Bank Credit and Monetary Policy

Andrew Fung and Eric Hansen discuss the nature of bank credit, its role in the monetary transmission mechanism, and the implications for the monetary indicators framework.

Summary

The monetary transmission mechanism is the process by which changes in the quantity and price of primary liquidity interact with the decision-making behaviour of banks, firms, households, and investors to alter the level of economic activity and, eventually, the level of prices. In a small open economy like New Zealand the exchange rate is the most important transmission channel. The relative importance of the other channels is less certain. For instance, with the advent of financial deregulation in the mid 1970s and subsequent instability in the relationship between monetary variables and economic activity, the role of money as a transmission channel now tends to receive much less attention than does the role of the general level of interest rates. Similarly, the role of bank loans and other sources of credit is usually acknowledged but not accorded much importance.

In recent years the role of bank credit has begun to be reassessed in light of new theories about how capital and credit markets work. These new theories assume borrowers have more information about their characteristics and prospects than do lenders. For example, the borrower will likely know more about his or her own capabilities and future industry developments than the lender. This asymmetric distribution of information limits the ability of firms to issue tradeable bonds or equity shares to finance their investments. Although these financing difficulties probably do not apply to the largest and most reputable firms, studies suggest that they do apply to a significant proportion of firms.

In some circumstances, asymmetric information could result in widespread credit rationing where firms are unable to borrow the funds they desire at prevailing interest rates. However, such widespread quantity rationing does not usually occur. Instead, the common result is that the risk premium in credit interest rates is higher and more variable than would be the case without asymmetric information problems. Consequently investment demand and output are lower and more variable.

The higher the borrower's current net worth, the more the risk premium required by banks seems to fall. Net worth usually changes over the business cycle, falling during recessions when asset prices are falling and profitability is low, and increasing during booms. Particularly during recessions, these net...
worth effects can exacerbate the direct interest rate effects on nominal spending from changes in monetary policy.

Because changes to monetary policy settings take time to impact on inflation, and because of the uncertainties in key economic relations, the Reserve Bank uses a ‘checklist’ of indicators to monitor prospective developments in inflation. For a number of years, the main indicators have been the (trade-weighted) exchange rate and the yield curve, but a range of other variables are also monitored. The credit theories described in this article suggest that the set of indicators should include the interest-rate spread between commercial bills and (riskless) Treasury bills, and firms’ mix of financing between bank loans and commercial bills. Overseas evidence finds these variables to be significant predictors of economic activity, but at present only the most rudimentary (but favourable) evidence is available for New Zealand.

Introduction

Many Classical economists attributed an important role to credit in their descriptions of the trade cycle. However, for many years most discussions of the monetary transmission mechanism have concentrated almost entirely on the ‘general level of interest rates’ as the channel through which monetary policy influences the real economy. By altering the quantity of ‘high powered’ or ‘base’ money (approximately the same as ‘primary liquidity’ in New Zealand), the central bank is able to influence interest rates and thus economic activity. Bank credit, or even credit in general, receives scant attention, and is relegated to simply acting as the instrument for explaining how banks are able to use reserves to create larger volumes of deposits.

At least since the early 1980s there has been a reassessment of the alternative channels through which shocks to the economy are transmitted into economic activity and inflation. The banking system and the services banks provide as financial intermediaries are now receiving attention.

This article explains why bank credit may have a greater role in the transmission of monetary policy than has been believed in the recent past. The next section discusses the relative importance of money and credit in the transmission mechanism, using two stylised views to draw out the distinctions between the two channels. This section also discusses some weak points in the traditional view, leading to the explanation of the

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1 See Mark Gertler (1988) “Financial Structure and Aggregate Economic Activity”, Journal of Money, Credit and Banking (Vol.20 (part 2), pp.559-88) for references to the writing of Veblen (1904), Hawtrey (1926), Fisher (1933), and later writers such as Gurley and Shaw (1955).
nature of bank credit in the following section. The penultimate section returns to the
transmission mechanism and assesses the implications of these new credit theories for
the monetary indicators framework. (It should be noted that in this article the term 'bank
credit' is often used generically to include all intermediated credit, not just credit
extended by 'registered' banks. Also, the article focuses on bank credit as a source of
finance for firms, but many of the arguments also apply to bank credit to households).

