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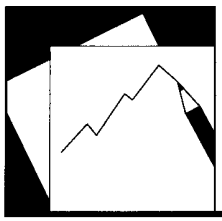

IMF Working Paper

Exotic Derivatives Losses in Emerging Markets: Questions of Suitability, Concerns for Stability

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IMF Working Paper

Monetary and Capital Markets Department

Exotic Derivatives Losses in Emerging Markets: Questions of Suitability, Concerns for Stability

Prepared by Randall Dodd

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Abstract

This paper explores a pattern of exotic derivatives transactions across emerging markets that led to substantial losses amongst non-financial firms in the tradable goods sector. The derivatives contracts were called different names in different countries, but the underlying economic structures followed a similar pattern. The risk exposures obtained through these contracts resulted in direct losses that roiled foreign exchange markets by the surge of local currency selling to cover the short positions in exotic derivatives and by the confusion and fear arising from not knowing who held these derivatives, how large the positions were and how large the losses might be. Taken together, these factors helped to transmit, along with capital outflows and sharp falls in equity prices, the financial crisis from advanced capital markets to emerging market financial systems. The paper also discusses several policy measures designed to reduce the likelihood of such problems recurring.

JEL Classification Numbers: F3 International Finance/ F30 General/
G Financial Markets/ G15 International Financial Markets
O Economic Development/ O16 Financial Markets

Keywords: derivatives, exotic, crisis transmission, KIKO, TARN, investor protection

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I. INTRODUCTION

An international pattern of exotic derivatives[1] trading appears to have helped transmit the financial crisis from the U.S. and the European Union to many different emerging market economies. The problem first came to light as unrelated instances of firms, usually in the traded goods sector, getting into trouble with derivatives that were ostensibly being used to hedge their exchange rate risks. The losses turned out to be large enough to have financial market and macroeconomic consequences. As these large financial sector problems appeared in country after country, the pattern began to take shape.

The direct cost to non-financial firms of these derivatives losses, based on the sum of national estimates, is $530 billion. Possibly 50,000 firms in at least 12 economies have suffered derivatives losses.[2] These economies include India, Sri Lanka, Malaysia, Indonesia, Japan, Korea, Hong Kong SAR, Taiwan Province of China, China, Brazil, Mexico and Poland. The figure includes 571 Korean small and medium-sized enterprises (SMEs) that lost an estimated $2 billion or more. In Indonesia, roughly 10 percent of exporters were involved and they lost at least $3 billion. Sri Lanka's publicly owned Ceylon Petroleum Company lost $0.6 billion, and China's Citic Pacific suffered $2.4 billion in losses. In Malaysia, PCCS Group Berhad had large losses and Japan's major food importer—Saizeriya—had multi-billion dollar damages. India's Axis Bank is being sued by its customers that lost over $3 billion on foreign currency derivatives.[3] Beyond Asia, exporting firms in Brazil and Mexico experienced even larger losses, with the Brazilian authorities estimating that its non-financial sector lost $28 billion. In Europe, Poland had a similar experience, with losses estimated at $5 billion.

These losses arose from very similar exotic derivatives contracts traded between sophisticated derivatives dealers and their non-financial corporate customers. In Korea these went by the name KIKOs, in other countries they were called TARNs (target redemption forwards or swaps), callable forwards, dual currency deposits, and currency coupon swaps.

Although the names for the exotic derivatives varied from country to country, the basic economic structure of the transactions remained the same. The first common feature is that they provided a long position in the local currency (or in oil or the source country currency for importers), and they settled each month or sometimes more frequently. A second common feature is that the potential gains on the transactions were capped or limited. In some cases it was accomplished through a knock-out provision like that used in barrier options, and in other cases it was done by the contract terminating once the sum of gains

[1] A derivative is a financial contract whose value is determined by the price or volatility on the underlying asset or event. For a primer see www.financialpolicy.org/dscprimers.htm .

[2] Bloomberg wire, April 25, 2009.

[3] The Banker, February 1, 2009.

reached a target amount (hence the term 'target redemption'). A third common feature is that the downside was not limited and indeed was geared so that the losses would occur at a faster rate (usually twice the rate) for a given change in the underlying exchange rate or reference price. The last key common feature is that these were zero premium or zero present value transactions so that the customer could enter into these contracts with no initial cost.

There were enough non-financial firms impaired by large losses on these transactions that it put stress back on their counterparties in the banking sector. Several local Korean banks suffered when their customers sued or became bankrupt. This left the banks with losses instead of gains because the banks had to honor their offsetting hedging obligations on the trades. This was also a problem in other countries, including Indonesian banks Mandiri, Danamon and Permata.

The damage to firms in the tradable goods sector and the reverberation through the banking sector have had macro-prudential impacts that have contributed to further weakening of the local currencies and economies.

These losses and their consequences are fueling a policy debate over whether the non-financial firms were speculating instead of hedging, whether the derivatives dealers were acting within investor protection laws in making their transactions with their clients, and whether financial supervisors can properly undertake surveillance of systemic risk in non-transparent markets.

The paper analyzes such policy issues more closely and provides guidance to policy makers in several key areas. It breaks down the exotic derivatives transactions into their various component parts in order to as to analyze their risk-return profiles. This exercise serves to clarify their appropriateness for hedging or speculation. The paper also discusses the problems arising from the use of these derivatives instruments in various economies and shows that the common economic properties of transactions in the different economies. The paper then provides a policy analysis of the suitability of these transactions as hedging instruments. Lastly the paper concludes with a set of policy recommendations designed to prevent recurrence of the problems experiences over the past years.

The rest of the paper is structured as follows: Section II describes KIKO-type exotic derivatives, outlining the main features and noting the major risks; Section III presents eight country case studies, giving details of the exposures and losses of each country; Section III provides a policy analysis, focusing on investor protection, while Section V makes a number of proposals designed to prevent such a crisis from recurring.

II. A Descriptive Analysis of KIKO-Type Exotic Derivatives

A. Basic Building Blocks

This subsection describes the basic building blocks of these exotic foreign exchange derivatives. It takes as its example the *KIKO* options, but the other similar exotic varieties can be largely understood by considering the following three concepts.

The first concept is that a synthetic futures contract can be created by combining a long and short option position. Combining a long call and a short put, that is buying a call and selling a put, is economically equivalent to buying a futures contract at the same strike price. The relationship between the payout on the derivative and the underlying referenced price is illustrated in Figure 1. The positive gains from the long futures or long call options on the Korean Won (KRW) begin accumulating once the exchange rate falls below the strike price of KRW 1200 per U.S. dollar, and the losses from the short put begin accumulating as it rises above the KRW 1200 strike price.

