a Brady bond with a two-year rolling interest guarantee, it was identical to buying a 20-year discount zero coupon bond, a six-month zero bond, a 12-month zero, an 18-month zero, and a two-year zero. These streams were default-free, so they could be considered as AAA. It was only the interest payments to be paid after the second year that (which could be represented as 36 zero coupon bonds with maturities running from 30 months to twenty years at six-month intervals) carried foreign exchange and sovereign credit risk. The Brady structure thus provided complicated market valuation, it also provided an infinite number of possibilities for rearranging the various pieces of the bond into more attractive cash flow structures.

"An example would be transferring Brady bonds into a trust structure, rearranging the cash flows and swapping them from floating USD into fixed DEM with a bullet repayment. Investors are thus able to achieve a higher yield than a Latin American DEM Eurobond with essentially the same counterparty risk. The bank arranging the issue is left with a contingent default risk on the underlying Brady bonds. There can be a loss in the case of a default, as the residual value of the Brady bonds in the trust might not be sufficient to cover the bank's potential loss from unwinding the cross currency swap." (Watzinger, p. 49).

Thus, a company set up to buy Brady Bonds could issue its own two-year bonds that would carry a AAA credit rating since the interest payments were backed by US Treasury securities, and another series of bonds with a twenty-year guaranteed principal value at maturity and a lower credit rating reflecting the risk on the remaining interest payments. If this second series could be rated investment grade, the final result would be to transform high risk, impaired, syndicated loans of banks to Latin American governments into low risk

investment grade bonds that could be sold to institutional investors, with a profit from the credit rating differential as well as fees and commissions. This is called credit enhancement, and investment banks quickly extended the Brady principle to other types of developing country debt. Since the first Brady issues were in Mexico (JP Morgan had produced a prototype of the Brady Bond called the Aztec bond in 1988), this extension also appears to have started in Mexico.

The problem facing investment bankers was thus to find structures that allowed credit enhancement of these issues at minimal cost. The first step in this process was the creation of an investment vehicle in the form of an offshore trust that would buy high interest rate domestic bond (say a Mexican government issued security, such as Cetes, which carries a AA domestic credit rating), along with some zero coupon US Treasury bonds. These purchases would be financed through the issue of its own-dollar denominated bonds (no longer called Brady's). The bonds could be divided into two classes, one class would have its principal collateralised by the Treasury discount bonds in Brady fashion, while the other class, backed by the domestic bonds, would carry no guarantee. The interest would be paid by the interest generated by the peso asset. For the rating agencies, these were credit enhanced peso bonds, and they were assigned a credit rating equal to the Mexican government rating on its peso issues in the domestic capital market. Since a government is always the benchmark, and thus the domestic risk-free rate, it is almost by definition investment grade in its own market. The enhanced bonds issued by the trust were thus given an investment grade rating. But, as dollar bonds paying dollar interest rates they could be sold to US institutional investors. What the investor was in fact buying was a peso denominated Mexican government bond, and the exchange rate risk on the interest payments. But, on their balance sheets these were represented as if they were US investment grade bonds. Again, the result was that US institutional investor funds were being invested in emerging market debt, earning above market interest rates, without their balance sheets necessarily reflecting the actual risk involved. These structures were offered in various combinations, but it still remains true that neither the investor nor the bank intermediary have any direct interest in evaluating either the final use of the funds nor the risk adjusted returns. For the intermediary there was no risk, unless the bank was required to guarantee that it could convert the interest payments into dollars, which only represented a risk if the foreign currency were to become inconvertible (this is not devaluation risk, but that it could not be traded at all). This provides one possible explanation of why so much effort was made to prevent Mexico from suspending convertibility in 1994. Structures similar to these were used in Asia as well as in Latin America. Thus the structured note and the credit enhanced Brady structure provide simple examples of how funds were moved from developed to developing countries despite the existence of prudential regulatory barriers, and why there was little effort expended in insuring that the funds were moving to the highest risk adjusted uses. The buyers were interested in enhancing yield in a low yield environment, while the intermediaries were interested in producing no risk, no capital using vehicles that generated fee and commission income. Earnings on structured vehicles could exceed 2% of principal.