Two Stylised Views of the Transmission Mechanism

The monetary transmission mechanism is the process by which changes in the quantity
and price of banking system reserves interact with a broad spectrum of financial and real
variables in the economy to alter the level of aggregate demand, and eventually, the level
of prices. The overall properties of the transmission mechanism depend on the
behavioural responses of the Reserve Bank, banks and other financial institutions,
investors, businesses, workers, and consumers to interest rates, exchange rates, asset
prices, excess demand or supply in the goods and labour markets, and their expectations
about future developments in all these variables and markets (Figure 1). However, since
most of the main behavioural features of the operation of monetary policy and the
transmission mechanism have been explained in a series of articles in this Bulletin2, the
discussion in this section is restricted to two stylised views of the mechanism for a closed
economy (as illustrated by the shaded region in Figure 1). It must be emphasized,
however, that this is simply a device for narrowing down the focus of the article, and does
not imply that any of the omitted channels are at all unimportant for the operation of
monetary policy. Indeed, the exchange rate channel is the most important channel in the
current environment.

The Modified Money View

For many years prior to the 1980s most discussions of the monetary transmission
mechanism accorded special status to money, generally defined as currency in circulation
and (various types of) bank deposits. While the liabilities side of banks’ balance
sheets were thought special, very little attention was paid to the asset side of their balance
sheets - in particular, bank credit was either assigned a passive role of reflecting
developments in the stock of deposits or analysed in terms of driving the growth of
deposits. Even in periods where governments imposed on banks interest rate controls
or credit growth guidelines, analysis often focused on the spillover effects on the money
supply.

Two key assumptions underlie this emphasis on money and neglect of credit: first, the
central role of bank deposits (and currency) as transactions media led to the assumption

2 John Tait and Michael Reddell, “The Operation of Monetary Policy” Reserve Bank Bulletin, 54(1), March 1991,
provide a detailed description of the day-to-day operation of the current monetary control framework, explaining
the nature of each available control instrument and how they are used in practice. Craig Beaumont and Michael
Reddell, “How Monetary Policy Influences Inflation” Reserve Bank Bulletin, 53(4), December 1990, discuss the
main channels of the monetary transmission mechanism in terms of their impact on inflation. In addition, Arthur
Grimes, “The Theoretical Basis for Monetary Policy”, Reserve Bank Bulletin, 53(2), June 1990, explains the
underlying theoretical basis for why the Reserve Bank is able to exert monetary control through the market for
settlement cash. These (and other) articles on monetary policy have also been published in a book titled Monetary

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that money performs a special service to business and consumers which is not performed by other assets, so that other assets are not close substitutes for money; second, with well functioning capital markets, bank credit is simply one of a number of alternative sources of investment finance for businesses. If, for whatever reason, the supply of bank credit is reduced, firms seeking to fund working capital or an investment project need simply issue tradeable bonds or equity shares in the capital market at no extra cost. Given this latter assumption that other sources of finance are perfectly substitutable for bank credit, any disturbance to the quantity or price of reserves impacts on the wider economy solely through the demand for and supply of money. From the policy-maker’s perspective this would mean that attempts to control credit would be negated by changes in the supply of substitutes, but attempts to control money would be effective (given the absence of substitutes). The transmission channels of this ‘money-only view’, are illustrated in Figure 2 with the bold arrows.