Figure 1. Synthetic Forward
(Long call (blue) + short put (red)

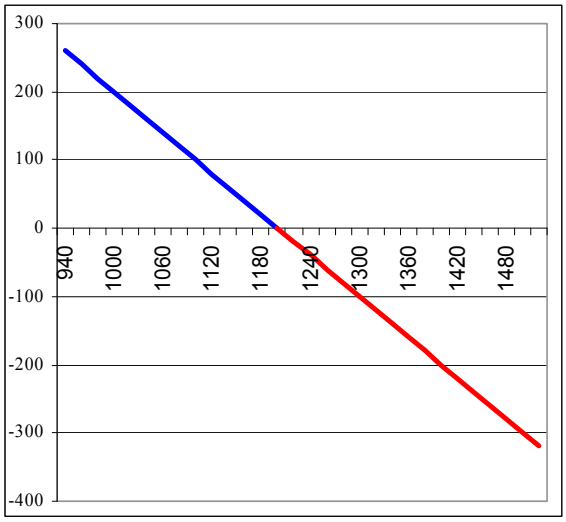
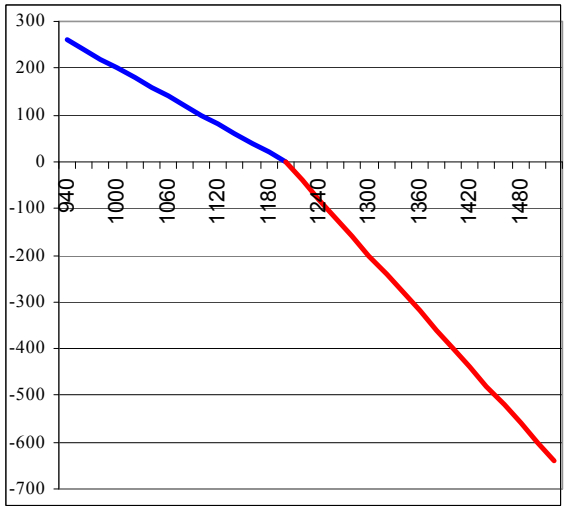


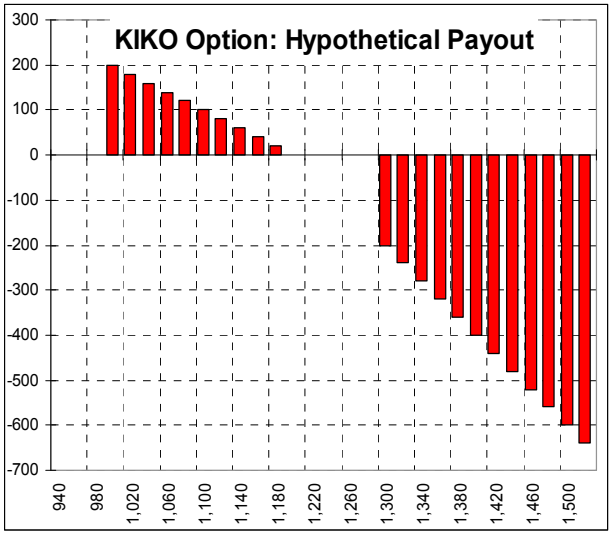
Figure 2. Gearing



Sources: author's illustrations

The second concept is that of gearing. A KIKO involves selling puts with a notional value twice that of the purchased calls (TARNs and swap-like structures similarly designate different notional values for favorable and unfavorable price movements). This results in asymmetric potential gains and losses such that the losses from a 100 point movement in the exchange rate above the strike will be twice the amount of the gains from a 100 point fall below the strike. Figure 2 illustrates how losses can develop at double the rate of the gains.

Figure 3. Barrier Points and Payout



The third concept is the role of the barrier points that cause the gains to be knocked out and determine when the losses begin to be knocked in. Gains on the hedge or speculative position cease when the price touches or passes the knock-out barrier price. In the above example, the knock-out exchange rate is KRW 990, and once that rate is reached the option is terminated and no payment is made. In the other direction, the option is only exercisable if the knock-in point is passed, and so losses do not occur until that barrier is reached or exceeded. In the example from Figure 3, the exchange rate must rise above KRW 1300 before the short put is exercisable, and once it is knocked-in the losses are calculated from the strike price of KRW 1200. The put seller is not liable for exchange rate movements between KRW 1200 and KRW 1300. This barrier lowers the risk to the put seller and thus lowers the premium received from selling the puts.

B. Detailed description

This subsection builds upon the basic points made above to describe, by way of example, how a KIKO works.[4] It will then compare the KIKO to other similar derivatives contract structures.

A KIKO is composed of two sets or strips of options. Each strip consists of European style[5] exchange rate options that expire on successive months (or sometimes other frequencies) over a one- or two-year period. One strip consists of bought call options on the local currency, e.g., the KRW, and the other strip consists of sold put options. It is important to note that a call on the KRW is the same as a put on the U.S. dollar, and that a put on the KRW is a call on the U.S. dollar. Combining a long call and a short put at the same strike

[4] The details are taken from an actual term sheet confirming a 2008 KIKO transaction between a Korean exporter and a major bank.

[5] A European option is only exercisable on a specific expiration date, whereas an American option is exercisable on any date prior to expiration.

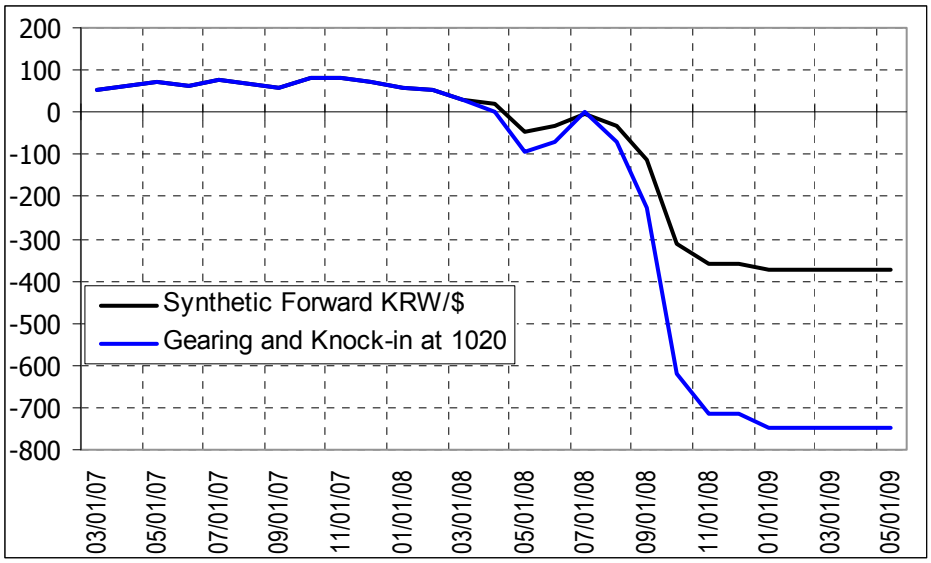
price is the economic equivalent of a futures or forward contract—as explained above—whereby the investor gains from an upward movement in the value of the underlying referenced item and loses from a downward movement. Also important is the fact that the cost of buying the call is offset by the revenue from selling the put, and if put-call parity holds then the sum of the two is zero.

The options in the KIKO are barrier options, and the call options are knocked out if the underlying currency appreciates beyond a specified exchange rate. An option that is knocked out becomes worthless and is thereby totally ineffective in hedging against further appreciations in the local currency. The puts are also barrier options that require the exchange rate to hit a specific level before the option is exercisable or "knocked-in." This means that the seller of the put is not liable for payments to the put buyer until the currency depreciates to a specific level, and then the losses are calculated based on the strike price or exchange rate. These knock-out and knock-in barriers reduce the value of both the calls and puts by potentially limiting the gains on the calls and losses on the puts.
A KIKO, like a target redemption forward or swap, is structured in an asymmetric way so that losses occur at a faster rate for a given change in the underlying asset price. This unequal payout is a result of the notional principal on the sold put options being twice as large as that on the bought call options. The result of this gearing of losses from downward currency movements is illustrated in Figure 4.

As an example, consider this actual Korean KIKO. Its total notional principal consists of 12 monthly call options, each with a notion principal of $250,000, and 12 monthly put options, each with a notional principal of $500,000. The total, or the sum of these 24 options, is $9 million.

By comparison, a TARN similarly specifies a doubling of the notional principal when the spot rate falls below the fixed forward or swap rate. In other similar exotic derivatives the contracts use a gearing or a ratchet payment formula to achieve a similar result.

