BANK PRICING AND RISK-ADJUSTED CAPITAL REQUIREMENTS

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ABSTRACT

This paper develops a methodology for analysing the impact of the risk weighting approach to bank capital adequacy upon bank pricing. The approach, based on a capital budgeting framework, considers how the risk weights constrain bank leverage and the likely effects upon bank funding costs. The approach is used to examine the validity several commonly held views about the likely impacts of risk adjusted capital requirements.

1. Introduction

The introduction of the risk asset ratio (r.a.r.) approach to bank capital adequacy has led to much debate over its likely effects upon interest rates and bank pricing policies. Among the propositions advanced have been the following:[i]

*Banks will have an incentive to allocate funds to housing finance because of its low risk weighting vis a vis other private sector financing.

*The classification of both low and high credit rating corporates in the 100% risk weighting category discriminates against good credit risk companies.

*Bank loan interest rates will have to increase to compensate for the higher equity requirement and thus higher cost of funds being imposed upon banks.

This paper argues that propositions such as these, and much general discussion of the impact of the r.a.r. approach, reflect a misunderstanding of the way in which the r.a.r. approach impinges upon bank funding costs and optimal pricing policies. Underpinning the argument is the recognition that the r.a.r. approach involves constraints on bank leverage which are linked

to the "business risk" of the bank.[ii] By modifying and applying the corporate finance literature on the irrelevance (or otherwise) of capital structure, a method for analysing the likely impact of the r.a.r. approach is developed.[iii]

The following section briefly outlines the major characteristics of the r.a.r. approach, and this is followed in section 3 by a discussion of the determinants of bank pricing policies which brings out the role of the weighted average cost of capital (w.a.c.c.) and bank capital structure. Section 4 discusses the type of relationship which might exist between bank capital structure and bank funding costs, and provides a framework for examining the impact of the r.a.r. approach. This framework is then applied in section 5 to address the propositions listed above.

2. The Risk Asset Ratio Approach.

Appendix 1 provides an outline of the mechanics of the r.a.r. approach for Australia.[iv] Assets (and off balance sheet transactions) are assigned risk weights which are meant to reflect the relative credit (default) risk of those assets. A higher weighting brings with it a requirement for a larger capital base as shown in Appendix 1. Loans to corporate customers, for example, carry a risk weighting of 1.00, while housing loans have a risk weighting of 0.50.

The effect of different risk weightings on bank financing is most easily seen by way of an example. Consider one dollar's worth of an asset in category A2 with a risk weight of 0.10. This is treated by the risk weighting approach as though it is funded by (at least) 0.8 cents of equity capital (C1 + C2) and 99.2 cents of deposits (D). In contrast, one dollar's worth of an asset in category A5 with a risk weight of 1.00 is treated as though it is funded by 8 cents equity and 92 cents of deposits. (These figures are calculated by multiplying the asset holding by its risk weight and by the capital requirement of 0.08 to obtain the required holding of equity associated with that asset. The residual financing of the asset is met by deposits.) An illustration of the treatment of "off-balance sheet" items is given in appendix one.

Two arguments can be advanced for a prudential policy which links permissible bank capital structures to some measure of the riskiness of bank assets. First, even if there is no incentive to bank leverage (so that any capital structure is as good as another), the capital structure chosen by a bank may involve a probability of deposit default which is seen as too high from society's perspective. The possibility of "contagion" seen when bank panics occur may justify this, as may the argument which asserts the inability of unsophisticated depositors to accurately assess the risk of deposits.[v] Since higher risk activities imply a higher probability of bankruptcy for a given capital structure, some link between "business risk" and capital

requirements is appropriate.[vi]

A second explanation for the imposition of risk related capital standards could be found in the view that the authorities are providing "underpriced" deposit insurance to the bank's depositors. In Australia, the implicit government guarantee of bank deposits which most depositors believe exists can be interpreted as free deposit insurance.[vii] It is well known that deposit insurance can be treated as the equivalent of the insurer granting a put option over the bank's assets to the owners of the bank. The value of an option will increase with the volatility of the underlying asset and with increases in the strike price. Consequently, the incentive exists for the bank owners to increase the value of the option granted to them by increasing the risk of the asset portfolio or by increasing the effective strike price through reductions in the capital base of the bank[viii]. The relationship of capital requirements to business risk can be seen as an attempt to prevent this exploitation of the option granted by the deposit insurer.