With the advent of financial deregulation in most Western economies during the 1970s and 1980s, the validity of the money-only view has been called into question. Widespread financial innovation, especially the increased use of credit cards and electronic banking, has helped to disrupt what was previously observed as a stable medium- to long-run relation between the stock of money and aggregate nominal income. As a result of these developments most descriptions of the transmission mechanism have now been modified to focus on the interest rate mechanism, rather than the demand for and supply of money per se. Nevertheless, until recently, these modified discussions usually continued to assume that bank credit is highly substitutable for other sources of finance.
In terms of the monetary policy framework in New Zealand, the *modified money view* can be described as follows. All banks operating in New Zealand either have an Exchange Settlement Account at the Reserve Bank or have a correspondent arrangement with a bank that does have such an account. Banks hold their cash (or money base) reserves in these settlement accounts for the purpose of settling transaction flows with other banks and the government (eg. tax payments). It is their inability to perfectly predict all flows, together with the Reserve Bank restriction preventing overdrafts on settlement accounts, which provide banks with a demand for settlement cash balances and a demand for securities convertible into cash at short notice. Each bank determines its desired level of settlement cash by trading off the costs of the below-market interest rate on cash (set by the Reserve Bank) with the costs of being caught short of cash, and having either to borrow cash from another bank, or pay a discount penalty (also set by the Reserve Bank) to convert Reserve Bank bills into cash.

As the monopoly supplier of settlement cash to the system, together with its control over cash interest rates and the discount margin, the Reserve Bank can alter conditions in the cash market and thus influence market interest rates and aggregate spending. For example, if the Bank reduces the target level of settlement cash for the system then banks expect on average to discount greater quantities of Reserve Bank bills, so that the cost of supporting the existing level of deposits and loans increases. Each bank will attempt to obtain additional cash by reducing its stock of marketable securities, and so causing interest rates to rise, but these actions cannot increase leaving the system-wide level of settlement cash above the new, lower target level. They can also reduce their demand for cash by reducing their level of deposits (via lower deposit interest rates) and by switching funds from loans to securities with known payment streams, such as Treasury bills and government stock. The final stage in the process is that higher interest rates reduce spending in the economy and appreciate the exchange rate. Both effects put downward pressure on inflation.

According to this modified money view, any reduction in bank lending affects the composition of firms’ financing but does not directly affect aggregate spending, which declines because market interest rates rise. For this reason, bank credit growth should have no value as an indicator of aggregate spending once money supply and interest rate movements are taken into account.

**The Credit View**

The credit view accepts the existence of the above channels in the monetary transmission mechanism, but adds further channels based on the assumption that bank credit is indeed special. The fundamental reasons for the distinctive role of bank credit relate to information asymmetries between borrowers and lenders, and are discussed in detail in the next section. For the purposes of this section it is sufficient that the distinctiveness of credit implies a significant proportion of firms are unable to easily substitute other sources of finance for credit, so that these firms are dependent on the supply of bank credit and retained earnings to meet their financing needs. In general, this is more likely to apply to smaller and younger firms than to the largest and most reputable firms. Broadly speaking, the credit view adds two channels to the transmission mechanism: a *credit quantity channel* and a *credit risk channel* (Figure 2).
A quantity channel may be included in the monetary transmission mechanism provided the output of large reputable firms is not fully substitutable for the output of firms reliant on bank credit. For example, IBM, with its reputation for high quality (at least until recently), would not be able to fill the market niche supplied by the many small businesses making IBM clones without significantly reducing the price of its Personal Computers. Thus, if the lack of bank credit constrained the smaller firms from increasing output to match demand, it is unlikely that IBM would expand output significantly to fill this gap. On the other hand, if a number of small sawmills producing rough-sawn timber stopped producing, it is likely that large firms such as New Zealand Forest Products would quickly fill the gap. In general, the greater and more widespread the firm-specific qualities of output the greater the impact of a reduction in bank loans on aggregate spending. This effect occurs independently of the interest rate effect discussed above. Hence, monetary policy is amplified through this quantity channel because spending declines more than in the money view.

A credit risk channel may also operate. In this channel the interest rate charged on loans displays ‘excess sensitivity’ relative to market interest rates on securities. In other words, an economy-wide shock will change the average default risk of borrowers in the bank credit market by more than occurs for the very large firms which fund through the securities market (as explained in the next section, this is essentially because the adverse selection and moral hazard incentives are more severe in the bank credit market). In fact, the true cost of borrowing from banks may change by even more than the change in loan rates because banks typically tighten other lending terms, such as collateral requirements and the size and maturity of loans. Thus, the credit risk channel amplifies the impact of monetary policy actions on those firms which do not have access to alternative sources of funding.

