

Derivatives play a vital role in enabling risks to be hedged. Whilst they add to the liquidity and efficiency of financial markets, they have potential to adversely affect banking stability. From the supervisory point of view, financial institutions must have adequate systems in place to ensure prudent risk management. Supervisors must also ensure that these institutions' management is fulfilling properly its control responsibilities and that there is sufficient capital in place to support the risks. The market itself also has an important role to play in reinforcing self-discipline, provided that it is given sufficient information to do so.

I am pleased to be able to attend this conference to offer you a banking supervisor's perspective on the implications of derivatives trading for the banking system.

Derivatives play a vital role in enabling risks to be hedged. In doing so, they add to the liquidity and efficiency of financial markets. But they have certain characteristics – including particularly the ability to leverage and the opaqueness of the valuation and pay-off characteristics of some of the products – which can make them particularly difficult to control and can lead to excessive risk taking.

The Implications of Derivatives for Banking Stability

This poses two distinct but related threats to the stability of the banking system. First, problems may arise at the level of the individual firm. If severe enough these could cause the collapse of the bank concerned, as in the case of Barings. Moreover, because derivatives trading tends to be concentrated in a relatively small number of firms there is concern that the collapse of one of these would have a substantial impact on both the markets in which they operate and the counterparties with whom they have dealt. Even if derivatives losses are not big enough to cause banks to fail, they may cause major embarrassment and damage the credibility of trading operations which have been built up at great expense.

There is also the possibility that the collective actions of derivative market participants may pose a threat to macroeconomic stability by increasing the volatility of exchange rates, interest rates and

asset prices. This would have negative effects on the banking system by making the operating environment more dangerous. A study of the impact of derivatives on market volatility by the Eurocurrency Standing Committee of the G10 central banks came up with the somewhat comforting conclusion in 1994 that derivatives were more a consequence than a cause of instability in exchange rates and interest rates; and that they should under normal conditions tend to make the financial markets more resilient to shocks by increasing market liquidity and by redistributing risk. The study did however acknowledge that during periods of stress, derivatives could amplify market price movements. This might happen for example through dynamic hedging of short options exposures which would require purchases of the underlying assets in rising markets and sales in falling markets. This seems to be a feature of the Hong Kong stock market at times as issuers of warrants put on or remove hedges. Increased volatility might also result from margin and collateral calls on derivatives forcing liquidation of both derivatives and underlying positions.

Support for the potentially destabilising role of derivatives is contained in a more recent study¹ which examines the part which derivatives played in exacerbating the Mexican crisis. This shows how Mexican banks used derivatives such as Tesobonos swaps, equity swaps and structured notes to build up leveraged positions and to circumvent domestic prudential requirements. When the peso crisis broke in December 1994, the positions which had been built up became loss-making. The banks were therefore forced to sell pesos to put up more US

* This is the text of a speech given by David T R Carse, Deputy Chief Executive of the Hong Kong Monetary Authority, at the International Conference on Stock Market Indexes and Index Derivative Trading held in Hong Kong on 21 April 1997.

¹ Folkerts-Landau and Garber (1997)

dollar collateral on the swap transactions or to close out short US dollar positions which they had effectively taken on through the purchase of structured notes. This added to the selling pressure on the peso. Because the exposure which the Mexican banks had incurred was both off-balance sheet and offshore, it was unknown to the regulators.

The Size of the Derivatives Market

The potential of derivatives to increase the magnitude of a financial crisis is obviously a factor of the growth and size of the market. The most authoritative guide to the size of the global market, though it is now somewhat out of date, is that derived from the survey conducted by the Bank for International Settlements (BIS) for the first time in 1995 in 26 countries and territories². This survey, in which Hong Kong participated, showed that the notional value of outstanding over-the-counter (OTC) foreign exchange, interest rate, equity and commodity derivative contracts was US\$47.5 trillion at end-March 1995³. Exchange-traded contracts account for a further US\$17 trillion. 98% of the OTC total is accounted for by foreign exchange and interest rate contracts. Derivatives based on equity and stock indices make up only 1.3% of the total, which may be partly due to the fact that the coverage of intermediaries active in this market was less comprehensive. An interesting fact revealed by the survey is that 55% of the total of foreign exchange and interest rate contracts involved foreign counterparties which underscores the role of derivatives in linking together markets and perhaps in transmitting shocks.

