Bank Share Prices and Profitability

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This paper considers the influence of economic conditions and financial markets on Australian bank share prices and profitability. It uses time series analysis to obtain an indication of the effectiveness of banks in managing their exposures to interest rates and exchange rates. The results give rise to some comments on the extent to which banks actively manage their exposures to financial and economic variables. The discussion of risk management activities necessarily raises the question of how recent regulatory initiatives will affect bank behaviour in these areas.

Preamble

The performance of Australian banks has varied widely since the deregulation of the financial sector. This has led to concerns over the ongoing profitability of banks and their financial stability. This paper examines both bank profits and share prices in order to measure the sensitivity of bank performance to changes in economic and financial variables, particularly interest rates. Bank share prices are worthy of study for two reasons: bank management is concerned with maximising shareholders' value; and share prices often give a better reflection of an entity’s performance than reported earnings.

Bank boards and managements aim to increase the value of the bank's outstanding shares because such a policy encourages a stable share register. In addition, high equity returns will facilitate the raising of additional capital. Bank management must therefore be aware of the major economic and financial factors that affect the banking sector and arrange their affairs so as to ensure that these factors have a positive influence on their share price.

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The sharemarket's evaluation of a bank's value is arguably more accurate than the picture conveyed by its financial accounts. Financial statements suffer from a number of inherent deficiencies when used to value a bank. For practical reasons, conservatism and historic convention, the financial statements of banks do not reflect the market value of their funding, investing and trading activities. In addition, the desire for smooth earnings has determined the timing of security sales and transfers to and from reserves - thereby resulting in under and overstatements of profitability.\footnote{Holdaway (1989) shows how much adjustment is required before reported bank profits can be used in valid comparisons. Barth, Beaver and Wolfson (1990) identify the problem of excluding unrealised gains and losses with specific reference to the securities gains and losses reported by US banks. Dermine (1987) provides a theoretical exposition of the measurement of the market value ("economic value") of a bank.}

The first section of the paper discusses the way in which interest rates affect bank profits. The empirical part of the study begins by looking at the major factors affecting reported profitability, but then moves on to look at the value of Australian banks as measured by the Australian Stock Exchange's Banking and Finance share index. The explanatory variables tested include interest rates, exchange rates and measures of economic activity.

The property market was the over-riding influence on bank profitability in the past decade. Property prices increased sharply throughout the 80's, allowing the banks to expand their loan books at reasonably good margins, and slumped in the early 90's, requiring very large bad debt provisions. However, property lending is not the only source of bank revenue. Property loans are a significant component of bank operations but the lending excesses of the 90's have led to a return to more appropriate credit policies and the staff training required to implement them. In contrast, other aspects of banking (e.g. securities and derivatives trading) have not attracted as much public scrutiny in terms of their impact on bank profitability and are only now receiving attention in regard to the possible risks they create for ongoing bank viability. In an attempt to focus the analysis on these other activities, we have tested the effect of adding back the bad debt expenses to bank profits in some of the regressions reported below.
A final section of the paper looks at the recently released BIS proposals on the measurement and control of interest rate risk and suggests ways in which these proposals will influence the activities of bank management.

**The Impact of Interest Rates on Banks**

As financial intermediaries banks’ interest rate margins are the basic source of their profits. Movements in interest rates can affect these interest rate margins and therefore bank profitability.

Leaving aside taxation, banks’ profits can be partitioned as follows:

\[ NY = (r_A - r_L)TA + NIY - OC \]  

where \( NY \) = net income  
\( TA \) = total assets  
\( r_A \) = average return on assets (defined as interest received divided by total assets)  
\( r_L \) = average cost of liabilities (defined as interest paid divided by total assets)  
\( r_A - r_L \) = aggregate interest rate margin  
\( NIY \) = non-interest income (account charges, transaction fees, commissions, fees for technical advice, etc)  
\( OC \) = operating costs (including bad debt expense).

Movements in bank profits can be explained by reference to the influences on the components of net income given in (1). For example, a decline in economic activity

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3 The Appendix discusses a DGAP measure of the sensitivity of a bank’s capital to changes in interest rates.
would generally lead to a decline in non-interest income (via a fall in the volume of transactions and the level of financial activity) and an increase in operating costs (especially through an increase in bad debt expense).

