

# SUPERVISION OF BANKS' DERIVATIVE ACTIVITIES<sup>1</sup>

## 1. Background

In addition to their traditional balance sheet activities of borrowing, lending and dealing in cash and securities, banks also conduct a wide range of activities 'off-balance sheet'. Derivatives are a subset of those off-balance sheet transactions. They can be defined as financial contracts the value of which are dependent on the value of some other asset.

Derivatives come in three generic forms:

- those which involve an obligation to acquire or sell an asset at a given price in the future (this category would include forward contracts and futures);
- those which involve the right (but not the obligation) to acquire or sell an asset in the future (options); and
- those involving the exchange of income streams without necessarily involving an exchange of principal (interest rate or foreign currency swaps).

More exotic forms of derivatives are generally combinations or variations of the forms described above.

Over the past decade banks' derivative activities, both in Australia and internationally, have expanded greatly. The rates of growth

experienced, the large gross values of outstanding obligations and the seemingly complex nature of some of the products have raised a number of concerns, amongst regulators, but also within the legal and accounting professions. The concerns fall into two main categories:

- the most general arises from the rapid growth and high dollar values placed on derivative business;
- the more specific is that the risks embodied in derivatives may not be well understood, either by the management of banks engaged in these activities or by supervisors and regulators.

In reviewing the supervisory issues posed by banks' derivative activities, two distinct, though closely related, sets of issues have emerged.

The first are so-called 'micro' issues associated with derivatives. These are essentially questions of the nature of the instruments themselves and measurement of the risks embodied in them. They extend to questions of how banks use derivatives, how they monitor and control the resulting risk profiles and how supervisors deal with derivatives and incorporate the risks into prudential arrangements and guidelines.

Beyond those issues are a set of broader 'macro' questions associated with possible

1. This is an edited version of a paper presented by Brian Gray, Chief Manager, Banking Supervision Department at an AIC 'Derivatives' Conference held in Sydney on 26 July 1993.

systemic effects arising from the growth in derivatives. Here the debate is not so much one of whether derivatives are risky in their own right, but whether a financial system in which derivative growth has been rapid, and where derivative obligations are large, is more susceptible to instability. It raises the question of whether problems emerging within some financial institution (whether related in the first instance to derivative activities or not) might spread more widely, and have more profound 'domino' effects, in a system where derivative activity is large and growing.

Recent debate on these issues has been prompted by concerns expressed early in 1992 by Gerald Corrigan, (the then President of the Federal Reserve Bank of New York and Chairman of the Basle Committee on Banking Supervision) on trends in derivative markets. Since then, some studies have been released which have stimulated further discussion. These include the Promisel Report issued in October 1992 by the Bank for International Settlements<sup>2</sup>, a Bank of England survey and study on derivatives released in April 1993<sup>3</sup>, and a major study by the Group of Thirty released in July 1993.<sup>4</sup>

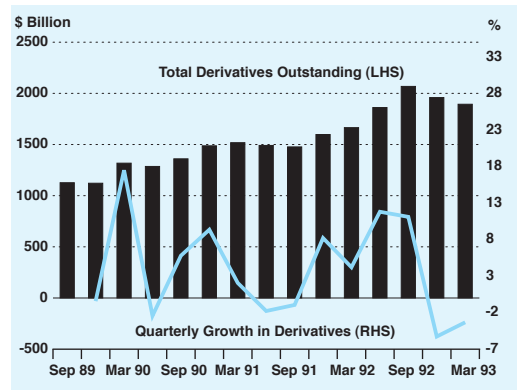
It is against this background that this paper looks at the derivative activities of Australian banks and the supervisory treatment accorded them by the Reserve Bank.

## 2. Derivative Activities of Australian Banks

Banks' derivative obligations are large in gross terms and have grown rapidly in recent years. As at March 1993, Australian banks' aggregate derivative obligations were just below \$2 000 billion. To put that figure into

perspective, it equates to about 5 times banks' Australian dollar assets. Despite a decline in activity over the past year, growth over a longer period has been rapid – around 20 per cent on average over the past 3 years.<sup>5</sup> Graph 1 illustrates both the level and growth rates of banks' derivative activities.

