

RESERVE ASSET RATIO SYSTEM

1. INTRODUCTION

The Reserve Bank, in line with most other central banks around the world, has been paying closer attention to growth rates of monetary aggregates in recent years. One of the major sources of changes in the growth rates of these aggregates is the rate at which trading banks expand their lending. As a consequence control over trading bank lending is thought to be important.

Over the last decade several main policy tools have been used at different times and in various combinations by the New Zealand authorities in the attempt to influence the path of bank lending. These include moral suasion, credit guidelines, changes in reserve asset ratios, and in more recent years public debt and open market operations. This article is addressed to the particular role of the reserve asset ratio (RAR) system.

Introduced in June 1973, the RAR system has now been in operation, with some modifications, for eight years. Over this period the RAR system has attracted a variety of comment from a wide range of sources, much of it favourable, some of it not. Some of the critical comments have in fact led to the modifications to the system referred to. However, some of the criticisms of the RAR system remain outstanding. Many of these clearly warrant some response from the Reserve Bank.

These criticisms are of two basic types. First there is a number of operational criticisms which involve questions relating to technical aspects of the design and operation of the RAR system. Secondly there are more general criticisms which look at the RAR policy from the viewpoint of monetary economic theory.

This article presents the background to the introduction of the RAR system, outlines the way the system was expected to operate and subsequent modifications to the system, and finally examines the workings of the RAR system as it now stands. A later article will investigate both types of criticisms of the RAR system referred to above. While not being wholly comprehensive, both articles read together should present a unified picture of the Reserve Bank's view of how the RAR system functions, and its view on the place the RAR system occupies in the overall scheme of monetary control.

2. BACKGROUND TO THE RAR SYSTEM

The nature of monetary policy in New Zealand in the early 1960's was such that the main impact of official action fell upon the trading banks which were subject to a variety of direct controls. Through the 1960's there was a growing realisation that this pattern of monetary control was becoming increasingly ineffective for a variety of reasons. Probably the main one was that the growth of non-bank financial institutions (partly stimulated by official controls over trading banks) meant that trading banks were rapidly losing their position of dominance of the financial sector, and as a result control over trading banks alone represented progressively less control over total financial sector flows.

Consequently, through the 1960's Government policy placed increasing emphasis on a wider range of financial institutions which, along with the development by the Reserve Bank of a broader statistical measure of liquidity encompassing selected deposit accepting financial institutions in addition to trading banks, involved the establishment of variable minimum holding of public sector security requirements for trustee savings banks, private savings banks, building societies, private superannuation funds, life insurance companies and finance companies. Also, controls were imposed on the portfolios of official short-term money market dealers. In addition, a number of significant liberalisations were introduced in so far as the trading banks were concerned and a number of measures designed to encourage the banks to compete for time deposits and thus limit the funds available to other intermediaries.

However, the recognition of the relevance of a wider range of financial institutions and the significance of inter-institutional competition for business created its own problems. The method of control used to influence trading bank lending involved the setting of an advances ceiling for the banking system, and the mechanical adjustment of banks' cash reserve requirements to the extent that banks stayed within or exceeded the ceilings. By increasing the cash reserve requirement above current holdings banks could be forced to borrow from the Reserve Bank at penal rates of interest. Attempts to capture the implications of changes in institutional shares or business in the setting of advances ceilings resulted in the calculations becoming extraordinarily complex, involving several separate steps and giving a spurious appearance of accuracy.

The then Governor of the Reserve Bank identified the problem as being 'to find a method of regulating bank credit in New Zealand which was effective, which ensured full competition between the banks and among banks and non-banks, which recognised appropriate priorities in the use of credit, (and) which was flexible, easily understood and simple to operate'.

As a temporary expedient a guideline growth policy was adopted throughout 1971 and 1972. This was initially intended to limit the amount by which the ceiling for low priority advances could be adjusted as a result of an increase in long-term deposits, but was subsequently used during 1972 to encourage the banks to lend more. Throughout this period the Reserve Bank had been discussing with the trading banks and others proposals for a new system of control over bank lending which satisfied the above objectives. From these discussions and internal policy work evolved the Reserve Asset Ratio system.