Non-interest income includes income from trading operations - i.e. in foreign exchange, money markets, fixed interest markets and derivative products. The level of this income is likely to depend on the volatility of financial variables (such as exchange rates, interest rates and share prices) rather than on their absolute levels. Changes in interest rates and exchange rates generate realised and unrealised gains and losses. Both have an impact on the economic performance and the wealth of a bank but only realised gains and losses have an impact (through non-interest income) on reported profitability. Accounting standards to date have not required all unrealised gains and losses to be marked to market and they do not therefore affect reported results.

With regard to interest rate trading, it is sometimes suggested that the BIS capital adequacy controls might create a moral hazard leading to increased speculative position taking by banks. Commonwealth Government Securities (CGSs) are riskfree but still attract a risk weighting under the Capital Adequacy requirements\(^4\) albeit a relatively low one. The need to service a large capital holding may induce banks to take large trading positions in bonds in order to increase their non-interest income. However, the evidence discussed below suggests that the major Australian banks have not succumbed to this moral hazard.

The major impact of movements in market interest rates on Australian bank profitability is likely to occur through the interest rate margin \( (r_A - r_L) \). If the bank maintains a constant margin so that the average return on assets is adjusted whenever the cost of liabilities changes in response to movements in market interest rates, these movements will have no effect on bank profits (see the Appendix for a more detailed discussion of

\(^{4}\) Where the maturity is greater than one year.
this point, one which is based on the assumption that bank security holdings are marked to market).

There are, however, a number of reasons why the average returns on assets and liabilities cannot simply be adjusted to maintain bank profitability. Amongst these:

* banks have a number of assets on which rates cannot be adjusted rapidly. These include the housing mortgages still subject to an interest rate ceiling and government securities;

* with most bank loans there is considerable political and media pressure against the adjustment of rates e.g. on consumer loans and variable rate mortgages; and

* banks have a proportion of their liabilities in the form of term deposits which may be at fixed interest rates for two years or more.

It is true, of course, that the fixed rate liabilities offset the fixed rate or quasi-fixed rate assets to some extent. Indeed, banks will have deliberately funded fixed rate assets out of fixed rate liabilities to reduce their exposure to interest rate movements. Nevertheless, they cannot achieve perfect matching. For example, regulated mortgages cannot be "laid off" because they were not issued at market interest rates. It seems likely that bank income will tend to fall as interest rates increase and vice versa.

Interest rate movements will also induce behaviour on the part of customers which will affect banks’ aggregate interest rate margins. Specifically:

* customers will tend to move their funds from low interest rate deposits into higher yielding deposits (e.g. from savings-investment accounts to money market accounts) when interest rates rise and especially when the yield curve is inverse; and
• borrowers on fixed rate loans will prepay the loans when market rates fall and this can result in substantial losses for banks (see Daugaard (1992)).

Banks are under pressure to earn the required rate of return on their capital. This means that when interest rates change, they will attempt to adjust their deposit and loan rates so that they maintain their existing interest rate margin. The returns on assets and liabilities whose rates can be adjusted may need to take up the slack created by fixed rate assets and liabilities or those whose rates can be adjusted only with a lag. Banks' reactions will also depend on the elasticity of the demand for the asset/liability in question (see Valentine (1992)).

It is also possible that banks' profits depend on the slope of the yield curve (the long rate minus the short rate). It is commonly said that banks "borrow short and lend long". If this characterisation is correct, banks should be favoured by a normal yield curve and earn lower profits in an inverse yield curve environment. This description is, however, less relevant in the deregulated environment than it was in earlier periods. Banks now offer a large proportion of their deposits and loans in a floating rate form so that they are all essentially short-term.

This discussion has indicated two hypotheses to be tested:

• bank profits depend positively on market interest rates; and

• bank profits depend positively on the difference between long-term and short-term interest rates.

