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## FEATURE ARTICLE

# On the inception of sound derivative products in emerging markets

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## Real-world observations and viable solutions

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### Abstract

**Purpose** – Since, the early 1990s, emerging markets have started to play an important role in the trading of derivatives products. Despite the fact that these markets are characterized in general as illiquid, segmented, politically unstable, with lack of regulations and historical financial databases, they do have some advantages for markets' participants. This paper aims to discuss some of the main obstacles to the inception of successful derivative products in emerging economies and to provide a number of viable solutions.

**Design/methodology/approach** – The objective of this paper is to share with financial markets' participants, regulators and policymakers some of the author's real-world experiences and observations as a derivatives trader and later as a trading risk manager in emerging economies. The endeavor here is to provide several robust guidelines that can assist emerging markets in the establishment of sound derivative markets within a prudential framework of rules and policies.

**Findings** – To this end, key risk management rules and procedures that should be considered before dealing with derivative products are examined and adapted to the specific needs of emerging markets. The suggested viable solutions can be implemented in almost all emerging economies, if they are adapted to correspond to each market's initial level of sophistication.

**Practical implications** – The real-world guidelines and observations that are discussed in this work will be of value to financial entities, regulators and policymakers operating within the context of emerging markets.

**Originality/value** – This paper fills a gap in the risk management literature, especially from the emerging markets perspective, by providing a practitioner's views on how to set-up sound and effective derivative products markets in emerging economies. The paper will be of value to those interested in founding a successful and sound trading environment of derivative products in emerging markets.

**Keywords** Derivative markets, Emerging markets, Financial engineering, Financial institutions, Financial risk, Government policy

**Paper type** Viewpoint

### 1. Introduction and overview

The global deregulation of financial markets has created new investment opportunities, which in turn require the development of new instruments to cope

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with increased risks. The instruments that allow markets' participants to manage risk or to shift risk from one participant to another are known as derivative products since they represent contracts whose payoffs at maturity is determined by the price of the underlying asset. Since, the early 1970s, derivative products have been increasingly used for hedging and investment purposes. The market for the first generation of derivatives, now called plain vanilla products, became mature in the late 1980s in developed economies.

Derivative products have value only in an environment of uncertainty (volatility or risk), and this is precisely why they serve so well to hedge the risk of unexpected price fluctuations, such as government and corporate bonds, commodities, currencies, stocks and stock indices – in short, any asset whose price can show volatility. Besides, derivatives cannot reduce the risks inherited with the ownership of volatile assets; rather these instruments can transfer risk from a risk-averse (hedger) party to someone who is willing to bear the risk (speculator or risk-taker).

Recently, the transactional view of derivative solutions by corporations, which are trying to repair one risk problem at a time, has given way to a new view, one that envisions regular strategic uses of derivatives in order to hedge ongoing risk exposures. In addition, corporate officers have become increasingly aware of how hedging (and sometimes, the unwinding of a hedge) can contribute to the stability of the corporation's earnings and cash flows. In general, corporations and individual investors are using derivatives for the following reasons:

- By using derivatives, particular financial risks can be detached from the funding or investment function of financial instruments. For example, a company that has used floating rate debt to fund its business in a period of declining interest rates may grow anxious that the bottom of the interest rate cycle has been reached. It can avoid any risk of rising debt servicing cost, without renegotiating its credit instruments, by simply entering into an interest rate swap in which it pays a fixed interest rate and receives a floating rate. This swap can also be viewed as two transactions – short (selling) fixed rate bond and long (buying) floating rate bond.
- Derivatives reallocate risk, and this in fact, does not reduce the amount of the overall risk – derivative transactions are a zero sum game – but rather redistributes it more efficiently, making risk less costly to society as a whole. Derivative products help to split and share risks in the same way that risk is shared in a joint-stock enterprise or pooled by insurance premiums. Sharing risks allows an economy to realize projects that are too risky for an individual investor or entity.
- Derivatives often offer a cheaper way to implement investment strategies than do cash markets. This is especially true for equity index and interest rate futures contracts. If a speculator is bullish on a stock market and would like to participate in the upside trend, he can buy a future contract on an equity market index instead of a large number of individual stocks. This allows the investor to invest much less capital and incur much lower trading costs and eventually gain benefits – if his bullish expectations come true!
- Derivatives can also reduce borrower's costs. Those with relatively low borrowing costs in one market can swap their payment streams with those

having relatively low costs in another market. Each can borrow at a lower overall cost by trading their comparative advantage. This concept has led to the creation of currency swaps.