Graph 1



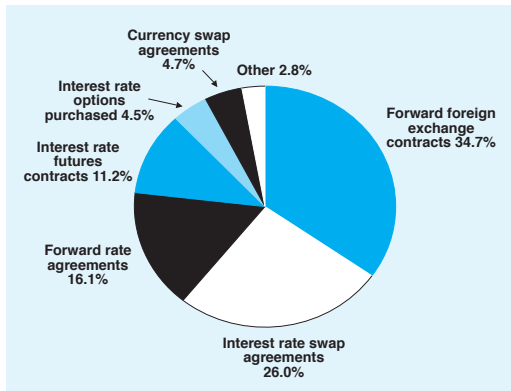
Graph 2 shows that of the total:

- forward foreign exchange contracts represent the largest proportion of banks' derivative activities. As at the March quarter 1993, they amount to \$657 billion (around 35 per cent of the total);
- interest rate swaps come next with outstanding obligations of \$493 billion (around 26 per cent of the total);
- forward rate agreements come to \$304 billion (about 16 per cent of the total);
- the remainder, approximately \$438 billion or 23 per cent of the total, is a mixture of interest rate futures, currency swaps, interest rate options and other transactions.

These figures, and the implications that can be drawn from them, need to be analysed cautiously.

2. 'Recent Developments in International Interbank Relations', Report prepared by a Working Group established by the Central Banks of the Group of Ten countries, Basle, October 1992.
3. 'Derivatives: Report of an Internal Working Group', Bank of England, April 1993.
4. 'Derivatives: Practices and Principles', Global Group, Group of Thirty, Washington DC, July 1993.
5. Banks' off-balance sheet data disaggregated between derivatives and other instruments is only available for the past three years. Over the past seven years total off-balance sheet exposures have grown at an average rate of 33 per cent. Most of this growth is attributable to growth in derivatives products.

Graph 2



Firstly, the figures quoted are the gross outstanding obligations of banks. In other words, when two banks engage each other as counterparties in a derivative transaction the value of this transaction is counted twice. In the case where transactions involve (as they often do) several counterparties and/or multiple instruments, then they may be counted several times.

Secondly, unlike a traditional loan, the value at risk in a derivative transaction is not accurately represented by the outstanding principal. Usually the true risk is only a fraction of the gross, or nominal contract, amount. This aspect is discussed further in Section 3.

### 3. Risk Assessment, Measurement and Supervisory Treatment

In assessing and measuring risk on derivatives, it is important to recognise that derivatives are essentially risk managing, not risk creating, instruments. They are used by institutions to 'hedge' or offset other risks incurred by them in their activities. For example, the foreign exchange risk associated with a foreign currency borrowing by a bank can be hedged by a forward foreign exchange contract; the interest rate risk associated with a fixed rate loan, funded by a variable

rate deposit, can be hedged by an interest rate swap.

The growth in derivatives over the past decade can be linked directly with volatility in traditional cash and physical markets. This has created a demand by risk-averse institutions for instruments to facilitate the 'transfer' of risks associated with this volatility to those in the financial community more willing to acquire those exposures. Viewed in that light, derivatives can be seen as a means of spreading risk more efficiently.

At the same time, derivatives can also provide leverage to users, enabling them to acquire increasing levels of risk for a relatively low outlay. They can lead to a concentration of risk amongst the major institutions willing to take on risks. It is these features that lead some to argue that, on balance, derivatives have introduced an independent and additional source of risk to institutions and the financial system.

The starting point in assessing these respective positions is an understanding of the risk attached to derivatives and how that risk can be assessed. Whether applied to the most complex of derivatives or to the simplest area of banks' on-balance sheet exposures, risk assessment is essentially a two-step process. The first is to identify the nature of the risk. The second is to quantify that risk in order to provide a measure of potential loss, so that safeguards can be put in place (be they capital standards, limit systems, etc.) to contain potential problems to manageable levels.

A fundamental point, and one most overlooked, is that the nature of risk associated with derivatives is identical to that faced by banks in their traditional areas of activity. The most important are:

- credit risk – the risk of counterparty failure;
- market risk – the risk arising from changes in market prices; and
- operational risk – the risk arising from the absence (or failure) of effective risk management systems and controls within institutions and the sometimes unclear legal and accounting foundation for financial transactions.