The preceding arguments indicate that an appropriate approach to analysing the r.a.r approach involves an examination of how bank capital structure and risk characteristics of bank activities affect the market valuation of banks.[ix] Only if those relationships are understood will it be possible to assess how the r.a.r. approach, which relates bank capital structure to some measure of risk of bank activities, affects bank behaviour.

That is the subject of the next section.

Bank Pricing

To understand the implications of the risk asset ratio approach, it is easiest to think of bank asset demands in a capital budgeting context. If a bank is to hold an asset, the expected cash flows of that asset must have a positive expected net present value (NPV) when discounted at the relevant cost of capital (required rate of return) for that asset. The question of interest, then, is how the required rate of return for any asset affected by the capital adequacy requirements. In theory, the answer is straightforward. The capital adequacy requirements determine the ratio in which debt and equity can be mixed in the financing of an asset and thus, using the costs of these funds, the weighted average cost of capital (WACC) for that asset. Effectively, the risk assets ratio approach may force a different weighted average cost of capital (WACC) upon banks for their evaluation of each asset category than that which they would have chosen voluntarily.

There are several differences between this approach and the standard textbook approach to capital budgeting. The first is that capital budgeting decisions for firms with several divisions (which correspond to asset categories in this context)

are normally approached somewhat differently. Separate costs of equity capital for each division, appropriate to the risk of that activity, are obtained and combined with the cost of debt in a ratio reflecting the firm's overall target debt/ equity ratio to derive a WACC for that division. Activities of higher risk will, because of the higher cost of equity capital, have a higher required rate of return. Here, a similar effect is achieved by imposing differential weights upon the use of equity and debt (deposits) in the WACC formula. (That would supplement any differential effects arising from different costs of equity for different activities.)

The second difference in applying the capital budgeting approach in this context is that the approach is typically used to provide an accept-reject criterion for assessing particular projects. In the context of banking it must be used as a price setting rule: customers willing to pay the interest rate derived by reference to the required rate of return (and meet other criteria) will provide an expected stream of cash flows to the bank with a positive expected net present value. This difference is simply one of interpretation, although the ability of banks to undertake fixed or variable rate lending adds a number of complexities.

A third difference is that the cost of deposit funds to be used in the calculation, cannot be simply the interest rate paid on deposits. Banks provide significant amounts of "implicit

interest" to customers in the way of services for which charges are not explicitly levied. Those costs need to be factored in on top of explicit interest costs to determine the effective cost of deposit funds.

Finally, the capital budgeting approach does not provide us with an indication of the rate banks will quote on a particular category of assets. One reason is that there are costs associated with the loan granting and administration process. The interest rate quoted must make allowance for these (unless offset by fees etc.). This will tend to push up interest rates quoted on loans vis a vis those required on marketable securities. Also, the capital budgeting approach enables us to determine the **expected cash flows** on an asset that are required to justify its purchase, given the associated risk implied in its WACC. The quoted interest rate will be higher by the extent of a default premium which ensures that the expected cash flows are those which are required. In practice, the default rate may vary over time (as numerous overseas examples of agricultural loan portfolios, housing loan portfolios, developing country debt portfolios etc. can attest), **and it is this risk which the differential capital adequacy requirements are attempting to reflect**. By quoting an interest rate which includes an appropriate default premium, banks can self insure against the average default risk on a category of assets. It is the unexpected deviations from that average which give rise to the need for adequate captial resources.

