
ARTICLES

Towards a framework for promoting financial stability in New Zealand

Leni Hunter, Adrian Orr, and Bruce White

Central banks, like the Reserve Bank of New Zealand, make judgements and take actions to promote the stability of the financial system. This involves making decisions in inherently uncertain situations. For example, how is financial stability defined? How can we recognise an imminent financial crisis? And, how is a financial crisis best mitigated or recovered from?

This article presents a step towards a broad conceptual framework for promoting financial system stability and guiding the Bank's policy actions. We argue that the preconditions for financial stability are met when all financial system risks are being adequately identified, allocated, priced and managed. The financial system is made up of markets, institutions, and payments and settlement systems. Financial system risks broadly include credit, liquidity, market and operational risks.

All of the preconditions are important to best ensuring that the financial system is resilient to a wide range of economic and financial shocks, and able to absorb financial crisis losses with least disruption. The preconditions for financial stability also best ensure that the financial system is efficient in its delivery of financial services, and allocating resources throughout the economy.

In making assessments of financial stability, the Reserve Bank does not have a single, well-defined quantitative measure. Instead we draw on a variety of information, practices, and ongoing research. The Bank conducts regular surveillance of financial risks and reports on its assessments in the twice-yearly *Financial Stability Report*.

1 Introduction

The last two decades have been recognised internationally as amongst the most financially unstable in modern history.¹ Many regions during this period have experienced periods of financial instability. For example, New Zealand, Australia, and Scandinavia in the late 1980s and early 1990s; Japan throughout much of the 1990s; East Asia in 1997/98, and the United States, first in the early 1990s (the Savings and Loan crisis) and again early this decade (the 'tech wreck'). These experiences have resulted in financial stability issues coming to the fore of central banks' attention.

Many central banks, including the Reserve Bank of New Zealand, now publish regular financial stability reports alongside their regular monetary policy and inflation reports. However, the framework for undertaking this surveillance and for linking financial system surveillance to its policy powers and purposes is less developed than for central banks' monetary policy function. Unlike inflation targeting,

financial stability is not an easily quantified concept, and is also not clearly separable from other factors such as political stability, international financial stability, and wider economic and social stability.

This article presents the beginnings of a framework for the promotion of financial stability. It is intended to aid assessment of the activities that the Bank undertakes, as well as assessment of the sufficiency of its legal and operational capacity, with regard to promoting financial stability.

2 Financial stability in the central banking context

The roles of central banks in maintaining monetary and financial system stability have evolved in different ways across countries. However, for many central banks, these roles emerged from similar origins: supplying notes and coins (monetary liabilities) to the public and being 'banker to the banks'. These origins have led central banks towards being an obvious potential 'lender of last resort', interested

¹ See Aliber (2005).

in bank and payments system prudential regulation, and maintaining various financial crisis management capacities.

In New Zealand today, the Reserve Bank of New Zealand Act (1989) sets two broad functions for the Reserve Bank. These are to:

- formulate and implement monetary policy to maintain price stability; and
- promote the soundness and efficiency of the financial system.²

Monetary policy concerns the policy followed by the Bank in issuing its monetary liabilities. The Bank currently implements its monetary policy by setting the interest rate at which it stands ready to transact in its liabilities overnight. In this way, the Reserve Bank sets the risk-free rate of interest for the economy and ensures that the purchasing power of its liabilities is broadly maintained over time (ie, that consumer price inflation is stable).

By contrast, the promotion of a sound and efficient financial system covers a range of activities. For example, in order to inject liquidity into the banking system and allow inter-bank transactions to occur, the Reserve Bank provides settlement accounts to domestic banks. The Bank is also the natural 'lender of last resort', which involves it potentially providing cash to a solvent bank that cannot obtain liquidity elsewhere.

In these roles, as 'banker to the banks' and 'lender of last resort', the Reserve Bank has an interest in ensuring that the risks are prudently managed in banks, and that financial crisis management capabilities exist. The Bank thus sets prudential regulatory policy as well as maintaining financial crisis management capacities. The Bank also has a natural interest in ensuring that all payments systems are operationally, financially, and legally robust, and is currently developing its oversight role in this area, as well as being the owner/operator of some critical payments system infrastructure itself. The Bank also holds a portfolio of liquid foreign

exchange reserves for the purpose of both intervening in the foreign exchange market to influence the exchange rate for monetary policy purposes, and to provide foreign exchange liquidity necessary to support the functioning of the foreign exchange market in a financial crisis.