Rejection of these hypotheses suggest that banks have been successful in insulating their income from movements in interest rates.
Graph 1  2 Year Bond Yield
Source: RBA Bulletin

Graph 2  Bank held Commonwealth Government Securities
Source: RBA Bulletin
Holdings of Government Securities of Australian Banks

The Australian bond market, along with major overseas bond markets has recently gone through large interest rate falls. Graph 1 shows that the two year Commonwealth bond rate fell 10 percentage points between June 1989 and June 1992. The ten year bond rate fell almost 7 percentage points over the same period. In spite of this strong downward trend in yields, Australian banks did not increase their holdings of CGSs. Graph 2 shows the fairly stable levels of the banks' CGS investments over this same period. As a percentage of total assets, banks' holdings actually declined over the period of falling interest rates\(^5\). The reduction in bank holdings was essentially driven by changes in the PAR - with the banks reducing their holdings to as low as possible under PAR. The Reserve Bank of Australia (RBA) reduced the PAR from 10% to 6% in stages throughout the first half of 1990\(^6\). Offsetting this 4% fall, the RBA tightened the definition of prime assets to exclude Non-Callable Deposits (NCDs). NCDs represented 1% of the PAR base at the beginning of 1990. From February 1990 to June 1990, bank holdings actually followed the minimum level, falling by 33% - this represents the 3 percentage points fall in the PAR base\(^7\). As a percentage of total assets, CGSs made up almost 10% of bank investments at June 1988 but fell to 7.5% by June 1989 and have been around 5.5% since June 1990. This divestment is also evident from a review of the Australian Bureau of Statistic's new Financial Accounts publication (Cat. No. 5232.0). "The Financial Accounts record that banks ran down holdings of long-term debt securities - even through the greatest bull market in living memory" (Erskine (1993)).

\(^{5}\) This pattern was also evident in Australian banks' holdings of Semi-Government securities and it is not clear that it was offset by significant position taking through interest rate swaps. As a percentage of total assets, bank holdings of Semi-Government securities fell consistently by .5% p.a. between 1989 and 1992. Banks' interest rate swap positions did grow throughout this period, but the growth reflected that experienced by end users (i.e. corporates, institutional investors and banks hedging their own interest rate exposures) and can be fully explained by the increase in customer demand for the product.

\(^{6}\) See RBA (1990a).

\(^{7}\) It is unlikely that there was increased position taking between reporting dates. The RBA (1990b) reports that trading volumes for CGSs fell from $1.5 billion per day in 1989 to $1 billion per day through 1990 (i.e. the first half of the bull run). This was mainly attributed to a diminished supply of CGSs resulting from budget surpluses.
Not all Australian banks reduced their holdings of CGSs through the bull market. In particular, Bankers Trust Australia and Macquarie Bank both doubled their holdings of term CGSs.

To give an indication of the size of the profits that banks could have achieved by increasing their securities holdings, we have estimated the capital gain earned on the minimal volumes actually held. Assuming an average maturity of five years was maintained throughout the period, the $20 billion of bonds actually held would have returned an average of $3 billion per year in capital gains.

The banks’ lack of response to the bull market contrasts strongly with the behaviour of US banks through the US bull market. Graph 3 shows that two year US Government bond yields fell by 5.5 percentage points - ten year yields fell by 3 percentage points. During this period, US commercial banks increased their holdings of Government securities from US$320 billion to US$600 billion. The US banks responded to the interest rate falls by channelling 7.5% of their funds into this profitable investment (i.e. from 11.5% of total assets in early 1988 to 19% by the end of 1990).

**Profitability**

In order to capture both the influence of financial markets and the real economy, a profit equation involving short-term interest rates, the term structure of interest rates and the unemployment rate has been constructed. The hypotheses listed at the end of the section before last indicate the inclusion of both the level and the slope of the yield curve. The unemployment rate has been chosen as an indicator of economic activity. An alternative variable (considered originally) is the Australian All Ordinaries Index. Daugaard and Valentine (1992) reported evidence that although this index reflects domestic economic activity, it is more dependent on international capital markets. The unemployment rate was chosen because it is more closely associated with Australia’s economic performance.
Graph 3  US 2 Year Bond Yield
Source: Federal Reserve Quarterly Review

Graph 4  US Bank held US Government Securities
Source: Federal Reserve Quarterly Review
The model was tested using quarterly observations from 1983 (March) to 1991 (September).