The result of these packages is to change the credit risk characteristics of the bonds by shifting them to different individuals. They thus allow access for investors whose activities are limited by the credit risk classification of the assets they can buy. "Emerging market borrowers use total return swaps to get access to funding, or reduce the cost of it. The borrower sells assets to a bank and enters into a total return swap. In this swap, he receives the total return on the assets sold and pays Libor plus spread. Consequently, the borrower raises funds while at the same time still being able to benefit from a price appreciation of the asset sold." "Investors use total return swaps to get access to their desired emerging market exposure. In a number of countries, severe restrictions in the cash market prevail. For instance, cumbersome settlement procedures, withholding taxes or minimum holding periods. Total return swaps can be an effective means for investors to structure a way around these restrictions." (ibid., p.49).

#### **IV. Asset and Foreign Exchange Market Linkages**

The linkage between foreign exchange markets and emerging asset markets is best seen through the example of an extension of the structured vehicles discussed above. In an equity swap the emerging market owner of a domestic asset exchanges the return from the asset (interest or dividend income plus change in capital value) for a fixed term (or until maturity or perpetuity) against the zero interest loan (which may be in foreign currency) of the current value of the asset. This is, of course, the equivalent of the sale of the asset, but without the official transfer of ownership. Such a transaction avoids having to book a loss on the asset (an advantage to

a bank in difficulty) or to book a tax event (an advantage of a rich businessman), while liquidating the value of the asset.

A variant of the equity swap is a total return swap in which the emerging market owner of a domestic asset swaps the asset and its total return (again interest or dividend plus any change in capital value) for a dollar loan equal to the value of the asset and a fixed dollar interest rate. Effectively a US bank is lending dollars against the collateral of an emerging market asset, and the bank is paying the total return on the foreign asset against receipt of a fixed dollar interest payment. Both the bank and the emerging market borrower are facing foreign exchange risk, and the bank is accepting credit risk. For the emerging country borrower the advantage is that the asset remains on the balance sheet and it gains funds at a cost below the domestic market without an entry on the balance sheet and thus no additional capital requirement. It does increase the US bank's balance sheet as it is lending dollar funds. Risk coverage would be arranged by buying the underlying asset, and then financing the purchase through a repo with another bank, thus getting it off its own balance sheet. This hedges the US bank's commitment to pay foreign currency denominated total returns on the asset. But exchange rate and convertibility exposure on the amount of the loan advanced still remains. This could be hedged by issuing a floating-rate note at a guaranteed above-market interest rate for the value of the principal and with a clause permitting the payment of interest in foreign currency in the event of a suspension of currency convertibility.

The total return swap could be made against any underlying asset and also represents the effective sale of the asset without a change in ownership. In effect, the US bank was buying foreign financial assets. While these were primarily against Treasury paper held by bank counterparties, they could also be made against equity positions, or the bank could use the proceeds to shift the allocation of its portfolio towards equity without actually selling the Treasury securities and without having them appear on the balance sheet.

This provides a possible explanation of a direct linkage between exchange rates and domestic asset markets. As already mentioned, most of these instruments were set up on the presumption of stable exchange rates and any indication that there might be a change in the way a central bank handled the exchange rate would create the potential for substantial losses to investors.

To see this, first consider the bank, paying total return on the foreign asset composed of interest plus change in capital value. The fall in capital value will usually more than offset a rise in the rate of interest on the asset, so that this value becomes negative. For the foreign owner of the asset, paying dollar interest on his loan, the domestic currency costs of his dollar payments change by the amount of the devaluation in the domestic currency. Since swap flows are calculated net, this means his carry cost on the position now represents the higher foreign currency costs of his dollar interest, plus the loss in capital value of the underlying asset. A position with a positive carry (i.e. a profit on the interest differential paid and received) is quickly reversed to a negative carry and there is an incentive to unwind the swap by repaying the dollar loan. This creates an increase in the demand for dollars in a market that is already showing massive excess dollar demand. However, if the fall in the price of the underlying asset is large, or the devaluation is large, this may be impossible, and there is default.

Further, the natural response for the bank holding a total return swap, recognising the possibility of counterparty default, would be to hedge its dollar exposure represented by the loan against the foreign asset. This is accomplished by unwinding the hedge of its total return commitment, i.e. unwinding the repo of the foreign asset, selling that asset in the foreign market and repatriating the proceeds at the best possible exchange rate. On the other hand, the emerging market owner of the asset will have to repay the dollars borrowed against the asset as collateral, so will seek to borrow domestic currency or sell the domestic assets financed with the loan in order to buy dollars. The net result is that both parties to the swap will react by selling emerging market financial assets and selling the domestic currency proceeds against dollars, providing levered downward pressure on both asset market prices and the foreign exchange market.