The insignificant role generally assigned to credit channels may have been partly due to the absence of a well articulated theory of why bank credit should be distinguished from other sources of finance. Another reason relevant for policy-makers was evidence which showed that the main credit aggregates had very little information value once money supply and interest rate movements had been taken into account. But, perhaps more importantly, the money view appeared consistent with observed facts. However, the breakdown of the money-income relation in the 1970s and 1980s and the magnitude of the real effects of monetary policy have provided impetus for development of new theories, including further development of the credit view.

The Money-Income Relation
Given the role of money as the medium of exchange, there should exist a relation between the level of money and aggregate nominal income. For many years the existence of a long-run money-income relation was generally accepted within most academic and policy-making communities, with debate focused on whether the relation was sufficiently stable over the short time periods relevant to policy-makers. However, during the 1980s the existence of even a long-run relation was called into question following world-wide experiences of monetary growth consistently far in excess of nominal income growth. This break down in the previously stable empirical relationships has been extensively studied in the literature and widely attributed to financial deregulation.
and financial innovation. Although the most recent Reserve Bank studies find some evidence that the long-run money-income relation has stabilised for the broad monetary aggregate (M3), this is not sufficient to significantly undermine the new credit theories. 3

Explaining the Real Effects of Monetary Policy

The second problem with the money view is the magnitude of real effects caused by disinflationary monetary policy. With rational expectations, the money view implies that an announced and credible monetary policy should mainly affect the inflation rate rather than the growth rate of economic activity. However, there is a large body of evidence consistent with a preannounced disinflationary monetary policy causing a significant fall in economic activity over the short-run. Most discussions of the monetary transmission mechanism attempt to explain these real effects by pointing to both downward rigidities in price and wage levels and inflation inertia, so that much of the initial reduction in nominal income growth occurs through reduced economic activity before prices ultimately are affected. Potential contributory factors to price level stickiness include slow adjustment in inflation expectations, the existence of explicit or implicit contracts which are unindexed to the level of inflation or to other observable measures of disinflationary pressure, and to the costs of adjusting prices (the so-called ‘menu costs’). 4 While each of these factors may have some validity, they do not provide an entirely convincing explanation for the magnitude of the real effects of monetary policy. For instance, can the difference between private and social cost of not adjusting prices or not indexing contracts (which is what underlies these theories) really account for the substantial recessionary costs that are observed in practice? Another weak point is that, except when inflation is close to zero, price level stickiness does not imply inflation rate stickiness.

In summary, the accumulation of stylised facts that are not convincingly explained by the money view provides impetus for the addition of other channels to the monetary transmission mechanism, particularly the credit channels described above. The following two sections discuss some of the modern theories of credit markets and the implications of these theories for the monetary indicators framework used to assess the state of monetary conditions.

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3 Recently, Reserve Bank staff have begun re-estimating money and credit demand equations but as yet none have shown particularly stable relations suitable for policy-making purposes. A summary of these studies is available in Alfred Wong and Arthur Grimes (1992) “The New Zealand Monetary Aggregates” Chapter 2.1 in Monetary Policy and the New Zealand Financial System, 3rd Edition, Reserve Bank of New Zealand.

Bank Credit as a Special Source of Investment Finance

The money view described above is consistent with the pre-1980s theoretical frameworks for financial intermediation and corporate finance, both of which assumed capital and credit markets to be 'informationally efficient'. Financial intermediaries were thought to exist because of economies of scale in the pooling of risk and also because of fixed costs in the lending process. Banks were distinguished from other financial intermediaries (eg, finance companies and venture capitalists) in their role as providers of liquidity and payments services. The latter role is closely related to the assumed special role of money.