We are therefore dealing with a market of considerable size and of global reach which requires careful handling by both market participants and by regulators.

The Supervisory Response to Derivatives

What then are regulators doing about this? The growth of the derivatives market has in fact been the catalyst for major changes in the way in which both banking and securities regulators approach their task. One option is to ban the use of derivatives, but this does not seem to be viable

in today's liberalised markets. Rather, the focus has been on three main areas: the encouragement of sound risk management systems; the incorporation of market risk into the capital adequacy framework; and increased market transparency. I will now go on to describe developments in each of these areas with particular reference to what we are doing in Hong Kong. However, we should maintain a sense of proportion. While Hong Kong is seventh in the league table of derivatives centres, it continues to lag well behind London, New York and Tokyo. Also, derivatives trading is not a significant business activity for most local banks for whom credit risk from straightforward lending remains the main preoccupation. Nevertheless, this should not prevent us from laying the foundation of a sound supervisory regime for derivatives in Hong Kong, because the market will undoubtedly expand here. Moreover, some of the foreign banks operating in Hong Kong are quite big players in derivatives and we have a vested interest in ensuring that they conduct this business prudently in our territory.

Risk Management Systems

Both banks and supervisors have always been concerned with the adequacy of risk management systems. However, this concern has become more highly developed and explicit in recent years as a result of certain features of derivatives. In particular, the capacity of derivatives quickly to change the risk profile of a bank can make assessment of its financial condition at a particular point in time less meaningful. This has led to greater emphasis by supervisors on satisfying themselves that banks and other financial institutions have adequate systems in place for measuring, managing and controlling risk on an ongoing basis. The new approach is essentially forward looking and shifts the focus of attention more to processes rather than historical financial performance.

The key elements of a sound risk management system have been spelt out in guidelines issued by the Basle Committee. In particular, there is emphasis on the role of the board of directors in setting the overall risk appetite of the bank and approving policies and procedures designed to ensure that the risk exposures incurred by the bank are

2 Bank for International Settlements (1996)

3 After adjusting for double-counting and estimated gaps in reporting. It is therefore a more up-to-date estimate than the preliminary figure of US\$40.7 trillion published in the February 1996 edition of the Hong Kong Monetary Authority's Quarterly Bulletin.

consistent with that appetite. Once risk management policies have been approved by the board, it is the job of management to implement these. One of the features of modern risk management is the more scientific approach which is now possible towards the quantification of risk. This is important because when risk can be accurately measured, it becomes possible to take on risk in a more informed and controlled manner. In other words, banks should be in a position better to control their own destiny rather than being at the mercy of market forces which they do not fully understand.

This trend towards better quantification of risk is evident in the increasing use of statistical models which attempt to measure the potential loss in a portfolio associated with price movements of a given probability over a specified time period. This approach has the advantage of incorporating not only a measure of the sensitivity of the portfolio to shifts in prices, but also an estimate of the likelihood of those shifts occurring. It also enables the risks across different portfolios to be aggregated and reduced to a common denominator – in other words, the value at risk – which can be more intuitively understood by the board and senior management. This approach has been developed in relation to the measurement of market risk, but it also has application in measuring credit risk across a portfolio.

The use of value at risk and other statistical models is something that has been welcomed by supervisors, including the Hong Kong Monetary Authority. However, there are important caveats. First, it is possible for senior management to be lulled into a false sense of security by such models. While on the face of it the mathematics of the models may be quite complex, they are in fact based on a set of simplifying assumptions, including that changes in prices or rates are normally distributed and that positions can be traded out within the assumed holding period. It is important therefore that models should not be seen as supplying the right answer under all circumstances. If volatilities change dramatically and if market liquidity dries up, the potential for loss may be greater than that predicted by the model. This means that stress tests should also be used to calculate the exposure under worst case market scenarios, which may not be probable but which are certainly possible. This may then lead

management to set more conservative limits than the value at risk model would otherwise imply. Thus, subjective judgement still matters.