- Derivatives can be used to hedge foreign exchange (FX) transactional exposure (due to import/export confirmed trades) or to hedge a particular debt issue. Also it can be used for strategic hedging (also known as operating or economic exposure), where the entity is attempting to protect expected cash flows or the value of the firm from movements in financial and commodities prices.

Nonetheless, many disastrous financial crises have hit several financial and non-financial corporations; even so, the developments and innovations in derivative products are on continuous growth. Emerging countries and markets, since the early nineties, have started to play an important role in standardized and over-the-counter (OTC) derivatives markets. Yet while emerging-market countries share some similarities in development patterns, it is often their individual differences that create unique opportunities and risks which may be addressed through derivative structures.

While these markets, in general, are characterized as illiquid, segmented, politically unstable, with the lack of regulations and historical financial data, they do have some advantages for markets' participants. One of these advantages, to both speculators and hedgers, is the enormous volatility that is a dominant factor in these markets. Volatility is the most important factor for the valuation of options contracts on any financial and non-financial assets.

Consequently, while these emerging markets are characterized with weak regulations and financial infrastructure, the volatility component gives an important ingredient for the creation and trading of derivative products. However, the management of the inherited risks must be dealt with by exercising both art and science techniques. Accordingly, the task and duties of risk managers, treasurers and CFOs in an emerging-market environment will, of course, be multiplied several-fold.

The recent year's surge in the use of derivatives along with large and widely-reported losses by well-known corporations and financial institutions have given rise to many concerns, debates and confusions on the proper use of derivative products, and have triggered alarms over the dangers posed by the widespread use of derivative products. This seems like a paradox – instruments that should reduce financial risks are accused themselves of introducing new risks. But are these losses caused by derivatives, or just by the improper use of derivatives?

The misunderstandings of their usefulness, expected payoffs and "handling-without-care" of several derivative instruments had led to many crises within the financial industry and other well-known enterprises. Examples of disastrous collapses are numerous and they include famous cases, such as Barings Brothers, Procter & Gamble, Metallgesellschaft AG, Daiwa Securities, Long-Term Capital Management and Enron (one of the biggest wholesale marketers of natural gas corporation in North America) – to name only a few. All these derivative-related losses have occurred since 1994.

The negligence of the "nonlinear-payoffs" of some of these instruments (such as in the case of options contracts), the misuse of sophisticated valuation models and software, the lack of regulations, in addition to the board of directors' ignorance of the

relevant categories of risks, these instrument can carry, had lead to immense loses and red-number balance sheets. Moreover, corporate executives – for most of the important name companies that were mentioned earlier – have ignored basic rules of finance and statistics.

By converting their company treasury department into a profit center (without the establishment of basic rules of risk management to measure and to set limits for their exposures), they have added volatility to their exposure instead of limiting it. Also they have treated low probability events (such as devaluation of a hard currency, or the default of an AAA corporation) as being impossible. Financial investment theory is clear: one cannot expect to make huge profits without taking the risk of big losses.

To have a choice between a certain loss and a speculation with derivative instruments, one should set his organization objectives and decisions utilizing modern financial risk measurement tools to estimate worst case scenarios. Thereafter, the level of the measured risk should be compared with his entity risk appetite, with the objectives to ascertain if the risk falls within its risk limits, and also to reveal if there is enough economic capital cushion to withstand unforeseen surprises.

Derivatives can effectively control financial risks, but their uncontrolled use can be disastrously risky. The leverage in derivatives that makes them price-effective, when hedging existing exposure or merely for speculation purposes, can also makes them the cheapest way to take on new positions. While they can be tailored to remove most risks, their complexity and potential for large profits lead some to overlook the remaining risks and encourage others to misuse them. Owing to the publicly reported losses and misuses, this revolution in derivatives has not run its course. To date, various categories of investors are still precluded from dealing in derivatives or are strictly limited by regulators. Many fund managers hesitate to use these new products for investment and many finance directors are not fully aware of the ways in which derivatives may be used to restructure their balance sheets and also of the risk/return profiles of these instruments.

