

Australian Banks' Activities in Derivatives Markets: Products and Risk-Management Practices¹

Introduction

In March of this year the Bank circulated a questionnaire on derivatives to all 38 banks operating in the Australian market. The questionnaire sought information on the products being traded by banks, the maturity composition of banks' derivatives portfolios and banks' counterparties. Information was also sought on banks' strategies in derivatives markets, and on their risk-management practices.

This article reports some results from that survey, with the main features of the quantitative data presented in the first section; the second section presents some of the qualitative information supplied by banks.

Derivatives Activities – Structure, Size and Nature of the Market

Structure

Institutions involved in derivative activities are typically categorised into two main groups – end users and dealers. End users use derivatives predominantly to hedge balance

sheet activities, but also to lower funding costs, diversify funding sources and enhance yields. Dealers, on the other hand, create and market derivatives, commit capital to satisfying customers' demands for derivatives, and quote both buying and selling prices for derivatives.

We have adopted a broader classification of the derivative activities of Australian banks, identifying five groups:

- *End users – regional*: defined as domestic regional banks whose derivatives activities are predominantly driven by their hedging requirements.
- *End users – foreign*: foreign banks whose derivatives activities are driven mainly by their hedging requirements but who tend to adopt rather more sophisticated risk-management practices than regional banks.
- *Dealers – basic*: derivatives activities of these banks are geared mostly to servicing customer needs, and they do little in the way of very sophisticated (or 'exotic') business.
- *Dealers – intermediate*: the majority of these banks' derivatives activities is related to servicing customer needs but they also offer exotic interest rate and cross-currency interest rate swaps.
- *Dealers – advanced*: dealers who in addition to offering straight-forward ('plain vanilla')

1. For further information, see 'Supervision of Banks' Derivatives Activities' in the August 1993 issue of the *Bulletin*.

Table 1: Australian Banks by Type of Dealer/User
(number of banks)

Dealer – advanced	Dealer – intermediate	Dealer – basic	End user – foreign	End user – regional
7	8	8	5	10

products also offer exotic option and other derivative products, including products involving metals, energy, commodities and equities.

Table 1 shows the distribution of banks according to that classification.

Activities

Estimates of banks' foreign exchange and interest-rate contracts outstanding are presented in Table 2.² Two measurements are shown. The first, based on notional principal

amounts, represents the face value for which the derivative contracts have been written. The second column shows the corresponding 'credit equivalent' values. The latter figures provide a more realistic indication of actual and potential credit exposures associated with the outstanding contracts.³

The survey shows gross outstanding derivatives obligations of banks totalling around \$2,300 billion in March 1994, which translates into an actual credit exposure of just over \$50 billion.

Table 2: Banks' Derivatives Activity
(contracts outstanding March 1994)

	Notional principal \$ million	Credit equivalent \$ million
Foreign exchange		
Forwards	724,649	27,513
Futures	932	0
Options	80,614	1,414
Cross currency interest rate swaps	77,849	7,920
Total	884,044	36,847
Interest rates		
Forward rate agreements	309,546	489
Futures	315,148	0
Swaps	532,379	13,969
Options	177,913	611
Total	1,334,986	15,069
Other markets		
Precious metals	12,043	490
Energy products	316	14
Base metals	4,474	88
Stocks and share market indices	35,440	10
Total	52,274	602
Total	2,271,304	52,518

- The notional principal figures need to be viewed with caution. When two reporting banks engage each other as counterparties in a derivatives transaction, the value of this transaction is counted twice.
- For further information on the concepts of notional principal amounts and the derivation of credit equivalent values, see 'Supervision of Banks' Derivatives Activities' in the August 1993 issue of the *Bulletin*.

The bulk of banks' activity remains concentrated in the simplest types of derivatives, such as:

- forward foreign exchange;
- fixed-for-floating interest rate swaps;
- interest rate futures; and
- forward rate agreements.