The second point is that, as the Basle Committee has emphasised, the qualitative controls surrounding how models are used are just as important as the mathematics. In particular, as recent events have demonstrated, it is vital that the data on prices and volatilities which are fed into models are accurate and are regularly checked by an independent risk control unit. The models themselves should be subject to regular independent review and back-testing. Of course, this principle of checks and balances and segregation of duties is absolutely vital for all aspects of a trading operation.

In Hong Kong, we are following the principle that sound risk management is the key to a successful derivatives operation. We have issued two sets of guidelines on the subject during the last two years and we have formed a specialist team to conduct examinations of the systems used by those authorised institutions which are active in trading derivatives and other financial instruments. This has uncovered weaknesses in internal controls in a number of institutions, usually involving a basic lack of segregation of duties.

Capital Adequacy

However, risk management is not the whole story. Even in well-run trading operations it is possible that losses may occur as a result of unexpected market movements and it is thus necessary to ensure that banks have sufficient capital to be able to withstand such losses. The existing capital adequacy framework in Hong Kong is based on the 1988 Basle Capital Accord which almost exclusively deals with credit risk. In 1996, the Basle Committee amended the Accord to take account of market risk and we shall change our capital adequacy rules in Hong Kong to take account of this. We have already introduced a new reporting return for market risk at the end of 1996 and we are planning to implement the capital requirement at the end of this year, in line with the Basle Committee's deadline.

It does not appear that the introduction of market risk will have a great impact on the capital ratios of most local authorised institutions using the "standardised approach" of the Basle

Committee. Even so, in line with the Basle recommendations we propose to give institutions the opportunity to economise still further on the use of capital by allowing those who are qualified to do so the alternative of using their own internal statistical models to calculate the capital requirement. This is in keeping with the Basle Committee's objective of giving banks every opportunity to improve their own internal risk management. However, as I have already indicated, modelling is still not an exact science and this is why the Basle Committee has insisted that the value at risk produced by a model should be multiplied by a factor of at least three in order to arrive at the capital requirement.

Increased Market Transparency

The final leg of the supervisory approach is to try to improve the quality of information about the derivatives activity being conducted in markets around the world and by individual market participants. There are three distinct strands to these efforts:

- (i) first, supervisors are trying to improve their understanding of how derivatives affect the overall risk profile and profitability of banks and securities firms. The Basle Committee and International Organisation of Securities Commissions (IOSCO) have therefore jointly developed a framework for the kind of information that supervisors should seek from their institutions. As far as possible, this should be based on information which the institutions use for their own internal control purposes. The Hong Kong Monetary Authority will take account of this framework in further developing the reporting regime in Hong Kong;
- (ii) second, banks and securities companies are being encouraged to expand the amount of public disclosure which they make about their overall involvement in the derivatives market and trading, the impact of these activities on profitability and their performance in managing the risks. If provided with meaningful information, the market should be able

to exert its own discipline on institutions to manage their derivatives business in a prudent fashion. If so, this should complement the efforts of the supervisors. In Hong Kong, the banks are now providing more information in their annual reports about their off-balance sheet business, including derivatives. You will see in the reports being published for 1996 that there is now descriptive information about how market risks are managed, the daily distribution of market risk revenues and, in some cases, the value at risk. This is a good start but I hope that banks will themselves take the initiative to increase the amount of disclosure in future years;

- (iii) third and finally, central banks are trying to obtain more statistics about activity in global derivatives markets so that they can better monitor the macroeconomic as well as the prudential aspects of this business. The April 1995 survey coordinated by the BIS was a first step in that direction and it will be repeated next year. Hong Kong will again participate. Coinciding with the 1998 survey, the G10 central banks will also begin regular reporting of the consolidated worldwide derivatives activities of OTC dealers, including banks, based in their countries. The global figures derived from this exercise will be published by the BIS.

Conclusions

To conclude, therefore, I think that we have to acknowledge that derivatives are here to stay and that both banks and supervisors have to live with that reality. From the supervisory point of view, the first line of defence against the potential ill-effects of derivatives is the prudent self-regulation of banks themselves. However, supervisors have a role to play in ensuring that management are indeed fulfilling properly their control responsibilities and in addition that there is sufficient capital in place to support the risks. Finally, the market itself also has an important role to play in reinforcing self-discipline, provided that it is given sufficient information to do the job. ☺