## Credit Risk

Credit risk is usually viewed as the single most significant risk to be addressed in relation to derivatives. It is widely accepted that, with the growth in the market, the evaluation of credit risk has also become increasingly complicated over recent years.

However, in principle at least, there is no reason to believe that establishing the probability of counterparty failure is any more difficult when the instrument concerned is a derivative as it is for a traditional loan. The added difficulty is the means by which the value at risk is quantified. In the case of a traditional loan, counterparty failure, should it occur, implies loss of outstanding principle and interest. In the case of derivatives, counterparty failure does not typically involve loss of that magnitude. Rather, the loss is equal to the cost of replacing the defaulting contract in the market. The complexity arises because the cost of replacement is not static but is influenced by market factors.

This can be best demonstrated by example. Where a failed counterparty is the seller of an option, the bank must purchase an equivalent option in the market to restore the original position. The difficulty is that option prices change over time and the price at any point depends on the price of the underlying asset to which it relates. Furthermore, the relationship between option prices and the underlying asset tends to change over time. Complexities of a similar nature arise when other derivatives – futures, forwards, swaps, etc., are involved.

The capital adequacy guidelines address these points by setting out a methodology which translates notional contract values of derivatives into figures more representative of the true risk facing the bank. Capital is then charged against this new amount consistent with the treatment of on-balance sheet items.<sup>6</sup> Using these credit equivalents, derivative exposures of banks can be put currently at around \$50 billion in credit equivalent terms, a figure 40 times less than suggested by the

gross figures (and about a seventh of banks on-balance sheets assets).

The appropriateness of this technique relies heavily on the appropriateness of the conversion or translation factors used in these calculations. These, however, tend to vary over time, in response both to economic cycles and to on-going developments in the market. There is, for example, some evidence from the US that just as default rates in traditional banking activities have risen in the past few years, that same trend has been observed for derivatives as well. However, allowing for that, credit risks attached to derivatives remains very small in absolute terms and appears to be well covered by current capital guidelines.

The issue of on-going trends in the market is more difficult to address. While the bulk of bank's derivative activities tend to be at the less complex end of the spectrum, developments have led to increasing degrees of complexity in the type of products available and, quite possibly, increasing degrees of riskiness. This raises the question of the appropriateness of conversion factors, derived from empirical analysis of the market five, six or more years ago (and prior to the introduction of the 1988 Capital Accord) to the market today.

A good deal of work is currently being done within central banks and supervisory authorities world-wide to keep track of new derivative products, and consider the extent to which the conversion factors within the existing capital guidelines are still adequate.

## Market Risk

By their nature, derivatives also carry market risk. Prices of obligations or options to trade assets, or to swap income streams with counterparties, are affected by changes in the market prices of the underlying assets.

However, the market risk is conceptually distinct from the credit risk referred to above even though credit risk is itself influenced by market prices. Credit risk is the risk of incurring losses (ie. the replacement cost rises) when a

6. Foreign Exchange contracts with original maturities of 14 days or less and instruments traded on futures and options exchanges that are subject to daily market-to-market and margin payments are excluded from the capital adequacy guidelines.

counterparty defaults. It arises even when a bank has completely hedged against movements in prices. Market risk, on the other hand, arises when the bank holds an 'open' position; that is, when it is less than fully hedged.

Consider a bank which has contracted to exchange fixed rate payments for payments associated with a floating rate instrument. The value of the swap fluctuates with market interest rates. If the counterparty subsequently defaults, the bank loses any profits that may have built up on the swap. This is credit risk. But there is also a risk that these profits might evaporate (or become losses) when market interest rates change. This is market risk.

Supervisors seek to address market risks attached to derivatives in a variety of ways (by discussions with banks on risk management systems, analysis of individual products, etc). However, it is the case the current capital adequacy guidelines do not explicitly take into account market risks, whether on- or off-balance sheet. The proposed market risk standards which have been developed by the Basle Committee and released recently to the market for comment, extends the existing capital adequacy framework to incorporate risks generated by banks' in their market-related activities.

The Basle Committee intends to collect comments on its market risk proposals by end 1993 and review them in the light of those responses. Firm proposals will emerge from the Committee after the process is complete.