\[ \log P = 17.16 - 2.70 \log R - 0.20T - 1.86 \log U \]

\[ (17.03**) \quad (7.31**) \quad (5.97**) \quad (7.61**) \]

\[ \bar{R}^2 = 0.83 \quad DW = 1.76 \]

where

- \( P \) = bank operating profits
- \( R \) = interest rates on 90 day bank bills
- \( T \) = term structure (ten year Government bond rate minus the 90 day bank bill rate)
- \( U \) = unemployment rate

\[ \bar{R}^2 = \text{Adjusted Coefficient of Determination} \]

( ) = t-value
* = coefficient significantly different from zero at 5% level
** = coefficient significantly different from zero at 1% level

\[ DW = \text{Durbin-Watson Statistic} \]

The variable for bank operating profits is the sum of the after-tax profits (before extraordinary items) of the three major fully listed banks on a half yearly basis (from interim and final profit announcements). These banks make up the bulk of Australian banking activity and represent most of the banking and finance index\(^8\). This is not to suggest that bank operations are homogenous across the spectrum of Australian banks, but the large banks (with their particular operational focus) dominate Australian banking. Although there is the possibility that some of the variables might have a delayed impact on profits, a lagged dependent variable cannot be used because the same half yearly profit will follow in subsequent quarters. However, when the model is tested

\[ ^8 \text{Using reported assets as at October 1992, the three major, fully listed banks' assets represented 50% of all banks in Australia, 63% of all banks included in the banking and finance index, and 89% of the index prior to the partial listing of the Commonwealth Bank (i.e. prior to September 1991).} \]
using half yearly observations it provides consistent results and shows no evidence of a
significant lag.

R is a measure of the level of interest rates. Its negative coefficient is in line with the
earlier discussion. Banks may also make realised capital gains on their security holdings
when interest rates fall. This income has not, however, been very large because the
banks have not taken large strategic positions in fixed interest markets.

The interest rate level, R, could also be acting as an additional economic indicator.
When interest rates are high, levered investments are less profitable and economic
growth is retarded. However, when interest rates are low there is an improvement in the
economy with a resulting increase in corporate profitability and more opportunities for
successful lending. It must be recognised, however, that interest rates are far from
perfectly correlated with economic activity. The economy continued to boom in spite of
the high interest rates of 1988-1990 and has remained in recession despite the lower rates
since.

The term structure of interest rates also has a negative coefficient which conflicts with
the traditional view discussed in the earlier section. The result could arise from the
probably accidental coincidence of falling bank profits and a positive yield curve. Also,
the slope of the yield curve may be yet another proxy for economic conditions. There
is, however, a well-established theory that a positive yield curve predicts a future
expansion of output (see Lowe (1992)). Under this theory, the term structure variable
has the incorrect sign in the equation reported above.

Unemployment also has a significant negative coefficient which indicates that bank
profitability is positively associated with economic activity. Unfortunately, the choice of
unemployment can cloud the general relationship between bank profitability and
economic activity because of the direct impact of unemployment on banks' bad debt
expenses.
The results suggest that Australian banks have not been able to immunise themselves against changes in the domestic economy. One way to maintain stable profitability in the face of a domestic recession, is to cut back on local investments and replace them with loans to geographically diversified multi-national companies, or directly loans to foreign economies, or fixed interest investments in the domestic economy. Through this most recent recession the banks did not actively pursue these strategies. In fact, they have scaled back their overseas operations (thereby reducing their capacity to assess and make sound loans in foreign economies) and reduced their holdings of CGSs in line with minimum required levels. To reduce their exposure to the domestic economy, Australian banks need to more dynamically pursue these strategies. This conclusion may not be socially palatable, but at the end of the day the banks' shareholders and depositors want the banks' investment decisions to be financially responsible rather than politically correct. Savings are a scarce resource and should be invested as productively as possible by the banks. If the domestic economy does not provide profitable investment opportunities, this is the responsibility of the Government - not the banks.

The Australian dollar exchange rate was also tested in the equation as another important market related variable but without significant impact. The large gains and losses made on banks' offshore assets (and liabilities) are unrealised and therefore, under normal accounting conventions, are not incorporated in reported income. Banks also earn income from foreign exchange trading, but this income is likely to be a relatively insignificant component of total income. If this income was significant it would be due to movements in the exchange rate, rather than its absolute level. Therefore, an additional variable (based on the volatility of the exchange rate) was also included in the equation. Its coefficient was not significantly different from zero. Again this suggests that the banks' trading exposures to exchange rates are not significant.