"Until recently, corporate finance theory also helped perpetuate the belief that credit has no special significance as a source of investment finance for companies. The famous Modigliani-Miller irrelevance theorems of corporate finance effectively state that the value of an investment is independent of the firm's capital structure. Thus, whether a firm finances its investments with debt or equity does not affect the expected profitability of an investment proposition. Moreover, theory did not provide any meaningful distinction between bank credit and publicly-traded debt or between retained earnings (internal equity) and external equity.

The Modigliani-Miller irrelevance propositions no longer hold once fixed costs of contracting and bankruptcy costs are allowed for. It can be shown that fixed contracting costs create a distinction between obtaining funds from a single source (eg from a financial intermediary or from a wealthy individual) and obtaining funds by issuing tradable bonds or equity shares, while bank bankruptcy costs create a distinction between debt and equity. Hence, together contracting and bankruptcy costs are sufficient to create a special role for non-traded debt (credit). However, with this approach, banks have no special role relative to other financial intermediaries, so that policy-induced contractions of bank credit still have no significance for other macroeconomic variables.

Simply appending fixed contracting costs and bankruptcy costs to the Modigliani-Miller theory also has the additional deficiency of providing no convincing explanation for the existence of these costs. Instead, the advent of the economics of information provides a coherent explanation for contracting and bankruptcy costs, and also provides a rich array of microeconomic theories to underpin the credit view of the monetary transmission mechanism.


6 Issuing publicly traded debt and equity incurs a fixed cost relating to the production and distribution of information (in the form of a prospectus) to potential investors. The implication of this for firms borrowing large amounts is that their average fixed costs will be relatively low. But firms needing to borrow only small amounts of funds may face relatively high average fixed costs, discouraging them from issuing public debt. Thus, small firms may depend solely on credit from financial intermediaries, while larger firms use a mixture of borrowing from financial intermediaries and issuing publicly traded securities. Bankruptcy cost is the total cost of disruption to all parties associated with the firm (ie, investors, employees, suppliers, and customers), and the cost of legal proceedings.
Asymmetric Information
In essence, modern theories of capital and credit markets assume borrowers have more information about their characteristics and prospects than do lenders. For example, the borrower will likely know more about his or her own capabilities and future industry developments than the lender. This asymmetry of information implies that potential outside investors must expend real resources gathering and analysing information in order to evaluate investment projects being proposed by firms. In addition to these ‘precontracting’ information asymmetries, there may exist information asymmetries subsequent to the granting of credit where lenders have difficulty monitoring the true return on a project. The former motivates the existence of lenders’ screening costs prior to loan contracting, while the latter implies that lenders also incur costs when a firm becomes bankrupt. Both types of information asymmetry can imply advantages for bank credit over other sources of finance, particularly for small firms.

However, despite the advantage of bank credit over other sources of finance, banks still face significant difficulties in allocating credit. In the presence of asymmetric information the interest rate on credit becomes an imperfect allocational device, since the loan rate may itself influence the riskiness of the banks’ pool of loans. As interest rates rise there are two effects at work:

- adverse selection, where the most prudent firms defer their investment plans in recognition of the increased cost of borrowing and, therefore, the rise in probability of the firm failing. Thus, the average ‘riskiness’ of the remaining pool of borrowers increases.

- moral hazard, where borrowers have an incentive to divert the funds to riskier projects to the detriment of the lender.

These adverse selection and moral hazard problems lead to agency costs - costs due to the reduced efficiency of the credit allocation process. Banks attempt to overcome these inefficiencies by using a range of screening devices prior to granting a loan and by monitoring firm performance subsequent to the granting of credit. These devices may include taking account of the age and size of the firm, its performance history, the reputation of its management, firm net worth and assets available as collateral, restrictions on types of investment and on subsequent refinancing, monitoring the firm’s deposit flows and their regular loan repayments during the life of the loan contract. Nevertheless, each of these mechanisms is costly, so that agency costs are not completely eliminated.