### Operations Risk

Despite the technical problems in measuring risks in derivatives, the main problems experienced overseas have come about as a result of the absence of basic internal controls. A key characteristic of derivatives is that they are traded contracts. Management of derivatives must, therefore, address issues similar to those arising from the trading of more simple products, such as bank bills. Issues here include the proper separation of the trading room from administrative areas to prevent fraud, ensuring compliance with limits set by management and secure settlement systems. Complex risk

reports have to be generated by computer and absorbed by management.

Derivative products, particularly options and the more complex contracts, are valued using theoretical, mathematical models. Similarly, hedging and trading strategies are based on such models. The appropriateness of such models (and the effectiveness of any risk management strategy based on them) depends on the validity of the assumptions behind the models. The most basic of these assumptions is that history is the best guide to the future and that demonstrated price volatility is the best estimate of future volatility. This, of course, is not always the case. Such problems require banks' management to not only have a good understanding of the risk measures used in derivatives trading, but also the limitations of those measures.

The Reserve Bank encourages banks to ensure that they have developed systems to address these risks. For example, where banks have sought to deal in foreign exchange options, the Bank has been at some pains to ensure banks are conscious of the risks involved and have appropriate expertise (both personal and systems) to deal with them.

Supervisory arrangements put in place in 1986 concerning the duties of banks external auditors, also place on them a responsibility to assess and report on systems and controls within banks', including those covering derivatives.

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## 4. Systemic or macro issues

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Here the focus of the debate centres on the implications of the growth in derivatives for system stability. The issues of concern include:

- *Increased Linkages* – financial deregulation, progress in computer technology and the development of financial instruments (including derivatives) have strengthened linkages within domestic and international financial markets. By many measures, these developments have been positive. Quoting the recent BIS paper:

... from the perspective of the financial system resilience to market disturbances, linked markets can act as a safety valve. By offering alternative sources of supply and demand, price changes may be transmitted from one market to others and can help diffuse disturbances.<sup>7</sup>

But it is also noted that these close linkages can be destabilising – with the potential for disturbances to be reinforced, perhaps even amplified, across markets. Derivatives may play a role in this process because of their ability to link different markets, even across borders.

- *Risk Concentration* – while derivatives offer the potential for spreading risk more evenly across the financial system, there is also the possibility that risk could, in fact, become more concentrated as a result of their use. The concentration of derivative exposures within banks in the US is well documented and a similar situation applies in Australia and other countries where derivative activities are sizeable.
- *Decline in Transparency* – derivatives enable financial institutions to change the nature of their exposures. For example, the linking of a currency swap with a standard loan can effectively change the currency exposure of the loan. Hence, published accounts may not accurately reflect the exposures and riskiness of financial institutions. A particular concern is that even sound institutions can be caught up in a process where market confidence declines and suspicions arise as to the true risks which all institutions face.

points to the need for continual monitoring and analysis of market developments. Specifically, there is a need to:

- keep abreast of developments in derivative instruments and continually assess prudential standards to ensure they are keeping pace with the market;
- work towards the development of appropriate accounting and disclosure standards – there are no established accounting standards for derivatives and consequently, a great deal of divergence exists internationally on disclosure requirements for institutions' derivative activities. It is worth noting that the International Accounting Standards Committee has released a draft accounting standard on financial institutions which includes provisions regarding derivatives. In Australia, an accounting exposure draft on financial instruments (ED59) has been released recently by the Australian Accounting Standards Board and covers similar territory;
- encourage the development of effective netting arrangements to encompass banks' derivative transactions – under current capital adequacy guidelines, banks are permitted to net (or offset) certain derivative transactions for the purpose of calculating their capital requirements. The Basle Committee on Banking Supervision released in April, a consultative paper to the market containing proposals for more extensive netting arrangements between banks. The issues involved are complex, extending from questions such as the validity of netting under local bankruptcy and banking laws to the appropriate techniques to measure netted exposures. These proposals are under discussion internationally between banks and their supervisors.

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## 5. On-going Issues

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The range of micro and macro issues associated with banks' derivative activities

7. Recent Developments in International Interbank Relations, pp 25-26.