Together, these products account for 80 per cent of banks' total obligations. Much of this business is conducted on organised exchanges – principally the Sydney Futures Exchange – rather than in direct counterparty-to-counterparty trades, known as 'over-the-counter' (OTC) business.

Exotic derivatives, defined broadly as combinations or complex variations of standard derivatives, represent only a small part of the overall business conducted by banks in these areas (four per cent of the total). The survey indicated, however, that first generation exotic derivatives are now used by a growing number of Australian banks. Such

products include variations of the standard interest rate swap, such as deferred-start swaps, swaps with a variable notional principal, floating-for-floating swaps (also known as basis swaps) and zero-coupon swaps. Table 3 shows the number of banks using these particular products; Attachment 1 defines these instruments.

Table 3: Banks Using Exotic Interest-Rate Swaps
(number of banks)

Basis	Zero coupon	Deferred start	Variable principal
11	6	10	17

At the most sophisticated end of the market, activity is restricted to a small number of banks-categorised here as 'advanced dealers'. Exotic options (such as average-rate options, options written against a basket of currencies

Table 4: Maturity of Transactions
(percentage of business in each time band)

	Up to and including 1 year	More than 1 year; up to 5 years	More than 5 years; up to 10 years	More than 10 years
Foreign exchange				
Forwards	93	6	1	0
Standard options	79	20	1	0
Exotic options	46	52	3	0
Cross currency interest rate swaps				
Standard	28	53	18	1
Exotics	39	44	14	2
Interest rates				
Forward rate agreements	91	9	0	0
Standard swaps	38	54	8	0
Exotic swaps	28	57	14	1
Swaptions	45	43	11	0
Standard options	55	43	2	0
Exotic options	44	53	3	0
Gold	43	54	3	0
Silver	68	30	2	0
Energy products	94	6	0	0
Base metals	41	59	0	0
Stocks and share market indices	6	94	0	0
Total	70	26	4	0

and options written against other options) are found principally in foreign exchange markets and even there, they accounted for only 0.32 per cent of foreign exchange outstandings (measured by notional principal).

Activity in derivatives written against underlying markets other than exchange rates and interest rates is small. Derivatives written against precious metals, base metals, equities and other commodities make up just two per cent of aggregate activity. Only eight of the 38 banks in the survey reported any involvement in these markets. Where such activity does occur, the emphasis remains on simple products – futures, forwards and exchange-traded options. In a number of instances, banks' dealings in these markets are restricted to direct intermediation – where transactions with Australian counterparties are directly offset by transactions with foreign banks.

The survey shows that by far the greater part of business in Australia is conducted in relatively short-dated contracts. Seventy per cent of banks' aggregate derivatives activity has a term to maturity less than one year. A further 26 per cent carried maturities of between one and five years. Only four per cent was in maturities of five to ten years. Transactions with maturities greater than ten years were negligible (see Table 4).

Business Trends and Risk-Management

Banks were asked about the general direction they were taking or intending to take their activities in future, and their approaches to the measurement and management of risks arising from derivatives business.

Trends in the Markets

Banks generally considered that the derivatives market was likely to grow over time, both in size and complexity. Most banks also saw their own involvement in the market growing over time, expanding into the more

sophisticated products, and embracing a wider range of customers.

Specific products most frequently cited as likely to *grow in importance* were interest rate and cross-currency swaps (by end users and basic dealer banks) and foreign exchange options (by dealer banks). Several end users observed that growth in their use of derivatives would be directly linked to their hedging requirements, and therefore to growth in balance sheets. Others saw their involvement in derivatives activity as essentially demand driven, and dependant on the evolving needs of the corporate sector.

Banks dealing in more advanced products pointed to the likelihood of growth in exotic interest rate swaps and options, structured derivative products (for example, securities with options embedded in the coupon payments), and the application of derivatives to commodities, metals and equity markets. Banks' increasing interest in commodity markets as a source of demand for derivative products partly reflects the changing role of a number of commodity marketing boards; as these boards cease to protect producers from fluctuation in commodity prices, banks are seeking to offer commodity producers derivatives products to manage price risks.