Most global investment banks were cognisant of risks that were created to exchange rate stability. Given this type of exposure it is perhaps not surprising that the investment banks selling these products continued publicly to express confidence in the prospects for exchange rate stability in countries to which they had large outstanding exposures. Even if they had performed appropriate risk assessment, it would not have been in their interests to inform market participants until they had succeed in unwinding their positions. It is thus also not

surprising that funds continued to flow to countries showing distinct risk of currency instability, for this is what was required in order for structured positions to be closed without substantial loss.

Since most of these structured products are expressly designed to hide risk exposure by providing credit enhancement, or by being classified off balance sheet, it is not surprising that bank regulators in emerging economies had difficulty in discovering or controlling them. There is no reason why Asian regulators should be any more efficient than US regulators who admit to difficulties in evaluating such instruments. Further, Asian banks were being encouraged, just as US thrifts were encouraged in the 1980s, to deregulate, liberalise and to attempt to grow their way out of difficulty by investing in higher return market assets. The regulators accepted this strategy for resolution of the difficulties facing US institutions, it would be difficult not to accept it if it were supported by both the government and the multilateral institutions.

## V. Derivatives and Asian Capital Flows in the 1990s

Although direct reports of the role of derivatives in the Asian crisis are scarce, the majority of losses reported by major US money center banks<sup>3</sup> on their Asian lending were listed as swaps. Further, the suits that have been filed by J.P Morgan and SK securities in their payments dispute, are reported to relate to total return swaps.<sup>4</sup>

It is also the case that the issue of capital market instruments by Asian borrowers surged in 1995 and 1996. For example Asian issuance rose from \$25.2 billion in 1995 to \$43.1 billion in 1996. Not only were US banks involved, much of the success of local investment banks, such as Hong Kong based Peregrine securities, was primarily in underwriting and selling debt for Asian corporations. It could only do this if it could provide reasonable guarantee for the placement for these issues. Given that its liquidation apparently placed a large number of Asian corporates hedges in jeopardy because of failure of the counterparty suggests that Peregrine might have been a major source of the high return Asian assets which served to form high return special purpose vehicle for banks in Korea and investors in the developed countries. Korean securities houses and investment banks were also apparently actively involved. The Korean Securities Supervisory Board reported that they were operating over 100 offshore investment funds with portfolios valued at around \$3 billion, two-thirds of which represented Korean assets.<sup>5</sup>

The law suits that have recently been filed by a number of Korean entities that were swap counterparties of JP Morgan shed some light on the nature of these transactions. For example, in one transaction Morgan engaged in a \$/won currency swap with Boram Bank.<sup>6</sup>

In a straight currency swap, the counterparties exchange principal and interest payments on the currencies, so presumably Boram gave won to Morgan in exchange for dollars, and was paying Morgan a fixed interest rate linked to the US dollar, while Morgan was paying a rate linked to won interest rates (the differential in the rates when the swap was initiated in February 1997 were about 2 to 1), making a profit on the interest rate differential. When the swap is unwound the principal sums are returned at a prearranged exchange rate, so that Boram would have had to return dollars that were worth about three times as many won as at the beginning of the swap. To cover this risk, Boram engaged in a series of swaps with SK securities. Presumably passing the dollars on to SK securities which now carried the foreign exchange risks, but was borrowing at cheap dollar interest rates, against won it was lending to its clients at call market rates. The exchange rate loss on the swap was thus borne by SK, who owed this sum to Boram, who in turn owed it to Morgan. The Morgan suit places the value at \$189 million. Given the changes in exchange rates, the original principal could have been less than \$250 million.<sup>7</sup> This is a relatively straightforward derivative transaction, but it gives an idea of the potential losses involved, and why there was such pressure on the foreign exchange market to acquire funds to unwind swaps of this nature.

The other transactions relate to swaps between Morgan and Korean offshore investment funds operated by SK securities and Shinsegi Investment Trust.<sup>8</sup> It is highly likely that these transactions involved equity swaps or total return swaps. Thus bonds issued by Korean companies, underwritten by SK were placed in an offshore special purpose vehicle, financed by the sale of investment shares to the Korean public or other financial

institutions. The offshore trusts also invested in other Asian assets. These assets could then be used by the offshore units to generate dollar loans equal to the value of the assets, plus won interest rate and capital appreciation flows, against payment of dollar interest rates. These dollars could then be used to make further loans to Korean companies, while the won payments received from Morgan would be used to pay the local investors in the offshore vehicles.