After all, what is most needed is a better understanding of derivatives and the risks they do not remove. This can be accomplished by striking a number of institutional changes that will help reduce the uncertainties in derivatives. In the rapidly changing and increasingly integrated financial markets, better management and closer supervision of the derivative positions being taken will better ward against the risks they pose than formal regulations that focus on particular instruments, markets or participants. Naturally this has to be accompanied with clearer legal environment, risk management and accounting standards governing their use, in addition to greater disclosure of derivative transactions. Accordingly, this will make users, dealers, and regulators better off and can improve their assessments of all kinds of risks they may encounter.

The growth in derivative markets gave birth to the new career of financial engineering. Financial engineers are the specialists who deal with the quantitative aspects of the derivatives and risk management businesses. These individuals usually have backgrounds in quantitative disciplines such as engineering, physics, mathematics and financial-economics. Specifically, the employment opportunities in this domain are frequently attractive to physicists and the nicknames “rocket scientists” or “quants” (short for quantitative analyst) is now broadly used to describe

individuals who work as quantitative analysts in the derivatives or risk management fields.

These day's financial engineers are armed with sophisticated financial/computational tools to price complex financial instruments and to create new hybrid instruments by combining the features of existing securities and sometimes just creating entirely new ones. As long as you can convince investors of the attractions of your new instruments and assure them that they comply with all legal, expenses and marketing aspects – who knows? Think about combinations of cash flows and try to “estimate” a price – “present value” – of these cash flows and your newly created instrument might generate considerable interest among investors. Variety is intrinsically good. People have different tastes, levels of wealth, and tradeoffs of risk/return and so on. Why not offer them a choice?

Today, the market of derivative products services a huge number of investors – all of whom have different capabilities, needs, and constraints, as well as different perspectives on the market and different attitudes toward risk. The variety of derivative instruments now available means that each of these investors should be able to implement a risk/return strategy that corresponds to their needs and expectations. At this time, major commercial banks, investment banking firms and insurance companies have established new units of specialized traders and financial engineers to design and structure tailor-made risk management products for corporate and retail customers. The continued success of the derivative markets, as well as the satisfaction of each user, depends on a clear understanding of what derivatives can and cannot do.

Set against this background, the objective of this paper is to provide viable guidelines, based on real-world observations and experiences, for the inception of sound and effective derivative products in emerging markets within a prudential framework of rules and policies. The aim of this paper is to fill a gap in the risk management literature especially from the perspective of the trading of derivative products in emerging markets.

The structure of the remaining parts of this paper is as follow. In the following section, the main characteristics of emerging markets for the trading of derivative products are examined and a number of market/regulatory barriers are then identified. This is followed with a detailed section that lay down the main obstacles for the establishment of sound derivatives products in emerging markets and then explores a few viable solutions. The final section concludes.

## **2. Governing characteristics of emerging markets**

During the 1990s, certain developing countries liberalized their economics and unlocked their financial markets, thereby gaining the promotion to the status of emerging-market economy. These emerging markets were attractive to international investors – mainly international portfolio investors – principally due to their expected growth potential and hence huge amounts of private capital have been flowing to these countries. Nevertheless, foreign money has valuable as well as bad aspects. Emerging markets must have the means to absorb these funds productively.

Emerging markets have a series of characteristics that require different risk management approaches than those of developed countries. Some of these characteristics affect risk measurement methodologies, while the others affect the implementation process, as follow:

- (1) The instruments traded are in many cases insufficient for the establishment of adequate benchmarks for the valuation of certain transactions, such as long-term interest rate swaps. The lack of quotation of long-term government fixed rate bonds, for instance, complicates the setting of interest rates on long-term loans to corporations and also the valuation (mark-to-market) of previously granted loans. Consequently, this leads to a lack of benchmarks for risk estimation (i.e. probability of a loss of a certain value of the portfolio). On the other hand, low trading volume (illiquid markets) and missing historical data for many financial instruments create doubts regarding the validity of the quoted prices.
- (2) The trading of option contracts in developed markets provides an alternative path for measuring risk (volatility). Since, options prices depend on this uncertainty (the so-called implied volatility), market-makers can assess the market consensus to the future prices of the underlying instruments. For emerging markets' environments, it is difficult to use this reference at all times (i.e. the implied volatility) due to the fact that few options contracts on FX, interest rates, commodities, or stock indices are traded.
- (3) These markets are also characterized by frequent government interventions in the financial markets to stabilize the short-term impact of a current event. Measurement of risk on the short end will divulge a relatively risk-stable market and it might give the wrong message – since the impact of current crisis is diluted with government interventions. However, once risk is measured on a long horizon of time, one should not be surprised to find big swings in the level of risk. In these situations, risk calculations require estimations of the potential fall in financial markets in case of a potential crisis or event. Techniques such as stress-testing, event risk under severe market conditions (assuming all financial assets are correlated positively) are more adequate in this case than market risk measure – such as value at risk – which assumes normal distributions of financial assets' returns.
- (4) On the other hand, in dealing with financial risk management, it is essential to bear in mind other factors, such as:
  - the cost of bankruptcy (due to rapid changes in macroeconomic variables);
  - default on debt (given the high level of interest rate and credit risk);
  - imposition of currency controls and illiquidity (fewer transactions in capital markets);
  - country risk (political and economic events); and
  - for countries with weak accounting, auditing and disclosures, derivative products can be abused and can substantially destabilize markets.
- (5) Finally, emerging countries are characterized by lower investment in information technology systems that can handle front office (trading desks), middle office (risk management and legal/regulatory) and back office (settlement and accounting). Besides, they lack personnel with technical backgrounds in economics and finance, such as traders, quantitative analysts and risk managers.

Since, the mid-1980s, the number of derivative exchanges operating in both developed and emerging-market economies has multiplied several-fold. Emerging markets can capture important benefits from the founding of derivatives trading activities, which includes the capability to transfer risks, lower transactions costs, and the accessibility of public information. Moreover, the success of a derivatives market depends on the wholeness of the foundations on which it was assembled, the adopted structure and the varieties of traded products.

However, the founding of derivative markets in emerging markets requires certain prerequisites, which include:

- Liquid and well-functioning cash markets and well-grounded credit and financial institutions with substantial number of traders, speculators, and hedgers.
- A legal environment structure that includes a system of property rights and enforceable trading contracts.
- Support of local government and policymakers and adequate financial resources for the creation of successful clearing-corporation.
- The absence of similar competing derivative products (on local cash markets' main indicators) in well-established foreign derivative exchanges.

### **3. Obstacles to the trading of derivative products in emerging markets and some viable solutions**

The demands for risk management instruments and processes by emerging countries are now large and it will continue to grow throughout the twenty-first century. This will put more burden on banking regulators and supervisors to ensure the safety and soundness of their respective financial systems through effective regulations. This, of course, is a difficult task, as evidenced by the variety of financial crises over the last century. Looking forward, the task is likely to get harder, given the likely increase in the complexity of financial instruments and the magnitude of cross border financial flows. Originating and demanding compliance of rational "rules-of-the-game" is a challenging endeavor for any banking regulator.

The regulatory challenge is even more difficult and more important to meet in emerging-market economies for several reasons:

- Market structure of banking and financial activities is concentrated in just few major institutions, on which the stability of the whole macro-economy depends. Local financial markets are often characterized as thin, illiquid, lacking information technology infrastructures, and severely volatile, making them even more difficult for local institutions to manage their risks effectively. In some countries, banks and other financial intermediary's functions are conducted and interlined with other corporate entity shareholders, creating severe moral hazard problems.
- The political structure and government policies of ensuring stability of the financial system are weak and less developed. These markets are characterized with frequent government interventions to stabilize the short-term impact of current events. Banks and other financial institutions may have a high degree of political influence in their countries, but only a limited understanding and acceptance of the needs for independent regulations and supervisions.

- Financial sophistication for the valuations of complex instruments and reporting of exposure are weak and less stringent than advanced economies. Additionally, accounting standards vary widely from market to market. Financial entity management and regulatory body supervisors are less trained in advanced methods for the identification, measurement, management and control of financial risks.
- Lack of adequate historical and current databases for most of these countries macroeconomic variables can complicate the logistics of an effective and integral risk management proceeding. Little real progress can be made without good databases and it will take considerable efforts to assemble them. Risk management systems are expensive to create and to run without adequate current and historical databases of most of the markets' main indicators.

In this section, my aim is to highlight some of the important issues related to the measurement, management and control of the relevant risks associated with the trading and operations of derivative instruments.