3. THE INTRODUCTION OF THE RAR SYSTEM

The particular deficiencies of the previous policy systems motivated the search for an effective replacement. It was thus regarded as being important to find a policy system which recognised the significance of the overall structure of banks' balance sheets and the inter-relationships between different parts of the balance sheet. This was especially relevant in the context of the volume of bank business relative to other financial institutions.

The RAR system which evolved was seen as a development on a conventional variable liquidity requirement, and was expected to be able to overcome the problems of arbitrariness which characterised the previous regimes while being relatively simple to operate and understand. In addition, it was seen to have the significant additional benefit of encouraging increased competition for deposits by the banking system despite the need for moves to moderate bank lending growth from time to time.

According to the Reserve Bank communications of the time the main elements of the RAR system were:

- '(a) Each trading bank would be required to hold a minimum amount of reserve assets (Government securities, deposits with the Reserve Bank, and Reserve Bank notes). The minimum amount of reserve assets would be expressed as percentages of trading bank demand and time liabilities for the preceding month (in order to obtain a requirement which is known to all parties at an early stage in the requirement period), the percentages to be variable . . .
- (b) The ratios would be varied for two reasons. First, as a policy measure to endeavour to expand or curtail spending in the private sector. An increase in the reserve asset ratios would require the banks to either increase their holdings of reserve assets or reduce their level of lending ... to the level that could be supported by their existing holdings of reserve assets at the new ratios. The banks could increase their holdings of reserve assets by reducing advances and/or increasing deposits. Both are desirable reactions when restraint is required. A decrease in the ratios would encourage the banks to lend more and/or reduce deposits below the level they might otherwise have reached, and would be the policy action if expansion of the economy were desirable.
- (c) Secondly, the ratios would be varied as a technical measure to take account of seasonal and random fluctuations in the level of reserve assets. The Reserve Bank has a sophisticated computer programme to remove seasonality from statistical series but judgement must be used in allowing for random fluctuations, e.g. an increase in bank lending to finance an increase in export stocks resulting from shipping delays. Precision is impossible.'

Further features of the system included the provision by the Reserve Bank of lender-of-last-resort facilities for the banks which they could use in order to meet their reserve asset requirements. The cost of such a facility would be set so that banks exhausted the alternative means of meeting their requirements as outlined in point (b) above. Also the reserve holdings requirement would be expressed as a daily average of holdings over a calendar month so as to allow flexibility in order to cope with the frequent within-month fluctuations in reserve asset levels.

The theoretical underpinning to this new system was the recognition of the way in which the expansion of bank lending affected the structure of banks' balance sheets. Assuming a neutral effect on bank reserve assets of Government transactions, overseas exchange transactions, Reserve Bank's lending to the private sector, and changes in the public's holdings of notes, an increase in bank lending can be expected both to increase bank deposits and decrease bank reserves. In

simplistic terms the first effect arises from the fact that increased lending leads to increases in money expenditure through the economy which leads to increases in bank deposits by the recipients of that additional money expenditure. The second effect arises from the fact that some of this increase in money expenditure is on imports, thus leading to a loss of bank reserve assets as foreign exchange settlements are made with overseas suppliers, and the additional income derived from the increased expenditure results in additional tax flows to Government.

If, then, the effects of the 'normal' pattern of Government transactions, and overseas exchange transactions etc. on bank reserve assets can be isolated, reserve asset ratio requirements expressed as a proportion of bank deposit liabilities can be set in such a way that a constraint is placed on the expansion of bank lending, while allowing banks to gain additional lending capacity by competing amongst themselves for deposits (and thus reserve assets). Given some excess or free reserve assets, expansion of lending will lead both to an increase in the future reserve asset requirement (as deposits rise) and to a decrease in reserve asset holdings (as reserve assets are lost through overseas transactions and flows to Government).