Those banks identifying products or markets which were *declining in importance* pointed generally to the more traditional products being overtaken in time by more sophisticated, structured instruments which offered higher profit margins or better risk/return pay-offs. Some banks cited the growth in new products being offered by the organised exchanges as a factor leading them to place less emphasis on some of their present derivatives activities.

Very few banks, however, have withdrawn from any derivatives market, although several noted specifically that they would not trade in markets which they found too risky. Options markets (across all underlying assets) were most often viewed as risky by respondents, for reasons which included the lack of interbank price makers, the complexity of products and a scarcity of skilled staff.

Risk Management

In July 1994, the Basle Committee on Banking Supervision released guidelines for 'best practice' in managing the risks associated with derivatives. They covered the appropriate oversight of the risk management process by boards, management and auditors. They also set out risk-management practices in respect of market, credit and other forms of risk. This followed a somewhat similar report a year earlier from the Group of Thirty (G30), an international group of private bankers and other derivatives market participants. Responses to the Bank's survey, enable a preliminary assessment to be made of the risk-management practices of Australian banks relative to international best practice.

Overall, it appears that Australian banks have controls and procedures in place which are appropriate to the nature and extent of their derivatives business. There is a good deal of variation in practice among the various banks but, in large part, that reflects differences in the volume and scope of business being done by the various banks.

One of the more important recommendations of the Basle Committee concerned the role of a bank's *board of directors* in overseeing its derivative activities. Specifically, the Committee proposed that a bank's board should approve all significant policies relating to the management of derivatives and that these policies should be consistent with the organisation's broader business strategies, capital strength, management expertise and overall willingness to take risk.

Two thirds of Australian banks indicated that their policies and practices relating to derivatives (including the purpose for which derivative transactions are used) were

explicitly approved by the board. Of the remainder, policies generally were approved by head office (in the case of foreign bank branches and subsidiaries) or the senior management.

Most banks reported their performance on derivatives business to their boards on a regular basis; bi-monthly reports being the most common (24 banks). Several banks indicated that while derivatives activity was reported to the board, it was aggregated with physical trading in the underlying markets. Profitability and performance were monitored more frequently by senior management of the banks with daily reporting in 33 banks. In addition, senior management in most banks received regular reports outlining the bank's market and credit risk exposures. In a few cases, management also received the results of applying various scenarios of changes in interest rates, exchange rates and other prices to the bank's portfolios.

The G30 report recommended that dealers *measure the components of revenue* regularly and in sufficient detail to understand the sources of risk. By identifying and isolating individual sources of revenue, dealers develop a better understanding of the risks and returns on derivatives activities.

Around half of the banks indicated that they disaggregated revenue among different types of activity. These figures, however, need to be seen against the difficulty in distinguishing alternative revenue sources. The revenue attributable to running open positions on the one hand and market making on the other is difficult to define. Acting as an intermediary typically means being a price maker in a market, and this, in turn, generally requires that the bank concerned take on some market-risk exposure. Table 5 shows the proportion

Table 5: Proportion of Banks Identifying Sources of Revenue
(percent)

Dealer – advanced	Dealer – intermediate	Dealer – basic	End user – foreign	End user – regional
100	50	38	60	20

of banks, in each group, which categorise revenue according to the type of activity generating the revenue.

Where banks' derivatives activities are significant in scale, it is considered good practice that banks set *profit targets* for that business which avoid creating pressures for excessive risk taking. The survey shows that the majority of banks do, in fact, set profit targets; those which do not tend to be end users or basic dealers. Several banks indicated that they set targets for aggregate portfolio returns, rather than distinguishing between derivatives and physical instruments. Most banks setting profit targets communicated these to staff as part of regular budgeting processes.