To illustrate the issues involved in this approach, an example is appropriate. Consider an asset in category A2 which has a l0 per cent risk weighting and assume for the moment that the risk weightings are binding so that the bank minimum capital requirement is met with equality. The overall cost of capital to be used for determining the expected return required on such assets is given by

$$k2 = .008\ k^2e + .992\ kd$$

where k^2e is the cost of equity capital which would face a bank whose asset portfolio consists solely of assets with risk characteristics similar to those of category A2 assets and kd is the cost of deposit funds. (Note that we have not defined how k^2e and kd vary with changing leverage - that is taken up in the next section). Given those costs, value maximising banks will require that assets in category A2 earn at least an expected rate of return of k2. For example, if k^2e is 15 per cent and kd is 10 per cent, the required rate of return on assets in category A2 would be 10.04 per cent.

For an asset in category A5 with a 100 per cent weighting the overall cost of capital is given by

$$k5 = .08\ k^5e + .92\ kd.$$

where k^5e is the cost of equity capital to a bank whose asset portfolio consists of assets with risk characteristics similar to those of category A5 assets. If we use the same figures for the cost of equity and deposits of 15 and 10 per cent respectively, the required rate of return k5 turns out to be 10.40 per cent, or 36 basis points above k2. If the appropriate value for k^5e is higher, say 20 per cent, k5 turns out to be 10.80 or 76 basis points above k2.

Since assets in category A2 are long term government debt and those in A5 are corporate borrowings, there are probably many readers puzzled at this small margin of 76 basis points implied by these calculations. That concern should be assuaged by decomposing the interest rates quoted by banks in the following way:

quoted interest rate	=	required return	+	average default premium	+	administration cost allowance

i.e.

$$r = k + d + a.$$

where

required return	=	risk free rate	+	quality spread	+	cost of requirement

i.e.

$$k = rf + q + c$$

It is the required return component (k) of these equations which the risk weighting approach can affect, and it is the differences in average default risk and administration costs which lead to such large differences in quoted interest rates. Differences in required rates of return exist to allow for variability in default experience from the average (and other risks) which even the diversification in bank portfolios does not prevent.

In the example given above, the 76 basis point differential between required returns on A5 and A2 assets could be broken down into a quality differential of 4 basis points and a cost of the requirement of 72 basis points.[x] Note, however, that such a calculation uses the average cost of equity and assumes that it does not change as leverage changes. The argument advanced later that the cost of the constraint may be zero is based upon using the marginal cost of equity and recognising that this can change as leverage changes.

4. Capital Structure and Bank Value.

The impact of capital structure on market value has been a topical issue in corporate finance for many years, and many of the arguments have been transposed to the analysis of financial firms such as banks. Buser, Chen and Kane (1981) for example,

have analysed the effect of deposit insurance utilising arguments about capital structure typically applied to business firms, while Merton (1977) pioneered an option theoretic approach to analysis of the effects of deposit insurance. Not all authors have accepted the validity of such an approach. Sealey (1983), for example, argues that the traditional debt/equity analysis applied to corporate financial decisions independently of their operating activities is not appropriate in the case of banks. The reason is essentially that bank business activities and financing decisions are unavoidably intertwined - deposit raising and associated provision of services is one of the essential components of bank activities.

To address the issue at hand it is appropriate to commence with a bank specialising in just one type of loan activity, of a particular risk category. (This avoids the problems raised by the multi-product (risk) nature of bank activities.) We further assume that the bank has purely Australian domestic activities. The question we ask is: how does the market value of the bank respond to the banks's leverage ? Equivalently, how is the weighted average cost of capital for a bank affected by its capital structure?

The Single Product Bank

Under the dividend imputation system of taxation, there is no tax shield available from debt (deposit) financing for a company which has a 100 per cent payout rate of franked dividends. The

reason is that savings on company tax arising from the deductibility of interest are offset by the differential personal tax treatment of interest and share income[xi]. If we assume that bankruptcy/financial distress costs are absent, there is then no optimal capital structure - unless agency costs or signalling arguments are brought into play as determinants of an optimal capital structure. This is the world of the famous Modigliani-Miller Proposition 1, which recognises that increasing leverage increases the average cost of equity capital just sufficiently to exactly offset the apparently lower cost of debt.