It was expected that a tolerably accurate isolation of 'normal' influences on reserve assets from total reserve asset movements could be achieved through the use of seasonal adjustment procedures. The technique used in the early stages of the RAR system was to select a base month against which movements in both deposits and reserve assets could be assessed. By allowing for 'normal' seasonal movements over the intervening period, as well as random factors known to have affected such movements, some ideal was derived of the hypothetical level of both deposits and reserve assets in the absence of changes in bank lending. Allowance could then be made for 'desirable' growth in bank lending, and the ratios set so as to achieve the degree of constraint desired by policy. If the actual outcome was a faster rate of growth of lending without the reserve requirement becoming more of a constraint, it was assumed that the outcome would either be a result of greater competition for deposits by the banks (thought to be an acceptable outcome) or a result of a forecasting error in the setting of the ratios.

4. CHANGES TO THE RAR SYSTEM

There have been a number of changes to the administrative details of the RAR system since its introduction. These are detailed later. However, the more interesting changes from a policy point of view relate to the procedures used to determine an appropriate ratio, and arose out of the problems encountered with the ratio setting procedures described above.

It soon became apparent that the procedures used in the first few months of the RAR system involved several unsustainable assumptions concerning the ability of the authorities to identify accurately and predict all the various influences on reserve assets, deposits and lending. The validity of these implicit assumptions was shown to be questionable since financial flows proved to be less predictable and regular than was necessary for the operation of what was essentially a text-book ratio system. (These problems are explained more fully in Section 5 in the context of an endeavour to contrast the RAR system as it now stands with the standard text-book system).

The evolution path of the RAR system subsequent to the realisation of these difficulties fundamentally changed both the way in which the Reserve Bank approached the operation of the system and the interpretation that the Bank placed on the key statistical parameters. Foremost in relation to these changes was the role of free or excess reserve assets. Whereas previously free reserve asset holdings were regarded as an indication of the degree of constraint imposed on the banks, or in other words a reflection of the extent of deviation of bank lending from the path desired by the authorities, free reserves became a policy tool in itself. Its latter role, which is the current role, is explained fully in the next section.

The implications of this change are important. The corollary of regarding the level of free reserve assets as an indication of the degree of constraint is the view that the level of free reserves measures the capacity of banks to expand further their lending. This is valid in the text-book type ratio system only, but is not a valid interpretation of the role of reserve assets in the current RAR system (as will become apparent in the next section). As will be seen in the second article of this pair, misinterpretation of the role of free reserve assets underlies a lot of the criticisms of the RAR system.

The administrative changes to the RAR system referred to at the beginning of this section relate to two particular aspects: first, the lender of last resort facilities provided by the Reserve Bank for trading banks in the event of prospective failures to meet reserve asset requirements and secondly, the differential ratios applied to demand and time deposit liabilities. The two changes of the greatest significance in these areas occurred recently, in July and August 1980, and involved a change to both the operation and cost of the lender of last resort provisions, and the movement to a single ratio on all deposit liabilities. These changes were fully described in an article in the October 1980 Reserve Bank *Bulletin*, and the interested reader is referred there.

5. HOW THE CURRENT RAR SYSTEM OPERATES

As noted in Section 3, the theoretical starting point for a ratio system of control over trading bank lending was as follows. At least in the short-term, the reserve base of the banking system is largely determined exogenously, i.e. outside banks' control. The level of reserve assets is determined by the pattern of Government transactions (including financing), overseas exchange transactions, Reserve Bank lending to the private sector, and changes in the public's demand for currency. (Some important qualifications to this are discussed later). Increased lending by trading banks can be expected to have two basic results: private sector incomes and expenditure will rise leading to (amongst other things) increased expenditure on imported goods and services and increased tax payments to Government, both resulting in a loss of reserve assets; and increased bank deposits in proportion to the extent that the induced loss of reserve assets falls short of the increases in income and expenditure flows.