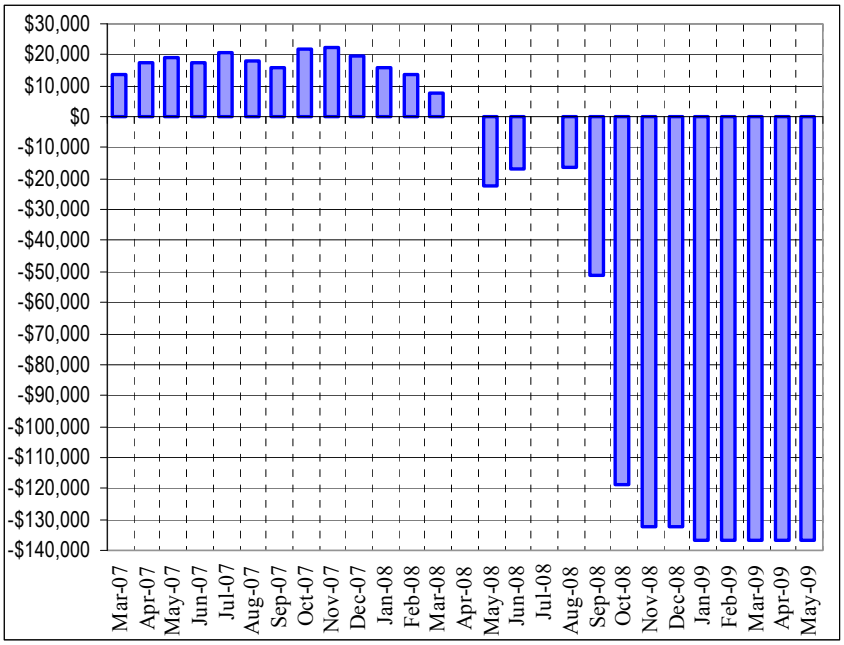
Figure 4. A KIKO or Synthetic Forward with and without Gearing



In order to be traded as a zero premium transaction, the KIKO's strike price along with the knock-in and knock-out barrier points are chosen so that the combined value of the bought and sold strips of options sums to zero. The primary objective of the zero premium structure is to make it easier to sell to the banks' customers—they pay no initial costs and financial accounting rules allow it to be reported as a hedging transaction.

Figure 5 shows the actual payout of a Korean KIKO option as calculated from the term sheet and the daily exchange rates from the Federal Reserve.

Figure 5. KIKO Option: Actual Payout



III. Country Case Studies

The following case studies of several emerging market economies have been selected on the basis of the impact that involvement in exotic derivatives has had on firms in those economies as a result of the current financial crisis. The case studies also include Japan because it illustrates the potential impact on importing firms (and because of the availability of the term sheet), and Sri Lanka because it illustrates similar exotic derivatives structures for commodity contracts.

Korea

Korea was one of the harder hit economies by the KIKO scandals where the exotic derivatives losses have caused crippling losses to many SME exporters as well as several large and high profile firms. Box 1 lists some of the higher profile cases.[6]

[6] Sources for Box 1 come from Asia Pulse, April 20, 2009, Bloomberg, Korea Times, and Hani and Chosun.

Box 1. Examples of Losses in Korea

- Win4Net lost KRW 5 billion and had to sell its headquarters building.
- C-motech had large losses on KIKOs and Snowballs and is being sued by shareholders.
- Taesan, Korea's third largest start-up, filed for bankruptcy due to losses on Pivots.
- GM Daewoo suffered about KRW 1.5 trillion ($1.11 billion) in losses.
- Baiksan, a chemical manufacturer, had losses totaling 20 percent of its capital.
- Monami lost KRW 12.4 billion.
- Hwankwang, a machinery manufacturer, had KRW 2.9 trillion in losses.

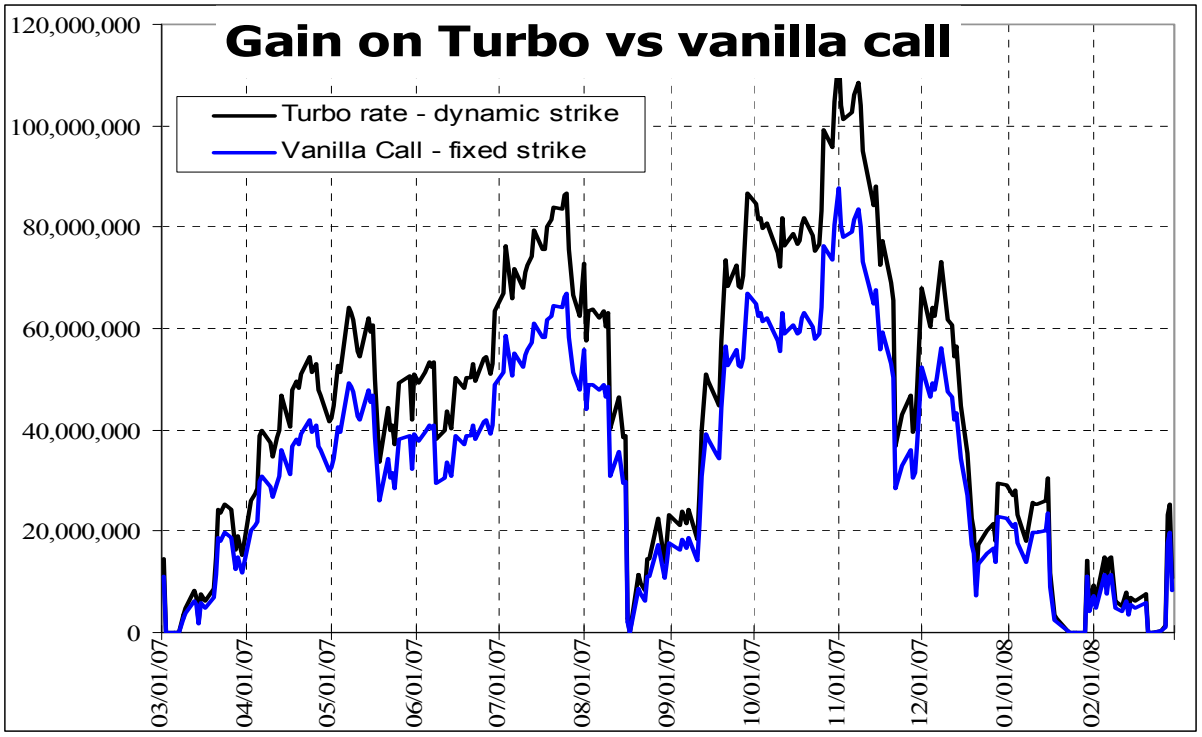
According to Korea's financial supervisory authorities, Citibank Korea, Standard Chartered, Kookmin Bank, Shinhan Bank, and Industrial Bank of Korea were among the derivatives dealers trading KIKOs and other exotics to non-financial companies.[7]

In addition to losses on KIKOs, other exotic derivatives called Snowballs and Pivots, were responsible for serious damages. The Financial Supervisory Service reported that by the end of August 2008 five exporters had lost KRW 39.7 billion through Snowball transactions with four banks. The Korean won went on to fall by another 37 percent before bottoming in late November 2008.

It has not been possible to obtain an actual term sheet for a Snowball or Pivot; however, in a term sheet for a similarly exotic derivative, it is described as a "KIKO with extendible forward window and turbo rate."

[7] Collected from numerous newspaper articles citing government sources.