If this is the case, the imposition of the r.a.r approach has no substantive implications for bank management. One capital structure is as good as any other and the overall cost of funding to the bank is not affected by the constraint on capital structure.

There are several reasons why this view might not be accepted and the existence of an inverse relationship between leverage and bank funding costs (at least over some range of leverage) postulated . One is that agency costs and signalling issues are important - and while that possibility must be acknowledged, the precise nature of their importance in the case of banks awaits analysis[xii]. A second reason is that in practice, banks do not have a 100% payout ratio of franked dividends - some part of profit is kept as retained earnings and this could be argued to

provide a mechanism through which tax effects would lead to an optimal capital structure. The problem with this argument is that accounting profits do not necessarily reflect the economic profits on which analysis is based. The no growth assumptions of simple analyses of capital structure are also not appropriate. Those difficulties must be acknowledged, but their precise effect (and their direction) is unknown. A third reason to query the "no effect" hypothesis is that capital adequacy requirements are based on book valuations of equity, whereas capital structure theory is concerned with market valuations. Again, the effect of this difference is unclear.

The final argument, which is probably of most significance, is that the analysis above ignores the possibility of risk of default on debt (deposits), or assumes that the cost of debt incorporates an allowance for such a possibility. In the latter case, as leverage increases the contractual interest rate on deposits would increase in order to keep the expected return on deposits constant. That assumption is inappropriate if free deposit insurance is provided to the bank's customers. Increasing leverage increases the value of the option granted by the insurer, and thus increases bank value. A capital adequacy constraint could then impinge upon bank decision making by preventing banks from increasing leverage as far as desired.

There are several responses to this argument that bank funding

costs continually fall as leverage increases. One is to assert that the option granted is so far out of the money as to be worthless, or that Australian institutional conditions do not involve something akin to free deposit insurance. A second response is based on the argument of Herring and Vankudre (1987) who assert that "growth options" may cause banks to avoid a situation in which bankruptcy is a possibility. Such growth options (economic rents which accrue to bank owners only if the organisation does not incur bankruptcy) are reflected in the implicit value of bank licences and arise from restriction on entry or accumulated reputation or relationships.

The implication of these arguments is that if bank capital structure is to matter, it is because of the interaction of implicit government guarantees over bank deposits and the growth options which provide bank owners with economic rents. The guarantees provide an incentive to increased leverage, while the existence of growth options inhibits increases in leverage. Figure 1 illustrates this possibility, and indicates how the r.a.r. approach may involve a regulatory "tax" upon particular bank activities. The "tax" is the cost of the capital adequacy constraint which prevents the bank from reaching its optimal capital structure. (Note, however, that such a tax effect arises as an offset to a subsidy created by deposit insurance or guarantees).

The Multi-product Bank

The principal feature of the r.a.r. approach is its differential treatment of different types of bank asset holdings. Recognising that banks undertake several types of lending activities with different risk characteristics creates some minor complications for the analysis outlined above - although they are not insurmountable. By analogy with the corporate finance literature the approach which can be adopted is to treat the bank as a firm with several divisions. Given our focus of interest, each division corresponds to a risk asset category specified by the authorities[xiii]. For each "division" there will be an appropriate cost of equity capital, and the overall cost of equity capital to the bank will reflect the mix of activities between the divisions. The pricing of products in different risk categories will differ in reflection of the different cost of funds for that activity.

Whether the r.a.r approach has any significance depends on the same sorts of arguments as outlined earlier. This is demonstrated in Figures 2 and 3, which show the relationship between the overall cost of capital for a particular activity and the leverage adopted for funding that activity, under differing assumptions. Both figures assume that the bank invests in two types of assets, corporate and government securities (denoted by c and g). The former involves the larger degree of risk, so that equity funds for this activity involve a higher required rate of return. Figure 2 assumes that no optimal

capital structure exists, so that the capital adequacy requirement is irrelevant for bank decision making. Figure 3 indicates how the r.a.r. approach may impose a cost or regulatory tax upon some bank activity, if the maximum leverage permitted is less than that desired. It should be noted however that there should be no a priori presumption that the constraint is more likely to be binding for high risk weighted asset categories. (Moreover, the source of any gains from leverage which lead to the constraint being binding need to be borne in mind).