Based on my previous observations and experience in emerging markets (as a trader and later on as a trading risk manager), I strongly recommend that any emerging-market country in the process of planning access into the derivative business should at least consider improving on the following:

- (1) Establishing of liquid cash markets for equity (common stocks) trading, FX transactions and debt trading (bonds and short term interest rate instruments). The absence of continuous liquidity in the trading of stocks, FX and debt instruments will lead to difficulties in the hedging of the relevant risks arising from booking derivative products on corporation's balance sheet. For instance, an options trader who "makes-market" and sells options on an equity index needs to hedge his risk by buying some proportion of the underlying assets. The assets in this case are a basket of stocks – assuming one can replicate the stock index by a basket of some of the most liquid stocks available.
- (2) Professional educational and training process for local and foreign investors on the trade-off between risk and expected return of local financial and non-financial underlying (such as stock, bonds and commodities). Investors who do not understand the risk/return profile of "plain-vanilla" cash instruments would be less likely to appreciate the usefulness of derivative products – for both speculation and hedging purposes. The same is true for treasury managers, risk managers and chief financial officers. Trained investors (both speculators and hedgers) and finance officers can provide substantial amount of liquidity to derivative markets. Certainly, both speculators and hedgers are necessary elements for the creation of any successful derivative market, as hedgers seek to reduce their uncertainties and speculators look forward to profiting from such uncertainty. As I described earlier in this paper, emerging markets are characterized by low investment in information technology systems and lack of qualified personnel that have good technical qualifications. In view of the importance of modern risk management for the efficient operation of any financial and non-financial organization, public and private entities should be pushed to make necessary investments in



material and human resources with great emphasis on professional and technical capabilities.

- (3) Specific attentions should be devoted to the peculiarities of the trading of options contracts in emerging markets. These contracts have embedded effects and factors (that in many cases are not detectable by many novice traders) such as non-linear payoffs and the dependence of full option's valuations on several Greeks factors – of the first and second mathematical derivative order (that are known in the financial markets as delta, gamma, theta, etc.). Because of their non-linear payoffs, special emphasis should be given to the valuation and pricing of options (for both simple and complex options), on the different hedging methods and techniques and the usefulness of portfolio theory for daily positioning management.
- (4) It is recommended to constitute first an OTC market for the trading of derivative products of relevant local market underlying assets, such as stock market indices, FX contracts and interest rates (debt instruments). This step will aid in building the basis for the following:
- Screening process of potential OTC market participants, such as, traders, speculators, arbitrageurs and hedgers who can afterwards participate as invited guests in friendly brainstorming committees – with policymakers – in setting up the necessary steps of adequate microstructures of successful standardized derivative exchange markets.
  - Setting up and improving on current preliminary regulatory requirements for accounting procedures, operations, settlements and risk management. This step will encourage market participants and policymakers to set the basis of adequate microstructures of formal derivatives exchange. These microstructures should include regulatory oversight, clearing and settlement procedures, trading and risk management systems, varieties of products to be traded, memberships of the derivative exchange and finally ownership of the clearing-corporation (clearing-house).
  - Choice of derivative products to be traded in a subsequent formal local derivatives exchange. This will help in assessing the benefits of the selected products and to determine if local market participants are eager about forming local derivative exchanges. The results should be compared with the risks and benefits of using already established derivative exchanges – mainly in developed foreign countries that are trading derivatives on main local market indicators – that are more liquid and stress prudential regulations. Derivative exchanges compete with one another to list futures and options contracts that have the possibility to become actively traded, hence the first-mover effect (which exchange first lists a contract), in my opinion, plays a vital role in the competitive outcome of any derivative products' listing strategy. The first-mover effect can have more influence than trading platform choices – electronic trading or open outcry trading – in determining the success of equivalent product introductions. New derivative exchanges with electronic trading platforms that offer competing versions of existing derivative contracts may have hard times competing and, therefore, succeeding. Based on various previous observations in

emerging markets, I have noticed that the majority of these countries have first started with the trading of FX forward contracts. This is followed by the introduction of equity-based derivatives on local stock market index (such as options and warrants) and thereafter interest-rate-based derivatives. I have perceived that emerging economies' participants are more eager to trade products related to equities. Since, it takes more time to introduce derivative contracts in emerging markets than in developed markets, it would probably be a favorable strategy to introduce first derivative products related to equities (such as OTC options contracts on local market index) in addition to FX forward contracts.