Figure 7. Turbo Exchange Rate versus Vanilla Call

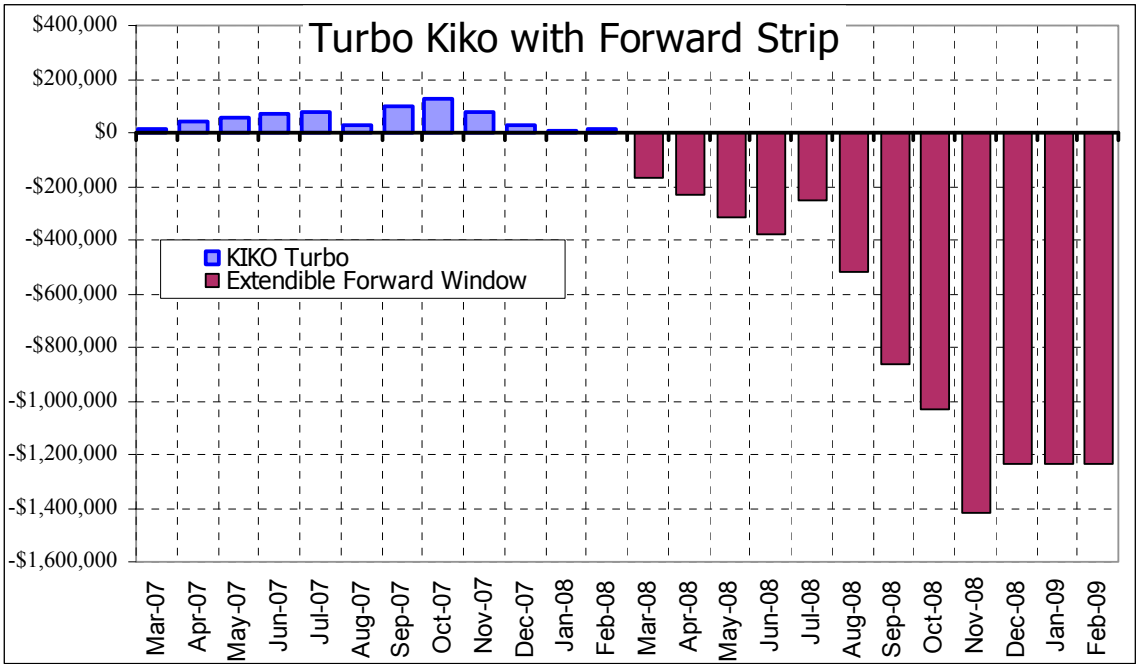


Based on an actual term sheet, this extra exotic derivative adds two features to the typical KIKOs described above. Like the typical KIKO, it consists of a year-long strip of monthly European options including bought calls on the Korean won (U.S. dollar puts) with a knock-out at KRW 890 and a strike at KRW 947 plus a strip of sold put with a knock-in at KRW 965. The notional principal on the calls is $2 million and that on the puts is $4 million.

The Turbo rate functions as a dynamic strike price. It is applied once the local currency exchange rate falls below the fixed strike exchange rate. The rate is equal to the strike plus 30 percent times the difference between the strike and the market spot rate. The option holder sells U.S. dollars and buys Korean won at the Turbo rate, which is a higher exchange rate than the fixed strike exchange rate, thus generating extra gains as the KRW appreciates (so long as it does not appreciate to the knock-out barrier). Figure 7 illustrates this extra gain using actual exchange rates and rates from an actual term sheet.

The contract's extendible window consists of an additional year of monthly foreign exchange forward contracts that is triggered if the KRW falls below a certain exchange rate. As a result, the contract converts into a strip of forward contracts in which the investor is again long KRW (short U.S. dollars) at a forward rate equal to the strike price, and the notional principal is doubled to $4 million for each monthly contract. Figure 8 illustrates the payout based on estimated exchange rates for the last three months.

Figure 8. Turbo KIKO Payout with Forward Strip



Sri Lanka

The severe losses suffered by the Sri Lanka oil company CPC (Ceylon Petroleum Company) revealed a similar pattern of exotic derivatives transactions—only this time between the publicly-owned oil company and derivatives dealers. The transactions were ostensibly designed to hedge fluctuations in the price of oil and oil distillates which CPC was purchasing on the open market and distributing in Sri Lanka.

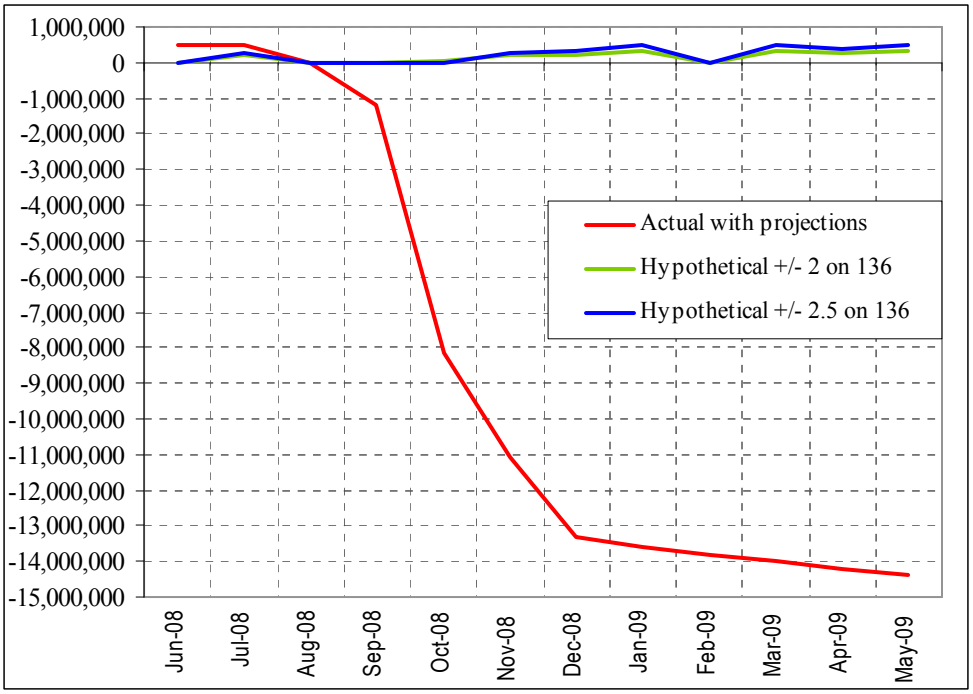
It has turned out that some of the contracts used by CPC for hedging were of the type known in other parts of the world as KIKO options. According to one of the term sheets published in Lakbima News, the name used in Sri Lanka was 'target redemption swaps.' The bank acting as derivatives dealer in the transaction was Standard Chartered.

Like a KIKO, the transactions consist of a set of long call options bought by selling a strip of put options. The result for the whole transaction was a zero premium. It offered the CPC protection from upside movements in the price of oil within a certain range. Movements above the range would be 'knocked-out' and movements below the range would 'knock-in' and the losses calculated at twice the rate of the fall in oil prices. The target redemption swap was thus very similar to the KIKOs used in Korea.

As illustrated by Figure 10, the transaction offers a potential gain if the price movements are positive and within a narrow range. Outside of that, the transaction is terminated or becomes a very substantial loss. In the case of Sri Lanka, the latter occurred. In Figure 10, the red line illustrates actual payouts. The blue and green lines illustrate hypothetical gains that would

have occurred if the oil price had remained in a positive band between the strike and knock-out barrier.

Figure 10. Sri Lanka —3 Way Target Redemption Swap



Japan: Geared-cross currency swaps[8]

Emerging markets, such as Korea, Brazil and Sri Lanka, were not the only countries to experience the problems with KIKO type transactions. Japan too suffered, and it offers notable cases such as Saizeriya and Ajinomotos.[9] Like the examples from emerging countries, the big losers were firms with significant foreign exchange exposures through their international trade, but in Japan it was the importers fearing a yen depreciation instead of emerging market exporters facing possible further appreciation. Other similarities to the examples from emerging countries are: (i) the exotic derivative contracts were designed to generate much larger potential losses than gains if the exchange rate moved in the wrong direction; and (ii) the contract had the underlying economic properties of a strip of forward contracts or synthetic forwards created with long and short options positions.