Given a ratio requirement (between trading bank reserve assets and liabilities), then if banks expand their lending from a situation where the reserve asset ratio requirement is not binding (i.e. banks have some surplus reserve assets), the induced increase in bank deposits

and loss in reserve assets described above will tend to make the ratio constraint binding. On the one hand the absolute reserve asset requirement will rise as deposits rise, while on the other hand surplus or excess reserve assets will be lost.

This description of a text-book ratio system implies that if the authorities knew with some accuracy first the relationship between changes in the level of reserve assets and changes in bank lending, and secondly the expected growth pattern of reserve assets, then ratio requirements could be set and varied so as to constrain growth in bank lending to some 'desired' path. However, with regard to the relationship between changes in reserves and changes in lending, the so-called bank 'credit multiplier', a multitude of factors need to be taken into account. For example, this relationship is dependent on the public's propensity to spend additional income on imported goods and services, the public's desire to hold additional currency against increased levels of transactions, and the public's propensity to save out of additional income in the form of Government debt. Furthermore, time lags affect all of these variables, since additional spending takes some time to permeate through the economic system. Combinations of these and other problems mean that our appreciation of this relationship is only a general one, and not particularly suited as a basis for policy setting.

The second requirement mentioned for the text-book operation of a ratio system is the ability of the authorities to forecast accurately the growth pattern of reserve assets. This requirement has a number of aspects. Reserve assets are subject to considerable seasonal influences which must be distinguished from movements in the underlying trend of reserve asset growth. In addition, the authorities need to be able to separate out the negative effect of bank lending on reserve assets, which implies knowledge of the 'credit multiplier' discussed above. After all these factors are identified, the underlying trend of reserve asset growth needs to be forecast. Each of these aspects of forecasting can be done in a general sense, but the degree of accuracy is not sufficient for the text-book operation of a ratio system.

Accordingly, the RAR system now operated by the Reserve Bank is fundamentally different from the text-book standard. Each month forecasts are made of total reserve asset movements in the forthcoming month, with no particular concern to separate out seasonal and other influences. This forecast, with its inherent margin of error, is then used for setting a ratio requirement for the forthcoming month, with the current month's weekly average deposit level as the base for the ratio (as the ratio setting exercise for the forthcoming month is performed a week or so before the end of the current month, some forecasting is required of the last week's deposit level).

The actual ratio is set in such a way as to allow a margin between required reserves for the month and the forecast average total reserve asset level. The 'free reserves margin' to be used each month is determined by the stance of monetary policy at the time. Bearing in mind that the forecast of total reserve assets is subject to a margin of uncertainty it can be seen that the greater the free reserves margin, the less likely is the chance that the actual average reserve asset outcome will fall below the value of the reserve asset ratio requirement imposed on the banks. Indeed, if the free reserves margin used in setting the ratio exceeds the bounds of uncertainty

surrounding the outcome, there is no potential constraint on the banking system.

It is not possible to determine the margin of uncertainty with any precision. However, the Reserve Bank has taken the view that a free reserves margin of around \$100 million is consistent with a neutral policy stance. This implies that the margin of uncertainty in reserve asset forecasting is around \$100 million, i.e. if a \$100 million free reserves margin is used in setting the ratio requirement there is little, but some, chance of the banking system being faced with a reserve asset shortfall. A tight policy stance would accordingly involve a free reserves margin used in setting the requirement of something below \$100 million. These figures are of course modified over time because of the effect of inflation and growth on the dollar values.

The setting of the free reserves margin is mainly determined by the behaviour of the variable that the RAR system is intended to influence: that is trading bank lending. The authorities have a view on what path of bank lending is consistent with desired money supply growth and conditions generally, without exactitude but rather in the sense of a broader concept. Accepting for the moment that reserve asset shortfalls below the ratio requirement involves a reduced profit to the trading banks (explored further below) it can be seen that the RAR system is essentially a behaviour modification approach to economic policy. As the lending behaviour of the banking system digresses from that thought desirable by the authorities, adjustment of the free reserves margin in the appropriate direction alters the risk to the banks of being faced with a loss of profits. On the assumption that banks are profit maximisers, this change in the risk of profit losses is expected to induce a behaviour modification on the part of the trading banks.