Hence, while implementing monetary policy to maintain price stability and promoting financial system soundness and efficiency are two different functions, they have similar origins. Taken together, they can encompass maintaining the stability of the monetary unit of account (the monetary policy function) and of the institutions, markets and systems through which economic exchange in a monetary economy occurs (the financial stability function).

3 The foundations for financial stability

The financial system enables the vast majority of economic exchange and plays a pivotal role in the efficient allocation of resources. It does this by providing the processes that mitigate the need for the simultaneous bilateral exchange of physical goods or services. Without a financial system, the scope for economic exchange would be confined to barter.

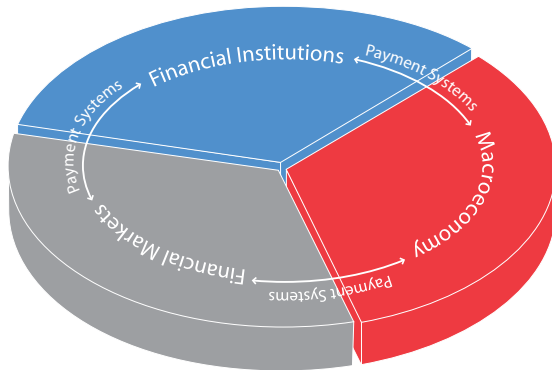
The financial system comprises three interconnected components:

- *financial markets*, in which financial contracts are entered into or traded directly between buyers and sellers (or borrowers and lenders);
- *financial institutions*, which intermediate between borrowers and lenders (including the central bank); and provide financial services; and,
- *payments systems*, which allow financial transactions within markets and with institutions to be made.

The efficiency of the financial system relates to both its role in allocating risk and resources throughout the economy, as well as the economic costs of doing so. Achieving efficiency in allocating resources is mostly about ensuring that the conditions required for optimal economic exchange are satisfied, such as full information and clear property rights.

² The Bank is required to prudentially supervise registered banks and to oversee the payments system, in order to promote the soundness and efficiency of the financial system. The Reserve Bank Act additionally specifies that the Bank should use its prudential intervention powers to avoid significant damage to the financial system should a registered bank fail.

Figure 1
The financial system



The efficiency of the financial system itself is mostly about satisfying the conditions required for competition amongst competitive firms eg, low barriers to entry and an absence of monopoly powers.

At the core of the process of exchange through the financial system is a market pricing mechanism. A current market price signals the market's valuation to prospective buyers and sellers, who compare that price to their own valuations. If a price is too low, then more people will want to buy than sell. As buyers outweigh sellers, the price rises and the imbalance is reduced until the market 'clears' and exchange takes place. At this point the resource is valued equally by both buyers and sellers. It is those buyers who value the resource the most who bid the highest price and remain in the market. Hence, markets set prices so as to efficiently allocate resources to those for whom they have the most value, at least as measured by ability to pay.

This basic explanation applies to trade in all sorts of goods and services. For assets there is an additional element to the pricing mechanism, where time is involved. Assets are bought and sold on the basis of a benefit that is expected to be realised over a future period of time. However, because the future is always uncertain, there is always some uncertainty around whether the future benefit will be delivered and match up to today's expectations. It is this uncertainty that creates financial risk.

Asset markets implicitly price this financial risk. The price of risk is the additional yield (or premium) an investor would expect to receive for holding a risky asset over and above the 'risk-free' interest rate. Hence, in a market, investors who

can best manage the risk associated with an asset will be prepared to receive a lower risk premium in compensation for the risk exposure (or conversely pay a higher asset price). Efficient pricing of risk therefore will tend to result in risk being allocated to those who best understand the nature of the risk, and are most willing and well-positioned to manage it.

However, the sound and efficient functioning of the financial system is conditional on assumptions about the economic environment which do not always hold. These assumptions include the existence of markets that can allocate all forms of financial risk, clear ownership rights of both financial risk and reward, and investors having adequate information with which they make their financial decisions. If these assumptions do not hold, then the financial system can become unstable and necessitate various forms of market intervention.³

Financial system risks

In general terms, a financial system is sound when it has the resilience to continue to efficiently provide financial services in a plausible range of adverse circumstances. However, if any one component of the financial system is impaired, then it can become unstable and will not operate to allocate resources efficiently. The financial system could be considered impaired when, for example, a material number of users incur significant losses from exposures to financial system risk that they could not have been expected to be aware of or manage. That is, all financial risks were not adequately identified, allocated, priced and/or managed.