- Assembly of adequate current and historical databases is at the core of any risk management process. Data should be filtered and verified, as decision-making will be based on such information, otherwise – “garbage-in, garbage-out”.
  - Set the basis for the implementation of management information systems (MIS) according to the need and level of sophistication of each emerging country and institution. Trading, booking and settlement systems that can handle front, middle and back offices should be devised and outfitted. It is recommended that local information technology providers get involved in the design process of these systems rather than importing foreign MIS systems. This is because imported systems might not satisfy the needs of each country and they might include very rigorous and tedious tools, which are not required at this stage. This step will encourage native MIS vendors – who will find this as an attractive opportunity for development to get a market niche – to get closer and establish businesses with regional financial institutions.
  - In addition, the creation of an OTC market can help in speeding up investor's tutorial process, especially for treasury department's managers who will be the first people interested in participation. Retailers will find such a market, an opportunity for hedging purposes and also for choosing a bet-side on local market macroeconomics' variables.
- (5) Regulations for the trading of derivative products are essential elements, and the lack of reinforcement of these elements had lead mainly to the previously mentioned crises. These regulations have to include several items such as accounting, legal environment, risk management, operations, pricing and valuation and settlement process. Regulations and supervisions in developed and developing countries are at the heart of any risk measurement/management process. The Basle Committee on banking supervision and the bank of international settlements (BIS) have set and enforced capital adequacy and regulations requirements on banks in major industrialized countries. In 1993, the BIS implemented risk-based capital ratios for all commercial banks, which are member countries of the BIS, under what has become known as the Basle agreement (now is called Basle I). The 1993 Basle agreement explicitly incorporated the different credit risks of assets (both on and off-balance-sheet) into capital adequacy measures. This was followed with a revision in 1998, in which market risk measures were incorporated into risk-based capital ratios. In

2001, the BIS issued a consultative document, “the new Basle capital accord” (currently is called Basle II, and in June 2004, the final version of the document was issued) that recommended the incorporation (effective in 2007) of operational risk into capital requirements and updated the credit risk assessments in the 1993 agreement. In the new Basle II accord or agreement, the measurement of market risk (the thus termed “standard model”) did not change from that adopted in 1998.

- (6) Local regulators and financial entities should give special emphasis to regulating “operational-risk”. The complexity and fast pace of developments in the derivatives market put particular pressure on the control function to keep up. If it does not keep up, the financial entity will be susceptible to both inadvertent errors and internal fraud. Admittedly, there is no substitute for the human element in any risk management process.
- (7) Excessive and inadequate regulation is usually perceived of creating risks of its own, costs, constraints and a fixation with compliance for its own sake. In emerging markets, one of the main raising concerns is that the rise in regulation was not being matched by the quality of the regulators themselves; hence a gap is opening up. Financial engineering processes and models have opened the doors for sophisticated instruments and valuation models that are years ahead for regulators and supervisors in emerging markets to catch up. As a result, improving the competence, independence and strength of the regulatory authorities to ensure that they can properly regulate derivatives trading is a crucial issue of paramount importance for a thriving trading of these instruments in emerging economies.
- (8) Financial institutions must first strive to hire responsible traders who understand and analyze what they are doing. Next, recognizing that many traders (if left alone without adequate supervision), have the propensity and incentive to break the rules. Thus, at this stage, management must have capable monitoring and enforcement of trading rules. At the very least, this requires autonomous reporting of a trader’s activity, and an eagerness to question the causes of extraordinarily profitable activity and to inquire why a trader is betting with high risk instruments or whether he is above the risk appetite limits of the institution. It is interesting that against most expectations, almost all of the financial crises and losses due to derivatives were neither in the weakest institutions nor in the most esoteric financial products. The size of the institution or its complexity in handling sophisticated instruments seems to not matter to the question of where the next slander will smack. It is not a matter of recruiting traders from limited education and moral teaching or to hire Phds – rocket scientists, who are often characterized as introverts with a propensity towards solitude and who harbor to virtual worlds of computer models and statistics. It seems likely that it is not the trader’s individual characteristics that matter. What really matters is to enforce corporate and regulatory rules to obstruct rogue traders’ behaviors and to encourage them to develop mature reasoning notions. Individual institutions have failed (like in the case of Barings) or taken massive losses (Daiwa, Sumitomo) due to the fraudulent actions of single individuals. Most of these instances took place in environments

with weak operational controls, often resulting from or aggravated by lack of clear organizational separation of the front and back offices. The possibility of this type of crisis in emerging-market is considerable, and will presumably grow through time as local markets for derivatives and other complex financial instruments augment. A common string uniting all of the above examples is insufficient risk management; in all cases, risk identification and classification, measurement and management controls were absent. Supervisors need to address these root causes in their regulatory processes to prevent engagement of others who would commit the same mistakes.