In an attempt to remove the effect of bad debts and to isolate the effects of the other factors affecting profitability, we used the same variables to explain profits before doubtful debts (and tax).

\[ P_{BDT} = \text{bank profit before doubtful debts expense and tax.} \]
\[ \log P_{BDT} = 17.49 - 2.17\log R - 0.14T - 2.22\log U \]

\[ R^2 = 0.69 \quad DW = 0.58 \]

The revised model was tested using quarterly observations from 1983 (March) to 1993 (March). The extension of the period was made possible because of the positive observations for \( P_{BDT} \) at the end of the period. The results are very similar to the operating profit equation, indicating that the observations made earlier are relevant to bank profitability even excluding doubtful debts expenses.

A serious problem with the new equation is the strong positive autocorrelation in the residuals indicated by the low Durbin-Watson statistic. This may be due in part to the use of duplicate half yearly profits to provide quarterly observations. But it is also a problem when the revised model is run using half yearly observations (i.e. \( DW = 0.68 \)) suggesting that there is a relationship between consecutive profit announcements (e.g. profit smoothing) and that an autoregressive model could give better results for predicting profits before tax and doubtful debts.

The profit equations were also run using inflation-indexed profits. This approach tests the possibility that the explanatory variables are simply acting as proxies for inflation - the more direct test (to include inflation in the model) is impractical because of the high correlation between inflation and interest rates. The results are quite similar to those reported above (allowing for some scaling down of the coefficients) with all the explanatory variables retaining their significant t-values (except for the term structure variable in the original profit equation: its t-value fell from the 5% significance level to 1%).
Share Prices

The second equation seeks to explain the level of bank share prices with operating profit now used as an explanatory variable.

\[
\log S = 2.01 + 0.15\log P - 0.48\log R + \frac{0.58\log S - 0.26\log OS + 0.75ER}{(2.54**)(1.89**)(2.24**)(6.77**)(3.15**)(2.83**)}
\]

\[\bar{R}^2 = 0.94 \quad DW = 2.64\]

where \( S \) = banking and finance index
\( P \) = bank operating profit
\( R \) = interest rate on 10 year Government bond
\( OS \) = Dow Jones US Banking-Money Centre Index
\( ER \) = change in the Australian dollar exchange rate in US dollar terms.

Bank share prices have been modelled using an expanded version of the traditional earnings model which values shares as the discounted earnings stream.

\[i.e. \quad S = \frac{P^*}{R}\]

where \( S \) is the bank share price, \( P^* \) is expected bank profitability and \( R \) is the discount rate. Variables have been added to the model to reflect the determinants of expected earnings.

Profitability is significant at the 5% level but not as significant as the other variables, or as significant as might be expected of such a major explanatory variable in a standard valuation model. This result probably arises from the deficiencies of reported accounting profits which have already been discussed.

The interest rate on ten year Government bonds was selected as an appropriate discount rate because it reflects interest rate expectations over a long period of time. Its long run
coefficient is close to minus unity\(^9\), showing that interest rates mainly affect bank share prices as discount rates and not through a direct influence on expected profitability. This does not mean that interest rates do not affect \textit{actual} bank profitability.

The US bank share price index has been included as a measure of global demand for bank equities. This assumes that fund managers are willing to replace overseas bank shares in the finance component of their equity portfolio with the shares of Australian banks. Although the evidence supporting the "internationalisation" of broad-based indices\(^{10}\) is not strong, there does appear to be some investor interest in the banking sector as an industry sector on a global basis\(^{11}\). Because the Dow Jones Industrial Average has a significant influence on the Australian All Ordinaries Index\(^{12}\), the Dow Jones US Banking - Money Centre Index was selected as a proxy for overseas bank share prices.

The overseas bank share variable is significant which suggests that Australian bank shares may be regarded as worthwhile strategic investments by overseas banks and bankholding companies, or as substitute finance shares for portfolio managers (especially where international diversification is desired). The significance of overseas bank stock prices could also arise because Australian fund managers move overseas when Australian banks are unprofitable.

\[
\text{Interest Rate Coefficient} = \frac{1}{1 - \text{Coefficient of Lagged Dependent Variable}}
\]

\[
= \frac{1}{1 - 0.48} = \frac{1}{0.52} = -1.14
\]

\(^{10}\) For studies suggesting international links between stock markets see Eun and Shim (1989), King and Wadhwani (1990) and Madura, White and McDaniel (1991).