The main types of financial system risk can be summarised as:

Credit risk – The risk that contracts represented as payable as a fixed sum of money in the future will not be paid in full on maturity.

Market risk – The potential for the market value of an asset to fluctuate because of, for example, changed credit risk

³ From Draghi, Giavazzi, and Merton (2006): "To understand the breeding conditions for financial crises the prime source of concern is not risk per se, but the unintended, or unanticipated accumulation of risks..."

Box 1

Microfoundations for financial stability

The preconditions for financial stability are such that all relevant financial system risks are adequately identified, priced, allocated and managed. These preconditions are consistent with the 'first order' intertemporal optimising conditions of early models of consumption under uncertainty, once these have been restated for assets rather than consumption goods. This follows in part the example of Haldane (2004).

If someone consumes a little less today in order to save and invest, then they reduce the benefit or 'utility' that they would have had today. According to the Keynes-Ramsey rule (Ramsey, 1928), if they use their resource optimally then the utility lost from the marginal reduction in today's consumption is counterbalanced by the discounted utility gained from their ability to use the investment returns to buy and consume goods at a later date.

The work by Samuelson (1969) and Merton (1969) effectively extended the Keynes-Ramsey rule and introduced future investment uncertainty. The extended rule describes how investors will choose to consume over time when they are maximising their utility, given expected asset returns.

However, we can also use the rule to think about what asset returns should be, depending on how people consume over time (see Blanchard and Fisher, (1989)). In this way the rule tells us whether an asset price is too high or low. An asset price is said to be too low if its implied pay-off is so high that the added future utility that we obtain from having invested in the asset is greater than the utility we have had to forgo today in order to purchase the asset. Intuitively then, it would follow that if the price is too low, the investor should reduce today's consumption, and increase savings in order to buy more of the asset. As the investor demands more of the asset the price moves towards its equilibrium.

The restatement of the consumption rule to an asset pricing relation is done in the consumption capital asset

pricing model (Breedon, 1979; Merton, 1973; Rubenstein 1976). In the consumption CAPM (capital asset pricing model) the price of an asset depends on the asset's risk; if an asset is risky, then people will only hold it if they are paid a risk premium in compensation.

The risk premium is determined by how the asset's return co-varies with the marginal utility of consumption. Assets that help to smooth consumption over time are relatively more valuable and command a higher price. An example of such an asset is insurance: it is generally designed to have a high pay-off at exactly the time when an event occurs which lowers income and hence consumption. On the other hand, suppose we have an asset that is likely to have a high pay-off when consumption is already high, but which might have a low or negative pay-off when consumption is low. This asset may well add to consumption volatility, and hence it is considered risky and less valuable.

Under certain conditions the asset price relation from the consumption CAPM model can in turn be recast in terms of the standard CAPM equation (Sharp, 1964; Lintner, 1965).⁴ Standard CAPM brings portfolio theory into focus, as the risk premium now depends on how the individual asset return co-varies with the total market return.⁵

The underlying objective in these models is to maximise the 'utility' of a representative individual. The conditions under which this is done amount to statements of optimal resource allocation: they are efficiency conditions.

However, the further we are from the optimal path, the more incorrectly priced are assets and risk. This incorrect/inadequate asset pricing may be due to the lack of adequate identification, allocation and management of financial risks; and may present potential threats to financial stability. Hence, in addition to its interpretation as an efficiency condition, we view the first order condition for asset prices as providing a precondition for financial stability.

⁴ The condition is the existence of an asset (or composite asset) that is perfectly negatively correlated with the marginal utility of tomorrow's (ie, the next period's) consumption.

⁵ We note that there is ongoing debate about the empirical validity of the CAPM.

It should be noted that the first order conditions discussed in this box are not solutions of the dynamic path for asset prices; in the event of a perturbation to the financial system they cannot tell us exactly how the economy will correct. Whether instances of inadequate pricing are actual threats

to financial stability requires further assessment of the materiality of the risks involved (see section 5 and figure 2). However, if financial risks are adequately identified, allocated, priced and managed then the financial system should be capable of dissipating imbalances.⁶

assessment, changed assessments of the future income flow from the asset, or a change in the rate of exchange between currencies.

Liquidity risk – A loss that might be incurred as the result of a forced sale.

Operational risk – Economic loss caused by a process breakdown eg, computer failure, human error, and fraud.