Consider the following example, taken from an actual term sheet of a transaction between a Japanese importer and a derivatives dealer. The importer has existing foreign exchange exposure as a result of importing goods denominated in Australian dollars and selling them in

[8] The author would like to thank Ken Miyajima (MCMGA) for his valuable assistance with this subsection.

[9] Bloomberg, November 18, 2008.

the local yen denominated market in Japan. The importer entered into what was billed as a cross-currency swap (CCS), but it was in fact the typical vanilla version of that type of derivative contract.

An ordinary CCS, also known as a cross rate swap or a 'cuanto' in parts of Latin America, is structured so that counterparties exchange the value of two different interest rate payments on two different currencies on each payment date in the contract. Thus, each payment has the economic property of a forward contract for that date. The payments can be set by a fixed exchange rate and an interest rate that can be fixed or floating (e.g., LIBOR in USD versus Euribor in Euros). Instead of exchanging the actual currencies, the contract can be 'cash settled' by requiring the net value to be exchanged in one currency.

However, the transaction under consideration is not a vanilla version, but instead one with asymmetric gearing so that the downside losses are potentially much greater than upside gains. The gearing is such that the notional value used to calculate payments will double when the spot exchange rate moves below a designated trigger rate. (This trigger rate thus acts like a knock-in barrier on the KIKO type contract.)

The purpose of the transaction was presumably to hedge existing risks by creating a long Australian dollar (AUD)—short yen—position. Each month it generated a payment determined by the difference between the market spot exchange rate and a fixed forward exchange rate (the equivalent of a strike exchange rate). The payment would be calculated as 78 times the notional principal of AUD 1,000,000, unless the market rate fell below 78. At those lower levels, the set rate would change according to the following formula (where f is the set forward rate and e is the market spot exchange rate and subscript t is the denoted time period).

$$f_t = f_{t-1} * (78/ e_t) = 78 * (f_{t-1}/ e_t) \text{ , given } e_t < 78$$

This ratcheting formula for determining the price used to calculate payments has a comparable property of gearing in that the downside losses are potentially much higher than upside gains. As the yen appreciates, it will generate greater differences between the market and the agreed rate so that the downside losses from the short yen position will accumulate faster than the percentage change in the exchange rate. Also, if the yen were to appreciate and then remain at the appreciated level, the agreed rate would remain at its higher rate. Figure 11 shows the path of the yen-AUD exchange rate over the relevant period.

Figure 11. Path of the Yen—Australian Dollar (AUD) Exchange Rate

Figure 12 shows the actual and projected cross exchange rate for the Japanese yen and Australian dollar, and the geared-ratcheted rate used to determine the payout for the geared CCS. The projected values assume an exchange rate of 60.

Figure 12. Yen—AUD Exchange Rate, Projected and 'Agreed' Forward Rate

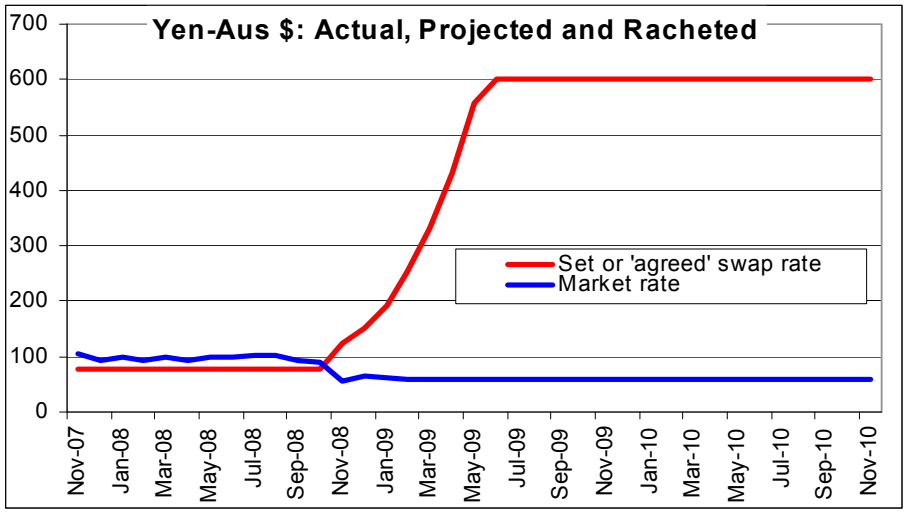
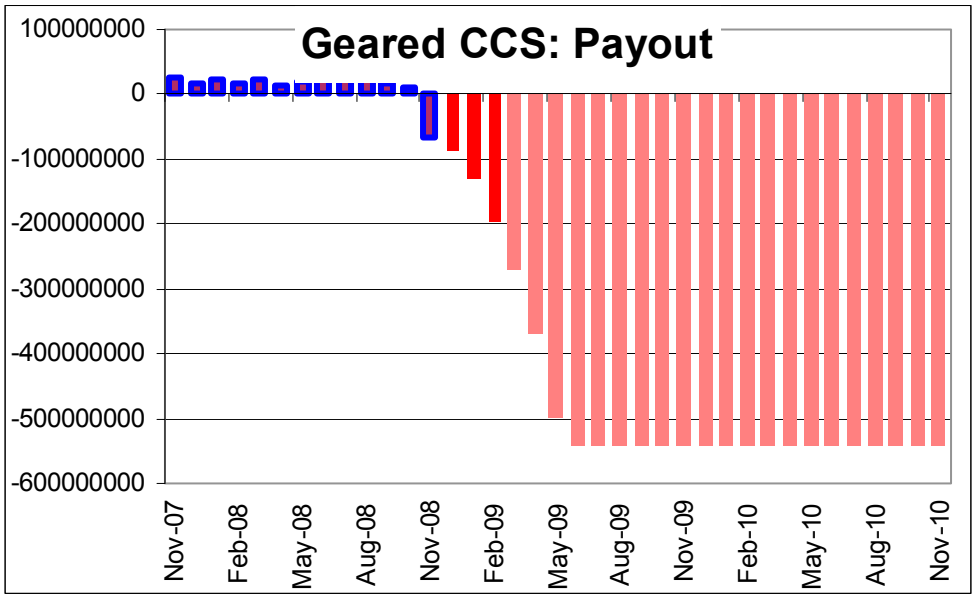


Figure 13 shows the expected payout (what would have been the actual payout from the trade date prior to contract start date), the actual payout thus far and the projected payout assuming an exchange rate equal to 60.

Figure 13. Payout for Geared CCS: Expected, Actual, and Projected



The Japanese importer stated in its public disclosure, dated November 21, 2008, that it had lost JY 14 billion based on the assumption of an exchange rate of 65—it fell further to 57 as of the end of January 2009.

The geared CCS is economically very similar to KIKO option contracts and TARNs that appeared in other countries. Whereas the KIKO used a combination of long calls and short puts to create a strip of synthetic forward contracts, the CCS is a more straightforward design because a CCS can be decomposed into a strip of forward contracts. Like KIKOs and TARNs, the CCS consisted of monthly payments. One difference is that the KIKO had knock-out barriers that limited the upside gains and knock-in barriers that reduced or initially postponed potential losses. More important was the similar feature of an asymmetric pay-out structure that would generate much larger potential losses than potential gains.

Indonesia: TARNs and callable forwards

In Indonesia, the exotic derivatives instruments go by the names of target redemption swaps, callable forwards and dual currency deposits. Examples of the actual term sheets of these exotic derivatives used in Indonesia were obtained from public records after J.P. Morgan sued the Indonesian exporter, Kalbe Farma in a U.K. court for non-payment of the TARN contract.