5. Impacts of the risk weightings

Once a conceptual framework is in place, it is relatively straightforward to assess some of the arguments advanced about the likely impacts of the r.a.r. approach. We consider some simple examples in turn.

(a) "The Reserve Bank's new capital adequacy guidelines for banks, which allow a 50 per cent weighting for housing loans secured by mortgage, will have increased the relative attractiveness of lending for housing", "Financial Intermediation in l988" Reserve Bank of Australia Bulletin, February 1989, p 14.

If bank capital structure does matter, the imposition of capital requirements linked to asset portfolio composition can increase

the relative attractiveness of some assets to banks. A priori, however, there is no way of knowing which assets will be made more attractive, and there should be no presumption that lower risk weightings increase relative attractiveness.

For example, it is possible that given freedom of choice, banks would choose a capital structure for funding housing loan activities which involved much less than the minimum 4 per cent of equity permitted under the r.a.r. approach. Conversely, corporate lending may involve an optimal capital structure for banks of (say) l0 per cent - making the 8 per cent minimum requirement redundant. In these hypothetical circumstances, the r.a.r. approach penalises housing lending, but does not impact upon corporate lending by banks.

To assess whether the r.a.r. approach does create incentives for the redirection of bank financing, it is necessary to determine how the overall cost of funds for each particular bank asset category depends upon the leverage adopted. Then, the relative impact of the leverage constraints can be assessed. That task is beyond the scope of this paper, but it seems apparent that the claim that housing finance is favoured by the r.a.r. approach is not yet proven.

(b) "The application of the 100% risk weighting to all long-term corporate securities appears to ignore the inherent differences between the credit risk of companies, and between

their credit ratings" Ken Latchford "The corporate view of capital adequacy" The Australian Corporate Treasurer, June 1989, p10.

There is no doubt that the r.a.r. approach includes in the same risk weight category assets of borrowers with significantly different degrees of default risk. Whether that matters is another issue, and an example may best illustrate. Consider a bank lending $100m to a large highly rated corporate customer, and $100m in much smaller parcels to a large number of less well rated corporate customers. The interest rate quoted to the highly rated corporate will undoubtedly be below those quoted to the other customers in reflection of the lower default risk on that loan vis a vis any of the others. Thus the loan to the highly rated corporate may have a premium in its quoted rate of two per cent over the required return for that type of asset, while the other category may have a premium in the quoted rate of 8 per cent over the required return.

But the critical issue is whether the required (expected) return, onto which the default premia are added, differs between the two groups of loans. If the r.a.r. approach does impinge upon banks, it is via affecting their required (expected) returns on various asset categories, not by affecting the default premium added onto those required returns.

It is far from apparent which of these two categories of assets

will have the higher required rate of return. Those required rates of return exceed the risk free interest rate in reflection of the variability in the default premium from its average and other risks which cannot be costlessly diversified away. While the average default risk of a loan to a highly ranked corporate may be less than that on loans to less well ranked customers, there is no guarantee that the variability of default experience around those means follows a similar pattern.

Thus, if bank capital structure matters, it is possible that the common classification of all non housing private sector loans in the l00 per cent category may be disadvantageous to small borrowers of lower credit standing. That would be the case if a portfolio of loans to such customers showed significantly less variability in average default experience than did a portfolio of loans to a smaller number of individually higher credit-rated borrowers.

(c) "The bottom line for borrowers under the new Capital Adequacy rules is higher interest rates with tighter conditions" Calcutt Watson & Associates Pty. Limited (advertising brochure for Capital adequacy seminar, Regent Hotel Ballroom, May l0-ll, l989).