- (9) Based on previous real-world experience and observations in emerging markets (as finance practitioner and witness of severe financial crises and collapses), I have perceived that emerging countries which have neglected most of the above “rule-of-thumb”, have fallen into the trap of establishing illiquid and inefficient derivative products/markets – with many loopholes for rogue participants.

#### 4. Concluding remarks

Risk management is a mixture of a continuous evolving discipline of both science and art. Losses in the financial and non-financial arena are inevitable, and one must learn from past events and crises. There are many methods and ways to identify, to measure and to control risk, and risk managers have the task to ascertain the identity of the one that suits their needs. In fact, there is no right or wrong way to measure/manage risk; it all depends on each entity's objectives, lines of business, risk appetite and the availability of funds for investment in risk management projects. Regardless of the methodology chosen, the most important factors to consider are the establishment of sound risk practices, policies and standards and the consistency in implementation process for all lines of businesses and risks.

The markets for derivative products in emerging markets have grown in recent years, but are still relatively small compared to the cash markets for emerging markets' equities, bonds and FX. As emerging markets countries continue to open up their economies to foreign investment and their capital markets continue to develop, firms operating in such markets face unique risk management challenges. Generally speaking, event risks associated with political changes and loss of currency convertibility assume crucial importance. Furthermore, credit risk estimations can become a more complex matter as governments impose exchange controls. An emerging-market corporation, which may have a good credit reputation by itself, can be classified as a defaulted corporation if its government imposes FX controls. In due course, counter party risk and country risk will become significant parts of the trade-off when measuring/managing risks in emerging markets.

This paper has identified a number of factors that limit the growth of derivative products in emerging economies and suggested efforts to be made to reduce such barriers. Special emphasis should be given to the measurement/management of risk of such portfolios with options contracts and options-like behavior. These contracts have embedded effects and factors that in many cases are not detectable by many novice traders.

In some emerging markets, local market participants have established committees with policymakers to promote the growth of local derivative markets by drafting standard documentation, lobbying regulators for changes in laws, and training market

participants in the uses and inherited risks of derivative instruments. Emerging markets can capture important benefits by establishing markets for the trading of derivatives. This includes the ability to transfer risk, enhance public information, and lower transaction costs. However, the creation of promising derivative products and successful trading markets depends on the soundness of the foundations on which it is contrived, the structure that is embraced, and the products that are traded and the ones which are planned to be traded. An investment in emerging markets' derivative products entails significant risks and possible high rewards (due to high volatilities) of the kind that is not common in developed economies. On the other hand, through the proper use of derivative products by identifying, measuring and managing the visible and invisible risks (with applicable risk-return quantitative tools combined with art intuitions), in addition to setting clear rules-of-the-game, an emerging country can establish successful derivative exchanges and markets, with less likely loopholes for rogue participants.

The growth of derivatives will continue despite the surge of losses reported in their use. These losses reveal that derivative products are not risk-free, albeit they can reduce risks when used properly. These losses can serve as a reminder that complexity does not assure safety, and those leveraged bets on interest rate, FX rate and stock market indices are still bets unless they are based on relevant serious analysis and information. However, these losses do not change the fact that many potential users of these flexible and inexpensive financial instruments have not yet recognized their full usefulness and value.

Today, the market for financial derivatives services a big number of investors with different capabilities, needs and constraints, in addition to different perspectives on the market and varied attitudes towards risk. The diversity of financial instruments now available means that each of these investors should be able to instrument a risk/return strategy that corresponds to their needs and expectations. Trading derivative products will continue to evolve as a connected process of both art and science; however, the continued success of the derivative markets together with the satisfaction of each end-user depends on a clear understanding of what derivatives can and cannot do.

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