An estimated 10 percent of all Indonesian exporting firms suffered losses from TARNs and similar exotic foreign currency derivatives. The magnitude of the direct losses to these firms is estimated to be $4 billion .[10] Examples of the firms that suffered large losses include the

[10] Reuters Thompson April 20, 2009.

state-owned mining company PT Aneka Tambang, a subsidiary of the state-owned oil and gas firm Pertamina, which lost Rp200 billion. PT Elnusa also reported losses of Rp200 billion. Indonesia's largest pharmaceutical company, Kalbe Farma, also reported major losses.

Box 2. Examples of Losses in Indonesia

- Sawit (palm oil firm) is suing Citigroup to cancel its derivatives contracts and seek repayment of $11.5 million. They claim that Citigroup contacted an unauthorized employee to negotiate and approve the callable forward contracts.
- Kalbe Farme (pharmaceutical) is similarly suing J.P. Morgan.
- Central bank claims that only $4 billion of $70 billion outstanding foreign exchange derivatives were used to speculate instead of hedge.
- PT Aneka Tambang and PT Timah (state-owned mining firms) and PT Elnuse also had substantial losses. These firms have reached their own settlements with the respective banks.

The banks that acted as derivatives dealers in trading these products with their customers include Citibank, JPMorgan Chase and local Bank Danamon.[11]

The central bank responded by first banning the trading of foreign exchange derivatives for purposes other than strictly hedging, and then issuing new regulations governing banks that issue or engage in transactions in complex instruments like exotic derivatives.

China

China's Citic Pacific corporation, the government's largest investment company and a major steelmaker and real estate developer, attempted to hedge part of its foreign exchange risk through exotic derivatives—known as target redemption forwards. That gave Citic a long position of AUD 9.44 billion, an amount much larger than its annual income or its market capitalization. It was such a large position relative to the size of the firm that investors were known to have taken an effective short position on the Australian dollar by shorting shares in Citic. The Australian dollar depreciated sharply in the last half of 2008, and in early 2009 Citic announced it was expecting to lose $2.4 billion on foreign exchange derivatives.

Citigroup, HSBC, and BNP Paribas were among the banks reported to have engaged in these transactions. Hong Kong's Securities and Futures Commission stated that it has begun an investigation into Citic and its transactions.

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[11] Reuters Thompson April 20, 2009 and similar sources. Danamon is partially owned by Deutsche Bank.

Brazil

The largest losses in any nation are likely to be in Brazil where regulators estimate that as many as 500 non-financial corporations suffered substantial losses from derivatives trades as a result of currency depreciation. Total losses to these firms are estimated at $28 billion—far exceeding the losses in Korea, Poland and Indonesia.[12]

A single export firm, Aracruz lost $2.3 billion and had to negotiate a special settlement with the banks that acted as the derivatives counterparties to exchange $2.1 billion in bonds as settlement for the losses. Sadia, a meatpacking firm, reported losses of $417 million through the third quarter of 2008.

Box 3. Examples of Losses in Brazil

- Sadia—Brazil's second largest food processor—lost $417 million in closing out its derivatives positions.
- Aracruz Papel e Celulose SA—paper and pulp—$2.3 billion.
- Grupo Votorantim—a diversified industrial group—closed out its derivatives positions with a $2.2 billion loss.
-
- Vicunha Textile reported a $30 million loss.
- Arantes, a beef exporter, filed for bankruptcy following massive derivatives losses.
- 200 Brazilian companies lost money in currency derivatives—though the government denies having constructed such a list.
- Banco Itau Holding Financeira SA Executive Director Sergio Werlang estimated $24 billion in derivative losses.

Banks that sold the derivatives include Citigroup, Merrill Lynch, Barclays, UBS, Deutsche Bank, and Itau. U.S. pension funds, which had invested in the Brazilian firms through ADRs, have filed suit against the companies for falsely reporting their hedging and risk taking activities.

[12] Bloomberg, December 11, 2008.

Mexico

The most common exotic derivatives instrument to emerge as part of Mexico's version of the problem was the target redemption forward.[13] Like the KIKOs and TARN described in other economies, Mexico's target redemption forwards contain provisions that "knock out" gains once a specified total amount of profit has accumulated, and provisions that involve twice the notional principal for calculating payments on downside price movements as upside movements. In addition to the target redemption forwards, the selling of U.S. dollar calls (i.e., Mexican peso puts) have also been reported as a source of similar derivatives trading losses.[14] It has not been possible to obtain copies of the derivatives' term sheets, but based on descriptions in the transactions they follow a close fit to the pattern.

"Mexico's central bank used more than 10 percent of its foreign reserves to support the peso and politicians are now looking for someone to blame for the currency's steepest drop since a mid-1990s financial shock that became known as the Tequila Crisis."

Mexico's national financial supervisory authority, the Comision Nacional Bancaria y de Valores (CNBV), has raised the disclosure requirements **for corporations** in regard to their derivatives activities.

Box 4. Examples of Losses in Mexico

- Controladora Comercial Mexicana SAB—major supermarket—filed for bankruptcy on October 9, 2008 after losses estimated at $2.2 billion.
- Banorte—Mexico's fifth largest bank—announced it would set aside 1.1 billion pesos ($74.5 million at the time) to provision against crisis losses to Controladora Comercial Mexicana.
- Grupo Industrial Saltillo SAB—auto parts and building materials—lost $60 million.
- Gruma—tortilla and cornflour—lost $684 million as of October 2008 (the firm owns 9 percent of Banorte). Maturities of exposures extend to 2010 and 2011.
- Cemex—the world's 3rd largest cement maker—lost $711 million on currency and equity derivatives.
- Vitro—glass manufacturer—reported losses of $342 million (and was negotiating with counterparties over a potential $235 million in further losses).
- Alfa—automobile parts manufacturer—suffered $494 million in derivatives losses on exchange rates as well as energy and interest rate products.

[13] Risk Magazine, November 2008 and January 2009.

[14] Risk Magazine, November 2008.

Poland

Box 5. Examples of Losses in Poland

- Ropczyce—a chemical producer—negotiated a settlement with its counterparty, Millennium Bank, and has converted its obligation into a five-year amortizing loan.
- Apator—switchgear and metering equipment.
- Zelmer—household goods.
- Elwo—gas cleaning equipment and filters—bankrupt.
- Odlewnie Polskie—foundry maker—bankrupt.
- Krosno—glassworks—bankrupt.

Exotic options are estimated to have resulted in over $5.5 billion in losses to Poland's non-financial corporations. This involves 100 publicly-traded corporations plus an unknown number of privately held companies. The Chair of Poland's Business Roundtable called them "Satanic contracts" and "a product from hell."

Based on reports from the media, these transactions had the characteristic KIKO or TARN structure. They consisted of strips of call and put options, and the sold options were of at least twice the notional value as the bought options. The transactions were marketed as zero premium (i.e. no initial cost) transactions. Official statements describe the transactions as options, forwards or cross-currency swaps; however, as examples from other countries have shown, these more familiar types of derivatives are often modified by asymmetric notional principals, barriers and other features that result in their risk profile being materially different from that of their vanilla derivative namesakes.

Regulatory authorities stated that 80 percent of non-financial firms using foreign exchange derivatives were hedging, and that only 10 percent to 15 percent were expecting losses that exceeded income and that only 5 percent to 10 percent were strictly speculative in their use.

The losses to would-be hedgers may not result in gains to their banking counterparties that acted as dealers in these instruments because the government is exploring statutory changes that will enable the many corporate firms with derivatives losses to file class action law suits against their banks. Poland's financial regulatory authorities estimated that only 15 percent to 20 percent of the losses would actually be paid. Banks are reported to have put aside 1.34 billion zlotys ($372 million) against such expected losses.