The arguments advanced in this paper should make it apparent that the validity of this statement requires that bank capital structure matters, and that the capital requirements imposed

preclude banks from achieving their optimal capital structure. Under dividend imputation (or alternatively if the Miller (l977) hypothesis holds), it is far from apparent that increasing leverage increases bank value - as is required for capital structure to matter.

The principal argument which can be advanced in support of the capital structure relevance view for banks would appear to be the one based upon the existence of free government (de facto) guarantees of bank deposits. If those guarantees are dismissed as being of no value (as some bank publicists are prone to argue) it is difficult to simultaneously argue that the r.a.r. approach significantly constrains banks. In that case, it is also difficult to argue that there will be any effect on interest rates.

The alternative argument is that the deposit guarantees matter, so that banks do benefit from increased leverage and may be constrained by the capital requirements. In this case, it must be realised that any "tax" effect of the capital requirements is only partially offsetting the "subsidy" effect of the guarantees. Interest rates for borrowers may be higher than if the r.a.r. approach were absent but the guarantees remained, but they would not be higher than if both were absent.

Even in the case outlined above where a higher interest rate for borrowers might occur, it is far from a foregone conclusion that

this would be the ultimate outcome. Interpreting the r.a.r. approach as a regulatory tax, the immediate question which arises is that of who bears the burden of the tax. Borrowers from banks through higher loan interest rates are indeed one group of candidates, but so also are the shareholders in banks and the depositors in banks. These latter possibilities suggest that if some asset price effects are to occur, they may involve lower bank equity returns or lower deposit interest rates instead of (or as well as) higher loan interest rates.[xiv]

6. Conclusion

This paper has argued that the impact of the risk weighting approach to capital adequacy on bank pricing can be understood using a modified capital budgeting framework. Within that framework, the question which emerges is the one of how the overall cost of funds to a bank is affected by its leverage. If the capital structure irrelevance view, first propounded by Modigliani and Miller (l958), applies in banking, it is clear that the r.a.r. approach should have no effect on bank pricing - since the leverage constraint imposed is of no practical significance. Alternatively, if leverage does affect the cost of bank funding (for reasons considered in section 4) and leads to an optimal capital structure, the r.a.r. approach may have an effect on bank pricing. That effect will depend upon the extent to which the leverage constraint imposed by the r.a.r. approach prevents banks from achieving their desired capital

structure. By considering this issue in a simple model of a multi-product bank, several commonly held views about the implications of the r.a.r. approach for bank pricing were analysed and found to be unproven.

REFERENCES

Bank For International Settlements (l987), "Proposals for international convergence of capital measurement and capital standards", Consultative paper, December

Buser, S., Chen, A., and Kane E. (l98l), "Federal Deposit Insurance, Regulation Policy, and Optimal Bank Capital", Journal of Finance, March.

Davis, K. (l989) "Bank Capital Adequacy" The Australian Corporate Treasurer, June 2-5.

Fama E.F. (l985) "What's Different About Banks" "Journal of Monetary Economics", l5, 29-39.

Hogan W. and I. Sharpe (l988), "Supervision of Bank Exit", Economic Papers, 7,2, June, 7l-77.

Herring, J.R. and P. Vankudre (l987), "Growth Opportunities and Risk-Taking by Financial Intermediaries", Journal of Finance, XLII, 3, July, 583-599.

Kelleher D.J. (l989), "The New Capital Adequacy Guidelines for Australian Banks" Reserve Bank of Australia Bulletin, January, 6-l2.

Kim, D. and A.M. Santomero (l988), "Risks in Banking and Capital Regulation:, Journal of Finance, 43,5, December, l2l9-l234.

Latchford, K. (l989) "The Corporate view of Capital Adequacy" The Australian Corporate Treasurer, June, pl0.

Lewis M.K. and K.T. Davis (l987), Domestic and International Banking, (Philip Allen Publishers and M.I.T. Press, Oxford and Cambridge).

Merton, R.C. (l977), "An Analytical Derivation of the Cost of Deposit Insurance and Loan Guarantees: An Application of Modern Option Pricing Theory", Jouranl of Banking and Finance, June, l:l, 3-l2.