Both the Basle Committee and the G30 report emphasise that *independent monitoring and management of risk* (as distinct from that done by the traders themselves) is vital to effective risk management. Almost all banks operating in Australia have such groups to monitor market, credit, legal and other risks. In many cases, independent monitoring of risk exposures is conducted in a number of separate areas within the bank, including the credit department, asset and liability management committee and through an in-house legal counsel.

As outlined in the Basle recommendations for banks' risk management, an equally important part of reviewing internal controls is *independent internal and external audits* of derivatives activities. Internal audit of derivatives operations is conducted regularly (annually or more frequently) in almost all banks operating in the Australian market. The derivatives activity of all banks is subject to external audit scrutiny.

Market Risk

Market risk refers to the possibility of loss due to movements in market prices, such as exchange rates and interest rates. All banks reported that they had systems in place to identify and measure market-related risk, although the degree of sophistication varies widely among banks.

Most banks have a *formal system of limits* to control the amount of market risk exposure for all products which the bank trades. Several banks indicated that they have explicit policies which prevent them trading products without a limit in place. Those few banks without formal limit systems for all products were those with relatively low levels of business.

The Basle Committee and the G30 both state that analysing *stress situations* is an important aspect of risk measurement. Simulations of improbable market environments can help in risk analysis because many assumptions which hold in normal market conditions might not always hold true. The Basle Committee recommended that worst-case analyses take into account the effect of unusual changes in prices, market illiquidity or the default of a large counterparty. The majority of Australian banks perform stress tests, and are developing the capacity to regularly conduct worst-case scenario analysis or allow for worst-case scenarios when setting market-risk limits; those in the minority are mostly end-user banks. In some cases, however, the stress tests employed are relatively rudimentary – for example, shifting interest rates up and down by one percentage point and evaluating the change in the value of the bank's portfolios.

Table 6: Stress Testing
(number of banks)

Yes	No – but developing stress testing methodology	No – stress scenarios accounted for in limits	No
18	6	3	11

Credit Risk

Credit risk is the risk of loss associated with counterparty failure. The credit risks faced by banks in their derivatives (and all other) activities, therefore, hinge on the quality of the parties with whom banks deal.

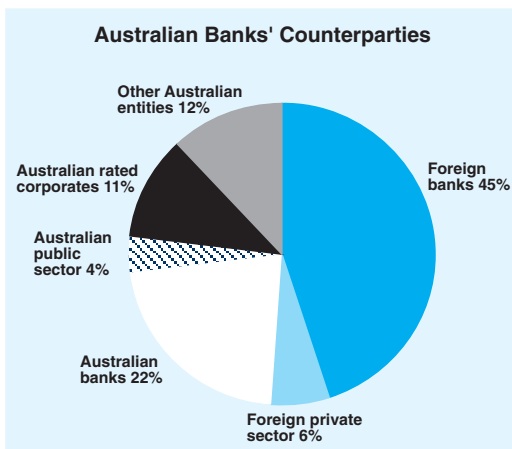
The survey shows that interbank trading accounts for two thirds of Australian banks'

aggregate derivatives business. Two thirds of that activity, in turn, is conducted with foreign banks. Banks also carry significant derivatives exposures to the corporate sector. Overall, the survey results suggest that the split of business between corporates rated by the main ratings agencies and unrated companies is relatively even. The types of products commonly used by smaller corporate counterparties are packaged loan products with embedded risk-management features (for example, a loan which incorporates some features of an option), and risk-management products designed to cover foreign exchange risk faced by exporters and importers.

While relatively small in aggregate terms, public sector enterprises account for a significant proportion of banks' interest rate and cross-currency interest rate swap business. A number of banks pointed to the expansion in the funds-management sector as a likely source of growth in the future.

Graph 1 shows the composition of banks' counterparties across their aggregate derivative activities.