We consider that the preconditions for financial stability are met when all financial system risks are adequately identified, allocated, priced and managed.

These financial system risks relate to all components of the financial system, which include markets, institutions, and payments systems. The financial system risks include credit, market, liquidity and operational risks.

All four of the preconditions may not be strictly necessary or relevant in every instance. In some cases the preconditions could be adequately met through non-price approaches to risk management. Or one might argue that in a perfect market with full information, adequately 'priced' risk would also imply adequately identified, allocated and managed risk (in which case adequate pricing alone would be the only relevant precondition).

However, for generality, and because the market fails for various reasons, we see an adequate combination of identification, pricing, allocation and management of financial system risk as necessary for financial stability. Each precondition is important to best ensuring that the financial system is resilient to a wide range of economic and financial shocks, and able to absorb financial crisis losses with least disruption.

Of course, even if the preconditions for financial stability are in place, volatility and sharp adjustments in financial prices (and/or quantities) can still occur. These adjustments are often an important part of the adjustment process in a

sound and stable system. For example, short-term volatility is often caused by the 'price discovery' or 'quantity adjustment' process that occurs as economic circumstances change. Such volatility is, however, less likely to lead to financial instability or necessitate some form of crisis intervention if the preconditions for financial stability are in place.

Furthermore, financial crises can and will still occur. Financial crises are caused by a combination of unlikely events where the correlations were not obvious ex ante. Hence financial crisis management capabilities must still be in place, including capital buffers and pre-positioned loss allocation, insurance and/or resolution mechanisms. This is why we include all components of identify, price, allocate, and manage in our preconditions.

The microeconomic foundations for our preconditions to financial stability are outlined in Box 1

4 Market failure and financial instability

Financial instability can be triggered by a variety of causes and shocks. These causes generally arise from combinations of structural and behavioural factors. Structural market failures are attributable to factors such as information asymmetries, negative externalities, and moral hazard. Behavioural market failures refer to issues such as herd behaviour in investment decisions, and investment fads and fashions, or myopia in decision making around various components of the financial system. There is substantial overlap between these structural/behavioural categories; for example, a structural problem such as information asymmetry will likely contribute to herd behaviour, by causing agents to rely more on observations of each other's trades for information regarding the appropriate market price.

⁶ Using words borrowed from Schinasi (2004).

Structural failure

An important determinant of structural failures in the financial system is information asymmetry. Sellers (or borrowers) typically know more about the risks embodied in the exchange than do buyers (lenders). Faced with such an asymmetry, buyers will be cautious, and will tend to overestimate (price) risk. If risk is over-priced, this may drive out the less-risky activities, causing buyers (lenders) to become more cautious still. Such a process can result in less exchange than would otherwise be the case if the two sides to the exchange were more equally informed.

Hence, an important purpose of financial regulation is to address this information gap. The regulation may include insisting on a greater level of disclosure, or impose certain standards on sellers (borrowers). Financial regulation, like many other forms of regulation, thus generally entails a combination of disclosure requirements and standard setting.

The existence of externalities and ‘free-rider’ opportunities in some instances also means that risks may not be owned by the owner of the asset, and hence not priced or managed adequately. A result can be under investment in some risk management tasks, such as ensuring the ongoing operational capacity of critical payment systems.

Structural factors can mean that identifying, pricing, allocating, and managing financial risks can be very difficult at times, if not impossible, thus necessitating various forms of prudential regulation, financial crisis management capabilities, and/or the public provision of certain financial services. For example, it is difficult to be able to identify all threats to financial stability *ex ante*. Hence, some forms of risk are best managed by ensuring adequate capital buffers are in place to absorb losses without disruption to the system. The Basel II process of allocating capital buffers to various forms of financial risks in banks is an example of such an intervention.

Some forms of risk are also not adequately *priced* due to the lack of a market for the price discovery process to occur. Likewise, both free-rider and externality aspects of certain payment system networks may mean that risks are not allocated accordingly and may be mismanaged. This may

necessitate the public provision of certain services (eg, utility networks) or prepositioned loss allocation mechanisms in the case of a bank failure.