In what ways do prospective failures to meet the ratio requirement involve a profit loss to banks? The RAR requirement is a statutory obligation for the banks, so if a shortfall in reserve-assets is imminent reserve assets must be acquired from one of a range of sources. In cases where one bank is facing a prospective shortfall while the banking system as a whole will meet its obligations, in the short-term the following sources of reserve assets are available:

- (a) Inter-bank borrowing of reserve assets.
- (b) Competing away other banks' deposits, resulting in a change in the ownership of reserve assets as daily inter-bank settlements are made.
- (c) Buying reserve assets from the non-bank private sector in exchange for deposit liabilities.
- (d) Borrowing overseas, and selling the foreign exchange proceeds of such borrowing to the Reserve Bank in exchange for deposits at the Reserve Bank.
- (e) Borrowing directly from the Reserve Bank.

In cases where the banking system as a whole is facing a prospective shortfall, the capacity for inter-bank borrowing is limited to the extent that some banks may still have excess reserves (which, by definition, would not be enough to cover the system's shortfall), and competition for other bank deposits would simply reallocate the prospective shortfall between the banks

without reducing it. The other three sources, however, are still available.

Each of the above 'emergency' sources of reserve assets involve additional costs to the banks when compared with acquisition of reserve assets in the normal course of business. This cost effect follows from the necessity to increase the marginal cost of liabilities created in the effort to obtain additional reserve assets: in (b) and (c) above the interest cost of deposit liabilities rises as banks endeavour to persuade the private sector to switch deposits from one bank to another or to switch out of Government securities into bank deposits; in (d) an interest cost of increments to banks' overseas liabilities is incurred, this interest cost being related to relative interest rates internationally as well as exchange rate considerations. In (a) an interest rate is agreed between banks such that the lending bank obtains a return on the lending operation greater than the return on the reserve assets borrowed by the other bank.

Borrowing from the Reserve Bank also involves costs to the banks. As the cost parameters of this source are the only ones subject to direct Reserve Bank control, a reasonably full description of the mechanism is warranted. Banks may borrow from the Reserve Bank at any time during the current month if it appears that they will not be able to satisfy their daily average reserve asset requirement by the end of the month. In addition, if banks are faced with a need to borrow on the last day of the month in order to satisfy their reserve asset requirement, they may spread these borrowings out through the subsequent month in such a way that the daily average of the borrowings equals the daily average deficiency. The proceeds of any borrowings must be re-deposited with the Reserve Bank in special deposit accounts ('contra deposit accounts') which serve to ensure that these proceeds are not available either to support future reserve asset deficiencies or to provide a source of liquidity.

The nominal cost of such borrowings to a deficit bank is the difference between the interest charged on the borrowings less the interest earned on contra deposits. If the extent of borrowing for reserve asset purposes exceeds 1 per cent of a bank's deposit liabilities the contra deposit interest rate decreases by 1 per cent for all borrowings in this second 'tranche'. Further borrowings beyond the second tranche attract a progressively greater penalty using the same stepwise decrease in the contra deposit interest rate.

Banks will obviously select that course of acquiring reserve assets to cover a deficiency which involves the smallest profit loss. Attempts by the banks to maintain profitability by increasing margins between deposit and lending rates will reinforce any tendency for interest rates to rise as banks compete for liabilities in the course of attempting to acquire reserve assets. Upward pressure on interest rates can be expected to have effects on the target of RAR policy, that is bank lending, in the same direction as the behaviour modification aspects of the policy system. Such interest rate effects are therefore beneficial in the sense that they work in the right direction, although as an empirical point the strength of the effect may not necessarily be strong. Nevertheless, it should be recognised that interest rate effects are complementary to the main thrust of the RAR system, and are an inevitable and economically desirable consequence of it.