\(^{11}\) The Economist (1992).

The equation indicates that the exchange rate has a significant effect on bank share prices. This effect can have two sources. First, it could represent the perceived effect of the exchange rate on bank profits. The results of the previous section indicate that this variable has no effect on measured income but it may influence the market value of banks. There are likely to have been unrealised capital gains/losses which are not reflected in reported profits. Also, the variable might reflect expectations of future exchange gains or losses on investments in Australian bank shares. In both cases the positive coefficient suggests that exchange rate expectations are extrapolative (i.e. that an appreciation is expected to be followed by further appreciations) which conflicts with the results obtained by Daugaard and Valentine (1992).

The Proposed BIS Interest Rate Risk Measures

The Basle Committee on Banking Supervision recently released proposals on the supervision of banks' market risk and interest rate risk (Basle Committee (1993)). The present paper will consider only the latter proposals. It is an attempt (to some extent successful) to overcome objections to previous proposals (see Dermine (1991)).

These proposals are the second step in the international reregulation of banking, the first step of which was the BIS capital adequacy controls which required banks to hold capital equal to at least 8% of their risk-adjusted total of assets. The latter control was designed to limit credit (default) risk and the risk weights used in the test were supposed to reflect the default risk attached to each class of assets. The control is not entirely consistent in this respect. Commonwealth government securities are given a small non-zero weight although they are free of credit risk. This weight may be an attempt to incorporate an element of interest rate risk into the control, but if so, it is a very imperfect attempt. A two year bond is given the same weight as a ten year bond although the interest rate risk involved in the latter is much higher than that of the former. The capital requirement for, say, a ten year bond does not cover the risk of loss from interest rate movements inherent in these instruments.
A notable characteristic of the existing capital adequacy controls is that they were imposed in virtually the same form in all countries with highly developed banking systems. That is, the control was intended to be internationally uniform. An international approach to bank regulation was deemed to be necessary to ensure competitive neutrality (a "level playing ground") amongst banks based in different countries. Looking at this another way, the unified international approach to bank regulation was made necessary by the high degree of integration of global funds markets created by financial deregulation and technological developments in communications. There are now few limitations on the ability of transactors to locate their transactions in the jurisdiction which is most favourable to them. Uniform regulation was therefore necessary to prevent the development of competition in low levels of bank regulation as countries attempted to attract financial business.

The most recent BIS proposal has abandoned the attempt to make international bank regulation uniform. It leaves domestic regulators free to choose the basic form of their controls - choosing amongst, for example, the imposition of position limits, capital requirements or flexible supervision. It makes sense not to impose uniform controls in this area. Banks in different countries face different levels of interest rate risk because there are differences in the level of interest rate volatility from country to country. For example, interest rate volatility is considerably higher in Australia than in the United States. An interest rate exposure which is very risky in one country may be relatively safe in another country.

The BIS approach divides bank portfolios into two categories - a trading book and basic banking business. The latter consists of the loans and deposits of the bank. This dichotomy is somewhat artificial. A bank may hold a bond as part of its general investment business (intending to hold it to maturity) or to satisfy the PAR requirement. Nevertheless, a fall in interest rates will generate an unrealised capital gain on this bond. The bank may decide to realise the capital gain if it believes that interest rates are likely to increase from that point on. If the bond is needed to satisfy PAR, it may be replaced

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13 Compare Graphs 1 and 3.
with a shorter term security (e.g. a Treasury note). The bond holdings therefore become part of the bank's trading activities. Also, the bank's overall interest rate exposure is what is important. If the exposure in the trading book partially affects the exposure in ordinary banking business, it is the net exposure which should be considered. This offset is obscured by the failure to adopt a "mark to market" approach to reporting ordinary banking business because the impact of interest rate movements on ordinary banking business is not evident in the accounts.

The process for measuring interest rate exposure recommended by the Basle Committee is as follows:

- all interest-sensitive assets, liabilities and off-balance sheet positions are allocated to one of thirteen time-bands ("buckets") based on their maturity or time to repricing;
- the resulting gap is weighted by an appropriate duration factor; and
- the weighted gaps are aggregated to provide a single measure of interest rate exposure.