Again, the magnitude of the change in the exchange rate witnessed after the decision to float the won would have produced capital losses on the assets and thus negative won inflows, which would have been transformed into large dollar interest payments due to Morgan. The offshore trusts would have had to borrow to meet any fixed interest payments, while the loss on the dollar borrowing would have decimated the capital value, irrespective of changes in stock prices. The rush to hedge such exposure thus made the fall in the exchange and asset markets that much worse. The legal cases at this stage simply involve failure of the trusts to meet periodic payments on the swaps.<sup>9</sup> It is reported that more than 40 of the over 100 such trusts had engaged in similar swaps with Morgan.<sup>10</sup>

Of its total of \$3.4 billion of exposure to Korea, \$2 billion are linked to derivative contracts. This perhaps explains why Morgan was at the forefront of the move to convert Korean banks' short-term debt into sovereign debt.

Another way of identifying the importance of derivatives activity in the area is with reference to the Country Exposure Lending Survey for money centre banks published by the FFIEC which reports figures for total amounts lent by country of borrower, net of derivatives, and the cross border exposure resulting from revaluation gains on foreign exchange and derivative products after adjustments for guarantees and external borrowings.

### Country Exposure of US Money Centre Banks: Loans and Derivatives

Country(\$ Millions outstanding 31 December 1997)	Total Amount Owed By Country of Borrower (Except Derivatives)	Cross Border Exposure from Foreign Exchange Revaluation and Derivatives
Indonesia	\$3,000	\$2,266
Korea	\$9,791	\$4,633
Malaysia	\$1,543	\$555
Philippines	\$1,533	\$40
Thailand	\$1,771	\$2,509

Source: Federal Financial Institutions Examination Council, Country Exposure Lending Survey/1, Table 1, p. 18-9, April 8, 1998.

Since derivatives exposure only results when a counterparty default places the bank under a risk of having to replace the instrument at a loss to current market conditions, the figures in the second column represent profits for US money centre banks on their derivatives activity. In Thailand, these profits far exceed the total amounts owed for traditional lending. For Korea they are well over half the figure of total lending. In Indonesia they are roughly two-thirds. Thus, in all three countries that have had to apply for IMF support, derivatives sold by US banks played a non-negligible role in financing activities.<sup>11</sup> While these figures do not allow a calculation of the actual amount of funds that were channeled to Asia via structured derivative products, they do support the view that they played an integral part in the rise in short-term flows to the region.

Clearly, as the crisis unfolds we shall learn more of the role of derivatives in facilitating the flow of short-term funds to the Asian economies. This note is not meant to argue that all of the difficulties surrounding capital

flows to Asia were caused by derivative instruments, but simply to point out that their existence does little to support the common belief in the self-regulating nature of private capital markets in terms of risk assessment or of their ability to allocate capital efficiently. Financial innovation and free capital movements, on the other hand, do provide means by which financial intermediaries can increase the rate of return on their capital by increasing the rate of flow and increasing the risks born by their counterparties.

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## Notes

1. This frequently cited study is as yet unavailable. The summary that appears in the *World Economic Outlook* (Part II, Box 1, 1998) suggests that hedge funds mainly attack countries whose "macroeconomic variables are far out of line with sustainable values". Another recent study (Brown, Goetzmann and Park, 1998) suggests

that hedge funds did not take major positions against Asian currencies or financial assets and did not make abnormal returns during the last half of 1997. From this one might conclude that the hedge fund managers did not detect any unsustainable policies in these countries..

2. For example, Chew (1996, p. 57) observes that "Structured notes are the epitome of how investment technology helped and continues to help money managers circumvent guidelines that were framed to protect the interest of small, unsophisticated investors ..."

3. It is clear that German and French banks were also heavily involved in derivatives trading in the region. Andrews, Edmund L. ("Huge German Bank Covering Risks in Asia," New York Times, January 29, 1998) reports that Deutsche Bank set aside \$777 million (double its loss provisions for 1996) to cover losses of as much as \$100 million on derivatives trading in South Korea, Thailand, Indonesia and Malaysia. Société Générale is reported to have set aside \$164 million, against a total exposure of \$6.8 billion (the \$4 billion lent in Korea is primarily lending to Korean companies, cf. Lavin). Commerz has \$3 billion in loans (37% of equity), Dresdner 26% of equity and Deutsche, 27% of equity in Asian loans..