The effect of adverse selection and moral hazard on banks’ lending behaviour is illustrated in Figure 3. In the figure, the demand curve (D) is downward sloping so that lower interest rates increase borrowers’ demand for credit. However, although the supply curve is upward sloping at low interest rates, it becomes ‘backward bending’ once interest rates reach sufficiently high levels. The reasons why the credit supply curve is shaped this way are explained in the accompanying box titled Credit Quantity and Credit Risk, but in essence it is a result of increased agency costs offsetting the bank’s extra revenue from higher interest rates. An initial market equilibrium, such as point A in Figure 3, develops into a credit rationing equilibrium when a shock to reserves shifts the supply curve leftward to $S_1$, so that the supply of credit is at C and demand for credit is at B, even though interest rates have increased to $i_1$.
The likelihood of credit rationing occurring partly depends on how well banks screen and monitor borrowers. The better banks are at allocating borrowers to well-defined risk categories, the less are the adverse selection and moral hazard incentives. Interest rates can then reflect underlying risk more appropriately and, hence, credit rationing becomes less likely. The likelihood of rationing is also lower in recessions because deterioration in the general state of the economy reduces firms’ profitability and demand for credit (ie the demand curve in Figure 3 shifts from \(D_0\) to \(D_1\) and equilibrium is at \(E\)). This accords well with the empirical literature which has not found much evidence for widespread credit rationing, except during periods with government imposed interest rate controls. Nevertheless, to the extent that interest rates rise and credit quantity is reduced, aggregate spending is also reduced.

**Borrower Net Worth**

Some borrower qualities observable by banks are inherent characteristics which do not depend on the state of the economy (eg. age and size of the firm), while others are economic variables closely linked to the business cycle. The borrower’s net worth, broadly defined as the current net asset or collateral value of the firm, is an important determinant of the riskiness of bank loans. Also, the higher is net worth, the less incentive borrowers have to engage in risky activities. Thus, agency costs will increase and decrease with the general state of borrowers’ balance sheets, generating changes in credit risk premia and possibly quantity effects. (In terms of Figure 4 in the Credit Quantity and Credit Risk box, a reduction in net worth shifts the loans return frontier downward.) Net worth is generally cyclical in nature, declining in recessions when asset prices are falling and profitability is low, and rising in booms.

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Credit Quantity and Credit Risk

This box describes in more detail how adverse selection and moral hazard affects banks' lending behaviour. The upper section of Figure 4 plots the loans return frontier, which is the combinations of a bank's expected return and loan portfolio risk as the loan interest rate increases (holding other factors constant). The simplest explanation for credit effects is to assume that loans are banks' only assets. The shape of the loans return frontier is explained as follows. Beginning from a low level of interest rates, an increase in the loan rate initially increases both the expected return and risk of the portfolio. However, as more 'good' borrowers drop out of the pool of borrowers, a point is reached where the increase in expected income from a higher interest rate will be exactly offset by the fall in expected income as the quality of borrowers declines. This is point A in the upper panel. Thereafter, the agency costs outweigh the marginal interest income, causing the loans return frontier to slope downward. At point A banks are unwilling to increase interest rates any further and would, in the face of increased demand for credit, ration credit by quantity. Thus, the loan supply curve becomes backward bending.

The above description illustrates the credit rationing possibility discussed in the main text. A better understanding of the credit quantity and credit risk channels is obtained by extending the previous analysis to allow banks to hold as assets both loans and riskless government securities. In this case, assume that the yield on government securities, \( i_g \), is determined by monetary policy. Given the initial demand and supply curves for credit, \( D_0 \) and \( S_0 \), the loan rate is \( i_0 \) and the bank's expected return and risk are \( r_0 \) and \( s_0 \), respectively. Each bank will hold a portion of its portfolio in loans and a portion in securities, but for purposes of clarity this is not shown on the upper figure.

Now suppose the economy is subject to an adverse shock which increases the general level of risk in the economy (for example, the onset of recession). This shock is represented by the downward shift and flattening in the loans return frontier (the broken line). As a result the riskiness of the pool of loans increases (B to C) at the given market interest rate on loans. However, this increase in risk induces banks to reduce their exposure by reducing lending and increasing instead holdings of securities, which causes the loan supply curve to shift leftward (\( S_0 \) to \( S_1 \)). This in turn increases the equilibrium loan rate (lower figure), and so exacerbates the adverse selection and moral hazard problems, causing risk to increase further to \( s_1 \) (which causes a further reduction in the proportion of the asset portfolio allocated to loans).