In terms of allocating positions to the buckets, the time to repricing is a more relevant measure than the term to maturity. Credit foncier instruments (i.e. those in which principal and interest are repaid in regular payments) can be broken down into individual cash flows and these cash flows allocated to the appropriate buckets. If this approach is not adopted, the sensitivity of these securities to interest rate movements is overestimated.

A major problem with this approach arises out of the attempt to keep the measure as simple as possible. As a result, it only reflects the vulnerability of a bank to a parallel shift in the yield curve. Non-parallel shifts are occurring all the time and can impose large losses on portfolios. Nor does the measure take account of the possibility that changes in interest rates will cause the prepayment of loans or changes in the composition of banks' deposit base. There is a danger that a bank which obtains a low
value for the BIS measure will believe that it is safe from losses from interest rate movements. In fact, there could still be a substantial interest rate risk.

As mentioned above, the Basle Committee did not suggest any definite way of controlling banks’ interest rate risk exposures. It preferred to leave this decision to national monetary authorities, noting only that these authorities should be looking for "outliers" i.e. banks running a high degree of interest rate risk. It also indicates that a certain amount of interest rate risk can be assumed to be covered by existing capital requirements although as noted above this is doubtful. The Committee also says that its aim is not to deter banks from taking interest rate positions. In fact, any controls based on their suggested measure is likely to deter some types of position taking but encourage others. In particular, the need to service a larger amount of capital could lead to banks’ taking positions based on anticipated changes in the shape of the yield curve.

Conclusion

The results show that the profitability and value of Australian banks is influenced by the domestic economy, interest rate movements and international trends in investments in banks. In particular, the results suggest that Australian banks do not or cannot immunise themselves against recessionary conditions occurring in the domestic economy. Further, there is some evidence that they do not actively manage their interest rate and exchange rate exposures to enhance their value. This is surprising given the extent to which prudential controls have been relaxed and the growth of derivative risk management products. Australian banks could do more to enhance their performance by actively protecting their investment returns against economic downturns and increasing the resources allocated to foreign exchange and interest rate trading. However, it must be recognised that these initiatives will be hampered by the limited depth of the markets for some domestic derivative instruments (especially those related to actual lending activity - e.g. Mortgage Backed securities) and the focus by Australian banks on their traditional domestic lending activities. It is unlikely that a prudential limit on interest rate risk will have a significant influence on Australian banks. If anything, new requirements will probably further reduce the banks’ capacity to make significant
earnings from trading financial markets and could have the effect of encouraging specific types of position taking.

References


Appendix: DGAP for a Financial Institution

The capital of the financial institution is

\[ CAP = A(r_A) - L(r_L) \]

where \( r_A = \) return on the assets

\( r_L = \) return on the liabilities

and we assume that \( r_A = f(r_L) \)

\[ \frac{dCAP}{dr_L} = A \left[ \frac{-D_A}{1+r_A} \frac{dr_A}{dr_L} + \frac{D_L}{1+r_L} \frac{L}{A} \right] \]

\[ = A \left[ \frac{-D_A}{1+r_A} \frac{r_A}{r_L} \cdot e_{LA} + \frac{D_L}{1+r_L} \frac{L}{A} \right] \]

where \( D_A \) is the average duration of assets, \( D_L \) is the average duration of liabilities and

\[ e_{LA} = \frac{r_L}{r_A} \frac{dr_A}{dr_L} \]

is the elasticity of the return on assets with respect to changes in the cost of liabilities. The financial institution can immunise itself against interest rate risk by setting the term in square brackets equal to zero.

The appropriate DGAP measure for a financial institution therefore depends on the relationship which it establishes between the return on its assets and the cost of its liabilities. If

\[ r_A = r_L + a \]

i.e. the return on assets is a constant margin above the cost of liabilities, the appropriate DGAP measure is the usual one for hedging the capital of a portfolio i.e.
\[ DGAP = D_A - \frac{L}{A}.D_L \]

Reference

Ben-Yehoshua, Miri (1992), Duration as a Measure of Interest Rate Risk as Applied to Banks in Israel, Banking Review, Bank of Israel, December.

TOM/BSP.2
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