Graph 1



Aggregation

Prudence dictates that credit exposures on derivatives and all other credit exposures to an individual counterparty should be calculated regularly, aggregated for monitoring purposes, and compared against credit limits. This enables a bank to determine its overall exposure to a customer and helps

the institution to take more responsive risk-management decisions.

Most banks sum counterparty exposures incurred through derivatives transactions with other exposures to the same client. At present, however, a number of banks aggregate transactions only for counterparties with whom they have significant exposures. Other banks aggregate exposures manually rather than having automatic systems in place. Banks which do not aggregate exposures across product lines tend to set separate limits on counterparties' transactions in derivatives and other banking products.

Most banks indicated that exposure to counterparties is re-evaluated on a daily basis. All banks have procedures to prevent deals with clients for whom there is no credit risk limit in place. The most sophisticated have systems which ensure that it is not possible to enter deals with unauthorised counterparties into the bank's trading and accounting systems. At the other end of the spectrum, where the degree of sophistication is lowest, traders are required to manually check credit exposure reports before entering into a derivatives transaction.

Loss Experience / Legal Issues

Losses incurred by all Australian banks over the past five years as a result of counterparty default in derivatives transactions totalled approximately \$12.5 million. While a number of banks reported instances of counterparty default, in most cases they had received full payout from the liquidators, and thus suffered no actual loss. In other cases, counterparty defaults have related to corporate facilities where derivatives transactions were connected with a loan. In these cases, losses on the loan overshadowed the losses incurred on derivatives transactions.

Legal risk was viewed by many banks as potentially a more serious problem in the Australian market than traditional counterparty default. Legal risk is the risk that contracts with counterparties may not be enforceable because these counterparties did not have the legal power to enter into derivative transactions. Banks identified a

range of counterparties which raised such problems, particularly those bodies constrained by statute to using derivatives for hedging purposes only. The statutory formula used to define the circumstances in which these bodies may enter into derivatives transactions often creates an environment in which it is difficult for financial institutions to be certain that the bodies have the requisite legal capacity.

An associated issue highlighted in banks' responses to the survey was the need for a sound legal foundation for netting arrangements between counterparties. The bilateral or multilateral netting of contractual payments due on settlement dates, and of unrealised losses against unrealised gains in the event of a counterparty's default, is an important means of mitigating credit risk. In July, the Basle Committee amended the Basle Capital Accord to recognise the effectiveness of bilateral netting in reducing credit risk faced by banks in those jurisdiction where it can be shown to be legally robust. The survey suggests that some doubt remains in the minds of Australian banks on this issue. Although many banks have netting agreements in place with a substantial proportion of their

counterparties, only a small number measure credit exposure on a net basis for internal purposes.

Forms of credit risk enhancement, other than netting, are not widely used by Australian banks. Only a small number reported that any significant proportion of their counterparty exposure was covered by collateral, margining requirements (whereby credit exposure is paid when it is incurred as market rates move, rather than accumulating between settlement dates), or third party guarantees.

Conclusion

Banks' responses to the survey suggest that, overall, banks have reasonable controls in place to manage derivative activities, although the situation is uneven, partly reflecting differences in the scope and scale of banks' activities. The Bank has more work to do to get a better handle on the adequacy of existing risk management systems, and will be following up the results of the survey in direct discussions with individual banks.

Appendix : Exotic Interest Rate Swaps

The typical interest rate swap involves an exchange between counterparties of cash flows; one based on a floating rate of interest and the other based on a fixed interest rate. Exotic interest rate swaps are variations on that basic theme. They include:

- basis swaps – where cash flows based on different floating rates are exchanged;
 - zero coupon swaps – where one counterparty pays a regular cash flow based on a floating rate of interest in
- exchange for a single payment from the other counterparty at the maturity of the swap contract;
 - deferred start swap – where the effective commencement date of the swap is delayed; and
 - variable principal swap – where the notional principal on which the cash flows are based varies over time, rather than remaining constant as is the case in normal swap contract.