Possibly mitigating the losses to the exporting firms are the higher potential export related earnings resulting from the more competitive zloty.

In November 2008, the Warsaw Business Journal ran a story about the strong growth in Poland's derivatives markets. It concluded with the observation that in Poland's financial business culture "there doesn't seem to be a tendency where a trader makes fast money and runs."

In the wake of the discovery of the large losses, the economic minister threatened to introduce new laws that would allow the firms to abrogate the contracts. According to Poland's Ministry of the Economy, which set up a hotline for the troubled companies, "businesspeople often complain that the banks were pushy and aggressive in selling them the instruments." The proposal was not supported by other parts of the government. But some firms are likely to sue their banks for the bad advice and investors may sue the firms for not reporting the risks.

Banks reported to be the major participants in these exotic derivatives contracts include Citigroup's Bank Handlowy, Banco Comercial Portuguese's Millennium Bank, Kredyt Bank which is owned by KBC Groep. According to Futures and Options World, "Apart from ING Bank Slaski and BRE Bank, majority owned by Commerzbank, all the Polish banks are understood to have acted as brokers between their clients and another bank outside Poland. JP Morgan and Merrill Lynch are often mentioned.".

These large losses on exotic foreign exchange derivatives fueled the fall of the zloty, which in turn exacerbated the losses from Poland's overall foreign exchange exposures. Not only is their corporate sector exposed through foreign currency denominated debt (24 percent of the total at end-2008 according to the central bank), but an estimated 70 percent their households have financed homes through foreign currency denominated mortgages (60 percent in Swiss francs but also Japanese yen).

IV. Policy Discussion

The enormous losses generated through these exotic derivatives contracts often led to crises in which the policy discussion became contentious as competing interests blamed each other for creating the problem. It was hard to resolve many of the conflicting arguments that arose from questions such as: Were the non-financial firms intending to hedge or speculate? Were they sufficiently informed or knowledgeable about the risk and return profile of these exotic derivatives? Were derivatives dealers merely meeting their customers demands for these products or were they using pressure or deceptive sales efforts to take advantage of their customers?

This acrimonious debate has often created more heat than light. One reason is that the mindset or '*scienter*' of the key actors is nearly impossible to establish, and so facts cannot directly solve the debate. However, the debate can be moved past this point by offering a financial analysis that shows how these exotic derivatives contracts were inappropriate for the purpose of either hedging or speculating. The policy debate then becomes how best to avoid the trading of these types of financial instruments and the buildup of these dangerous risk exposures in the future.

Public interest concerns with these exotic financial products arise not only from the question of their suitability for investors, but also because their overall impact on the respective emerging market economies was even greater than the direct impact on the firms involved. Once the local currency began to depreciate sufficiently to generate big losses for KIKO or TARN investors, the reports of those losses roiled the local currency markets and amplified selling pressures. The lack of transparency in the market for these exotic derivatives meant that currency markets could not know either the amounts of the outstanding transactions, who held them or the sizes of the potential losses. In the absence of information, uncertainties led to fear and then panic. This created a negative feedback loop as fears further depressed currency values and in turn caused greater losses on exotic foreign exchange derivatives. Thus public interest concerns with the financial imperfections of the transactions became macroeconomic problems with stability.

A. SUITABILITY AND INVESTOR PROTECTION

In discussing the unsuitability of exotic derivatives for either hedging or speculation, three key points need to be made. First, exotic derivatives are not appropriate hedging instruments because they do not closely match the existing risk exposures of the non-financial firms. While in most cases the firms do need to hedge against an appreciation in the local currency, the KIKO and TARN instruments do not function as a hedge if the currency appreciates sufficiently to knock-out or trigger a redemption of the contracts. Moreover, the firms' exposure to a currency depreciation, which is normally beneficial to the exporting firm by making its products more competitive, is not matched by the doubling of the rate of derivatives losses from a currency depreciation.

Second, the instruments are not appropriate because the firms are not capable of absorbing the potential losses that can occur from a 'geared' or double-size notional principal used to calculate losses on the downside. One of the fundamental principles of suitability is that the investor should be capable of absorbing potential losses from a financial instrument.

Third, if the firm in the tradable goods sector intended to speculate, these were clearly not the best instruments to use for speculation. Either a currency futures or standard forward or swap would offer the same or better potential gains on the upside—it would be better in that it would not be knocked out—while not exposing the speculator to double the downside risks. So if there were several alternative derivatives that would have offered the firm better returns at lower risks, then exotic derivatives were not the best or were not the most appropriate vehicles for speculation.

So if the KIKOs and TARNs were not suitable for hedging and not the best alternative for speculating, then why were they traded in such large quantities? One hypothesis is that the investors were either not sophisticated or they were not informed or knowledgeable about the risks. This hypothesis, as mentioned above, is hard to test—the officers of the non-financial firms are not required to pass financial competency exams and there is no other way of knowing.

Another hypothesis is that the firms were sometimes pressured into the contracts by banks as a condition for rolling-over their loans. This point was mentioned in interviews by several regulatory authorities.

Yet another hypothesis is that the KIKOs and TARNs were not priced with at-the-money strike or forward exchange rates, so that investors were knowingly attracted to the higher risks by the allure of getting better exchange rates than the normal market price for standard forwards and options. This implies that investors at least had some knowledge and lost money as a result of losing the gamble they decided to take. There is evidence that these exotics were deliberately priced to sell to investors in this manner. However, it does not follow that in order to buy 'in-the-money calls' the investors' best choice was to finance the purchase by selling twice the amount of puts. It is not economically efficient for smaller non-financial firms to sell extreme risk insurance to larger, more sophisticated financial firms.

Another related dimension of the issue of suitability and investor protection pertains to the design of the instruments. These exotics were made with good 'optics', i.e. to look good to investors.[15] First, the contracts were zero premium transactions so that sales representatives of the banks could offer their customers a zero premium trade, meaning that the transaction required no money up front. And if they looked to offer the investor in-the-money call options, then it was that much more attractive.

Second, they were designed to, at least initially, meet the hedge accounting test so as to qualify for hedge accounting treatment under International Financial Reporting Standards (IFRS). In order for a derivative and the underlying asset or payment to be treated as a hedge for financial reporting purposes under IFRS 39, the change in the value of the derivatives due to a change in the value of the underlying reference price must fall within a range of 85 percent to 105 percent of the change in the value of the hedged item with respect to changes in the reference price.[16]

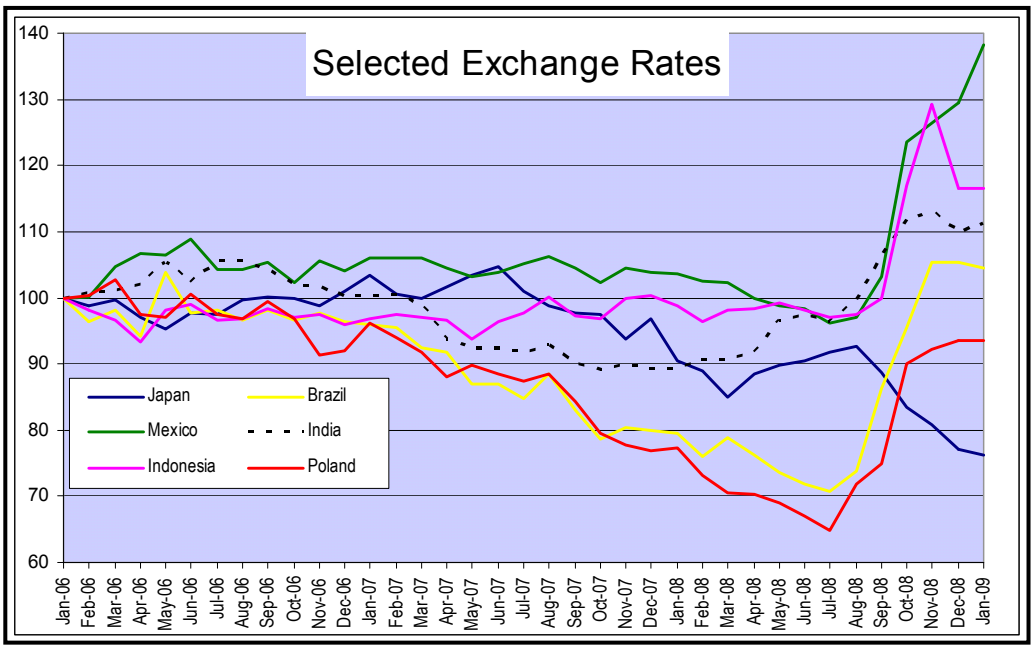
[15] The term 'optics' was coined by Frank Partnoy in his books FIASCO and Infectious Greed.