4. Cf. Korea Times, 16 February, 1998: "SK Securities, JP Morgan Heading for Int'l Court Battle Over Derivatives" which refers to an offshore investment fund created by LG Metal and SK Hannam Investment Securities Fund: "The \$18 million fund was called 'Diamond Fund', and was guaranteed by Boram Bank" "JP Morgan had entered into a swap transaction with Boram in February 1997, involving an exchange of dollars for the Korean currency." (The fund lost an estimated \$120 million). "Such derivatives as total return swap were popular a year ago as they allowed investors to borrow yen at low interest rates and invest in higher-yielding currencies such as the Thai baht (sic) or Indonesian rupiah."

5. Korea Times, "Brokerage, Trust Firms Incur 1.5 Tril. Won Losses From Offshore Funds" February 19, 1998. The Korean "Securities Supervisory Board said that brokerage houses have more than a 10 percent stake in 66 funds. Another 23 funds were invested in by parent offshore funds of securities firms." "The offshore funds were reported to have invested 68.3 percent of their money in Korean securities". The Board also reports that the losses that SK securities companies and investment trust companies suffered in offshore funds are estimated at 1.5 trillion won (KRW)(\$1 = krw 1,672) as of the end of last year. "Four investment trust companies are running 19 offshore funds, which were reported to have suffered about 400 billion won." See AP-DJ News Service, February 20, 1998 "S.Korea Banks Sec Cos From Making Offshore Fund Guarantees"

6. "Boram had agreed to a trade of two revenue streams, giving Morgan the stream linked to the prevailing US interest rate in return for the revenue from a basket of derivatives linked to the value of Southeast Asian securities and the Thai baht" ... "A year ago, investment bankers eagerly pitched derivatives to SK companies. With benchmark Japanese rates at 0.5 percent, it made sense to sign contracts that would allow investors to borrow in yen and invest in higher-yielding Asian currencies, many of which were linked to the dollar until last year. "It's not an accident that a lot of derivatives got sold in Korea," said John Ellis, head of the Asia derivatives debt at Bank of America in Honk Kong, "It was as good as lending money." See "Review & Outlook": Busting Contracts, *Wall Street Journal* , February 23, 1998.

7. Although Boram was prepared to pay Morgan, SK brought suit in a Korean court to block the payment, thus hoping to exonerate it from having to pay Boram the funds which would have ended up being paid to Morgan.

8. One of the 30 recently created investment banks created, it was suspended by the Korean Government at the beginning of December and closed at the end of the year. In September it was listed as having 66 billion won in equity, 3,125 billion won in total outstanding loans, 3.66% of which were classified.

9. Again, the legal cases are peripheral to these considerations. Housing and Commercial Bank (a government owned bank ranked 24<sup>th</sup> in N. Asia with over \$1billion in equity in 1996 at 1996 exchange rates) apparently offered credit enhancement by offering to guarantee the foreign exchange payments of the offshore trusts. Morgan has brought suit against the bank (and SK securities) for failing to make payments missed by the offshore trusts). Housing and Commercial however contends that their exposure was limited to a maximum of \$50 million for each swap, and is therefore not responsible for the total losses of the trusts. O'Brien (1997, p. D2) suggests that the original maximum was \$100 million but that the contract was changed without the knowledge of the bank to unlimited exposure. Morgan contends that as officer of the bank authorised removal of the limiting clause before closure of the contract. According to O'Brien's account "SK and M had a close working arrangement. SK had established offshore funds to manage the derivatives, and those funds also purchased other securities directly from Morgan".

SK was also sued as parent of the trusts. The total value of the suit is \$300 million.

10. "there are about 40 other local funds that operated in similar agreements with J.P. Morgan, ...J.P. Morgan has a total exposure of \$3.4 billion to Korea, of which \$2 billion is to derivatives products." See Cecilia Kang, "Korea Housing/J.P. Morgan -3: Calls Inaction Inappropriate"(AP-DJ News Service, February 18, 1998).

11. The Bank of Korea reported (AP-Dow, March 5, 1998) that trading in financial derivatives by South Korean banks increased by 60.1% in 1997 to \$556.5 billion. Foreign exchange forwards comprise about two-thirds of the total. It also reported that Korea's 26 banks booked losses for 1997 of 3.92 trillion won, while the 39 branches of foreign banks reported net profits of 930.48 billion won (Industrial & Commercial Bank of China and Credit Suisse First Boston were the only foreign banks reporting losses) (Park, 1998).