The net effect is that the risk premium on loan interest rates has increased by \( i_2 - i_1 \) and the supply of credit is reduced. A further implication is that a monetary policy tightening which initially increases \( i_g \) may result in \( i_2 \) falling as banks substitute out of loans and into securities. A rather extreme episode where this occurred is the Great Depression of the 1930s (see Ben Bernanke (1983) ‘Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression’, American Economic Review, Vol.73, pp 258-76.)
The effects of fluctuations in borrower net worth are not limited solely to the supply-side of the credit market. In the presence of bankruptcy costs the borrower's demand for loans may also become sensitive to his or her net worth position. If net worth is initially very low then the borrower has an incentive to invest in high risk projects (since they lose little in the event of failure, but gain much if the project is successful), and this exacerbates the adverse selection and moral hazard effects discussed above. However, with sufficiently high net worth, the existence of bankruptcy costs induces borrowers to be more cautious. Thus, a decline in net worth, perhaps caused by a monetary policy-induced decline in asset prices (as has recently happened in Japan), can lead firms to substantially reduce output and loan demand to reduce the risk of bankruptcy. In terms of Figure 3, a decline in net worth may be associated with leftward shifts in both the demand and supply curves. This mutates the spiral increase in interest rates (which could even fall), further reducing the likelihood of credit rationing in practice.

**Lender Net Worth (Bank Capital)**

Thus far the focus in this section has been almost exclusively on the creditworthiness of firms seeking to borrow funds, and how banks allocate available funds between loans and security assets. No mention has been made of the liability side of the banks' balance sheets, particularly their capital position. Yet banks are also firms, albeit a specific type of firm whose production is the making of loans to 'information intensive' borrowers. Applying the above discussion on the output effects of net worth fluctuations to banks implies a potentially important role for bank capital. For example, provided the initial capital position is not too low, an adverse shock to a bank's capital will reduce its willingness to produce loans. Similarly, a bank with a very low capital position may be induced to invest in risky projects in a bid for survival, as appears to have happened in the United States Savings and Loans industry during the 1980s.

The effect of disinflationary monetary policy on bank capital is also similar to the impact on borrower net worth. Recessions lead to an increase in business defaults and an increase in the general riskiness of a bank's loans, so that increased loan loss provisions must be made against capital. Also, unexpected declines in real estate prices reduce the collateral value of loans and also increase loan loss provisions set against capital.

To summarise, at least four general predictions follow from the analysis of this section:

- A small disturbance may have a large impact on both aggregate investment demand and aggregate supply of goods. For example, if a firm's profit margin is 10 percent then an unexpected fall in output price of 5 percent will reduce profit by 50 percent. This can cause a significant reduction in current net worth (relative to plan).

- Aggregate output will exhibit persistence because low net worth causes low demand and output, which in turn reduces next period's net worth.

- The credit mechanism is asymmetric. A shock to net worth is likely to have greater impact during a recession than during a boom, since a prolonged boom allows the accumulation of retained earnings (though it can be shown that even in a prolonged boom firms generally would not accumulate sufficient retained earnings to fully mitigate the credit channels).

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Unlike the money view, these credit effects do not disappear if prices are fully flexible. Indeed, the more flexible are asset prices, such as commercial property prices, the more pronounced the initial decline in net worth and the greater are the real effects of the credit channel.

Implications for the Monetary Indicators Framework

Because changes to monetary policy settings take time to impact on inflation and because of the complexity of the transmission mechanism and inherent uncertainties in these relationships, the Reserve Bank uses a set of indicators to monitor prospective developments in inflation. The so-called ‘checklist’ includes the exchange rate, the shape of the yield curve, the level of interest rates relative to expected inflation, and the growth rates of the money and credit aggregates. Further information is also obtained from a range of other data from the real sector and asset markets, including commercial and residential property prices, sharemarket indices, and survey measures of corporate profitability. The credit market theories discussed above are consistent with these variables containing useful information, though other theories provide alternative reasons.