Mester L.J. (l989) "Owners Versus Managers: Who Controls the Bank?" Federal Reserve Bank of Philedelphia Business Review May/June l989.

Miller, M. (l977) "Debt and Taxes" Journal of Finance, May.

Modigliani F. and M. Miller (l958), "The Cost of Capital Corporation Finance, and the Theory of Investment", American Economic Review, 48, June, 26l-77.

Reserve Bank of Australia (l988a), "Supervision of Capital

Adequacy of Banks" Reserve Bank of Australia, Press Release 88-07, l February

_____ (l988b), "Prudential Statement No. l6. Capital Adequacy of Banks", Reserve Bank of Australia, Press Release 88-2l, 23 August.

_____ (l989), "Campbell Committee Revisited -- Prudential Supervision" Reserve Bank of Australia Bulletin, July, 20-27.

Sealey, C.W. (l983), "Valuation, Capital Structure and Shareholder Unanimity for Depository Financial Intermediaries: Journal of Finance June, 857-872

Van Horne J., K. Davis, R. Nicol, and F.K. Wright (l990), Financial Management and Policy in Australia, 3rd edition Prentice Hall).

ENDNOTES

i.References to sources for these propositions are given in section 5.

ii. A formal treatment of this relationship can be found in Kim and Santomero (l988).

iii. This paper extends the analysis in Davis (l989) from which some of the material is drawn.

iv. The Reserve Bank's proposals are outlined in Reserve Bank of Australia (l988a, l988b) and Kelleher (l989). See also the Bank for International Settlements (l987).

v. See Lewis and Davis (l987) Chapter 7 for a discussion of these arguments.

vi. Whether the r.a.r. approach measures business risk appropriately, or whether it adequately aggregates different activities to measure overall risk, are questions we do not pursue here.

vii. A discussion of the role of the Reserve Bank in situations where banks fail and the protection of depositors can be found in Hogan and Sharpe (l988)

viii. See Merton (1977)

ix.It is assumed that the objective of bank management is to maximise shareholder wealth. Given the constraints imposed by the Bank Shareholdings Act on the market for bank equity, that assumption could be questioned. Even without that constraint, there is some evidence to suggest that bank management may pursue goals other than shareholder wealth maximization. (See Mester l989). The implications of this for the impact of capital adequacy requirements are not pursued here.

x. This is calculated by noting that the required rate of return for A5 assets would be 10.08 per cent if the gearing ratio of A2 assets applied, implying a quality differential of 4 basis points. Readers should note that there are many ways in which the division of spreads between quality differentials and cost of requirements could be done. The approach adopted here is purely for illustrative purposes.

xi. The standard formula for the tax shield associated with debt in the presence of personal taxes and corporate taxes (see Van Horne, Davis, Nicol and Wright (1989) Chapter 10) is given by

$$\text{Tax shield} = \{ 1 - [(1-tc)(1-ts)]/(1-tp)\} \cdot B$$

where

tc is the corporate tax rate
ts is the personal tax rate applicable to share income
tp is the personal tax rate applicable to interest

and

B is the market value of debt on issue.

Under dividend imputation, the payment of franked dividends leads to a personal tax rate on cash received based on

$$(1-tp) = (1-tc)(1-ts)$$

so that the value of the tax shield is zero.

xii. The existence of the Bank (Shareholdings) Act can be expected to influence the nature of agency costs involved in Australian banking, while the absence of prospectus requirements for deposit raisings (and the linkage between deposit raisings and the fundamentals of banking business) make the validity of the usual signalling arguments unclear.

xiii. A problem recognised here, but ignored, concerns the fact that the asset categories selected by the authorities may not represent a good grouping of lending/investing activities into categories of similar risk.

xiv. Precise assessment of who bears the burden of any regulatory tax depends upon a knowledge of the characteristics of the markets in which banks operate. Fama (l985) for example argues that a reserve ratio "tax" is borne by lenders from banks because of the perfectly competitive nature of wholesale deposit markets and the special characteristics of bank loans which give banks some degree of market power in this loan market.