[16] The author would like to thank Ken Sullivan (MCMCB) for clarifying this issue.

Third, these contracts were more complex than traditional derivatives, and this made it more difficult for less sophisticated non-financial firms to determine their fair market price and to fully assess their risks. A one-year KIKO had 24 different options, and while there may have been market prices for near-the-money options in nearby months, there was unlikely to have been liquid prices for more distant months, much less the barrier provisions. Other features such as target redemptions and ratcheting mechanisms would have been even more difficult to price using available market information.

These three features served as a complement to the economic context in which they were traded. Prior to the sharp depreciation in the second half of 2008, many emerging market countries had experienced years of steady, appreciating local currency values. Figure 14 below illustrates this trend for several key currencies.

Figure 14. Selected Exchange Rates



The appreciation derived in part from persistent interest rate differentials that invited domestic and foreign investors to profit from the positive carry relative to the U.S. dollar or yen. In addition, the steadiness of the appreciating trend was partially the result of central bank policy in many emerging countries to avoid excess appreciation that might dampen economic activity in the tradable goods sector. That had resulted in the central banks amassing large foreign exchange reserves that further served to reassure investors that the emerging markets' currencies would stay strong. The financial crisis that had begun in mature market economies was not initially threatening, as many global investors viewed emerging markets as a safe haven from the problems in the U.S. and the EU.

In this context, with scant apparent threat of a trend reversal, local non-financial firms in the tradable goods sector whose earnings were increasingly being pressured by the appreciation of their currencies, might well have viewed the exotic derivatives as a low-cost vehicle to turn the currency appreciation into increased earnings. Taken together, the design of these contracts and the circumstances that prevailed when they were traded created great opportunities: easy sales by the derivatives dealers and easy potential gains by the non-financial counterparty. Like the lobbyist said in the film *Thank You For Smoking*, "We sell cigarettes. And they're cool and available and 'addictive'. The job is almost done for us!"

V. Policy Proposals

A. Clearer, stronger investor protection regulations

Investor protection rules are designed to protect less sophisticated investors from sharp-trading and misleading sales efforts by more sophisticated financial firms. They are sometimes based on suitability standards, requiring that consideration be given to the question: Is the derivatives transaction suitable or appropriate for the investor as an efficient device for hedging, gaining diversification or obtaining a certain risk-adjusted rate of return? The investor's sophistication, ability to absorb losses and intended investment goals are usually part of the guidelines for determining suitability.

The complexity of pricing exotic derivatives transactions may be deemed unsuitable for unsophisticated investors that do not possess the capacity to independently evaluate the risks and price the transactions. The lack of transparency further aggravates this situation. Derivatives transactions may be deemed unsuitable if they have the potential to quickly bankrupt a firm in the event of sharp market price fluctuations—thus exceeding the ability of the firm to absorb foreseeable losses. Lastly, a derivatives transaction used with the intent to hedge may be deemed unsuitable if its hedge effectiveness is too low; for example, it fails to protect against large adverse price movements in the underlying risk and generates excessive losses in the event of favorable price movements.

In order to discourage and help prevent this type of scandal, suitability or 'know your customer' provisions—whether statutory or as regulations—need to be clearly defined, and any violation should be subject to harsh fines and criminal penalties. Thus, supervisory authorities need to be empowered with enforcement capabilities, and private victims need to have the ability to sue in civil court to recover their damages.

B. Contract approval or review

Complexity of contract design can contribute to derivatives misuse and market instability. One tested method to govern potential misuse is through a formal contract approval process. There are two basic ways to regulate contract design. One is to create a 'positive' list and then prohibit transactions in derivatives other than those specified on the list. Any new design must first be approved before it can be traded. The alternative method is to create a 'negative' list and prohibit transactions in derivatives that are on the list—all other contracts are deemed acceptable. Both can be modified or made conditional on the size or sophistication of counterparties. Both can be enforced by making the legality of the contracts conditional on their being on or off the list. The negative is less restrictive and less apt to unnecessarily impede innovation; however, it risks overlooking the introduction of new troublesome products. The positive list provides greater assurance that no new problematic contracts are traded in the market.

There are ample examples of both policies. The U.S. went from a positive list to a negative list for exchange traded derivatives back in 2000 (there are no such regulations for OTC traded products), and Korea moved from a positive list to a negative one in early 2009. On the other hand, Chile, Brazil and Colombia have positive lists, although Brazil's list pertains to the underlying item and not the structure of the contract, while Chile's designates both the underlying product (e.g., interest rates or exchange rates) and the type of contract structure (forwards or options). The best policy for a particular situation will depend upon the importance of innovation and the confidence in the financial supervisors that they will be able to detect problematic contracts before they become prevalent (it is difficult and disruptive to disavow or unwind trades as a result of a new contract being subsequently prohibited).

C. Enhanced financial system surveillance

In order to facilitate an adequate degree of market surveillance, the OTC derivatives markets need more complete reporting requirements. More thorough information is needed in order to help enforce existing laws so as to better police markets against fraud and manipulation. Early detection allows more less costly and more effective solutions.

Consider Brazil, which has one of the highest standards in the world for reporting derivatives transactions, and was also one of the largest losers from this activity. The situation is summed up by former deputy central bank governor Paulo Cunha,

> "Although the trades were reported to the Brazilian clearing house CETIP, few details were given because each one was so specific, and they were recorded as just a footnote in the company accounts."[17]

Greater information is also needed in order to detect the formation of potentially destabilizing positions in the market. Concerns about the role of financial investors in

[17] Quoted in The Banker, February 1, 2009.

commodity markets in 2007 and 2008 could have been better addressed had regulatory authorities been equipped with sufficient market information that could have demonstrated whether or not certain financial investors or derivatives markets in general were causing distortions in commodity prices.

Surveillance authorities also need to use **'soft data'**—data gathered through regular meetings and interviews with market participants. This helps to overcome the fact that certain questionable activities are deliberately designed to avoid detection.

D. More Comprehensive view of the economy

Financial stability surveillance requires a more comprehensive view of the economy. While it is apparent from previous crises, the current one has emphasized that not all systemic risk resides in banks or other regulated financial firms, e.g., LTCM, Enron, the Russian government's default, and the U.S. housing sector. While regulated financial firms are subject to prudential regulations, others are not, e.g., PE, HF, GE capital. The buildup of large exposures elsewhere in the economy should be of equal importance to large exposures in banks and financial institutions. Those broader exposures might be in exchange rates, interest rates, commodity prices or elsewhere.

This is not a reversion to a traditional macroeconomic analysis of 'fundamentals' but rather a macro-prudential approach that integrates an analysis of financial sector stability with macroeconomic outcomes.

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