The weight attached to each of the indicators depends on its place in the transmission mechanism and the degree of uncertainty associated with key relations between the variables. Relatively little weight has been put on the money and credit aggregates due to the destabilisation of their relation with nominal income following financial deregulation in the 1980s and subsequent financial innovation (see footnote 3). Instead, the exchange rate and the yield curve have been used as the main indicators for a number of years.

The discussion in the previous section suggests there may be value in assessing a number of explicitly credit-related indicator variables. Given that the transmission channels may operate through both the demand side and supply side of the credit market, and that the relative strengths of these channels may differ according to the state of banks’ and firms’ balance sheets, simply looking at the growth rate of credit or at loan rates may not provide much information relevant to policy. Moreover, estimating well-specified demand and supply equations is further inhibited by the fact that the announced base lending rates may not reflect the ‘true’ lending rate, which includes a risk premium specific to each borrower and other conditions that banks may impose on borrowers such as loan covenants and posting collateral. The credit theories described in the previous section imply that these factors should vary over the business cycle.

In the face of these difficulties, it is probably best to resort to an assessment of credit variables compared with, or relative to, related assets, such as commercial bills. Two general approaches to the problem of identifying the state of credit conditions are the examination of the interest-rate spread between commercial bills and ‘riskless’ government issued bills, and the mix of financing obtained from bank loans and commercial bills.

Tight monetary conditions will reduce the quantity of loans which banks are willing to grant. As a result, firms which are able will turn to the commercial bill market. In order to sell the increased quantity of commercial bills, borrowers must offer higher rates, increasing the spread between commercial and Treasury bill interest rates. Of course,
there are a number of other influences on the commercial-Treasury bill spread, such as the relative supply of bills, and investors' assessment of private default risk. Yet, overseas studies have shown that this spread is significantly related to future movements in real economic activity. In addition, an opposing movement in the quantities of commercial bills and bank loans would suggest a tightening in monetary conditions. In contrast, a contraction in the demand for bank credit, as part of a more general decline in the demand for loans, would result in a reduction in the quantity of all forms of credit.

Recent studies overseas find some support these variables. However, no reliable data is available to construct the mix-of-financing variable for New Zealand, and only very limited data is available to construct the interest rate spread. Nevertheless, Figure 5 plots the spread and real Gross Domestic Product (GDP) growth for the two and a half years to December 1987. Credit market theory implies that the spread should increase prior to a downturn in economic growth and decrease as the economy pulls out of recession. As plotted, the spread could be construed as leading real GDP growth as predicted by theory, but it could also represent a lagging relationship. (Note also that although the minimum feasible spread is zero, it actually becomes negative in mid-1987). Given the short period over which the graph is drawn it would be unwise to draw any conclusions about the role of credit in New Zealand. At most, we can conclude that the gathering of further data may be worthwhile.

Conclusion

The recognition that there may exist credit channels in the transmission of monetary policy is not itself a new development. But the underlying microeconomic theories about the nature of credit are newly developed and this, together with some tentatively favourable evidence, is leading to a reassessment of the importance of the credit channels.

The strict 'money-only view' implies that bank credit has no value as a monetary indicator because credit is just one of a number of easily substitutable sources of finance. The credit view asserts that credit does indeed play a special role in financing investment. This latter theory suggests that both the interest-rate spread between commercial bills and (riskless) Treasury bills and firms' mix of financing between bank loans and commercial bills may be valuable indicators of monetary conditions. Overseas evidence finds these variables to be reasonably good predictors of economic activity, but at present only the most rudimentary (but favourable) evidence is available for New Zealand.

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8 Prior to mid-1985 Treasury bills were issued 'on tap' at a preset interest rate, rather than auctioned. The series on commercial bill interest rates available at the Bank ends in 1987.