Behavioural factors

The financial system can also be exposed to destabilising behaviours. These influences can be exacerbated by some of the structural weaknesses discussed already, especially for example, the phenomenon of contagious bank runs.⁷

Recent developments in the field of behavioural finance have extended our understanding of the potential sources of financial instability. Concepts such as myopic decision making, cognitive dissonance (repression of contradictory evidence), and fallacy of composition, some of which come from psychology, are receiving wider recognition in relation to the study of financial stability. It is becoming increasingly recognised that individually ‘rational’ people all making the same choices can lead to herd behaviour and momentum that can drive a market price far away from that consistent with underlying returns and risks. Kindleberger (1996) describes how ‘euphoria’ can turn into mania, as speculation “leads from normal rational behaviour to what has been described as ‘mania’ or a ‘bubble’”. In short, people can become overly optimistic about returns, and insufficiently focussed on their risks.

History gives us many examples of ‘mania’, bank runs, asset bubbles and other financial crises, from as early as the Dutch tulip bulb bubble in 1636 to the present day. Aliber (2005) has described the most recent 35 years as the “most tumultuous in international monetary history.” He describes the effect of financial deregulation in enabling Japanese banks to rapidly increase their real estate loans – resulting in both property price increases, and real estate company valuation increases, boosting the Tokyo stock exchange. At the same time, Aliber notes that when Nordic controls on foreign borrowing were lifted, there was an inflow of foreign

⁷ Contagious runs on (solvent) banks are attributed to depositors with little information on their own bank exercising their ability to withdraw on-demand funds when they see others doing so. Because the bank deposit contract provides for repayment in full on a “first come, first served” basis, depositors face no penalty if they are wrong, but stand to avoid loss if their bank actually does have a problem.

(notably Japanese) funds which led to real estate and stock price bubbles in Finland, Sweden and Norway. The Mexican crisis of the 1990s had its roots in over-optimism regarding the success of macroeconomic reform. Excessive lending driven by high expectations of growth helped to create both the Asian crisis and the US stock market bubble in the latter years of the 1990s and early this decade.

New Zealand had a similar experience in the second half of the 1980s, when economic reform and financial liberalisation resulted in a surge in credit expansion and correspondingly leveraged bubbles in commercial real estate and listed equity prices. When it became apparent that the market's assessment of risk had become substantially misaligned from the returns, a reassessment triggered by the sharemarket correction in the US in October 1987 caused the bubble to burst and widespread defaults occurred. This correction of previous misalignments caused material damage to the financial system, including the failure and hence closure of a number of financial institutions and a significant fall in equity market participation for several years following.

A common element in these financial crises has been the rapid expansion in the supply of bank credit which, at least with the benefit of hindsight, was priced too cheaply (ie, the risks were underpriced). Enthusiasm draws in a wider and wider class of investors and the financial intermediaries who provide them with credit.⁸ Borio (2005) emphasises credit supply by highlighting the role of 'financial imbalances' in causing crises. That is, lenders over-extend themselves by financing highly leveraged assets that turn out to be incapable of generating the cash flows required to service the debt.

When credit is more readily available than usual, or when it is relatively inexpensive, financial systems can become prone to credit defaults and ensuing instability. For example, the Latin American debt crisis that broke out in the early 1980s had its origins in large scale bank lending to sovereigns in the 1970s that became unsustainable when US interest rates rose sharply at the end of the decade. By contrast, the equity bubble in the US in the late 1990s, which was

relatively less leveraged with bank debt, was associated with less financial instability.

However, credit growth measures and asset market valuations alone are not *necessarily* good financial stability indicators. Rather, it is assessing why the indicators have moved that matters most, and hence the need for a framework to assess these developments.

Making assessments of the sustainability of credit expansions and large asset price movements is, of course, difficult. The extent to which central banks should attempt such assessments is also an area of considerable debate. Much of the debate concerns rather polar positions, that is, whether or not central banks should 'target' asset prices. The financial stability assessment framework proposed in this article does not approach this question as an 'either-or' issue, but instead aims to assist an assessment-based approach by providing a framework of questions (see section 5).

Regulatory response

Crafting the regulatory infrastructure to support the process of economic exchange is not straightforward. Regulation that excessively constrains sellers, whether directly or through imposition of compliance costs, can cause them to withdraw from the market and lead to economic inefficiencies. Significant 'moral hazard' problems can also arise, where over-regulation can remove the actual financial risk from the owner of the asset, institution, market, or payments system. The public provision of certain financial services may also crowd out competition and innovation. These factors can imply that the financial risk will then not be adequately identified, priced, and/or managed.

It is also very important to recognise that markets can and do generate their own solutions to what otherwise would be information asymmetry market failures. Financial intermediaries themselves are a market response to this underlying economic problem. The role of a bank is to monitor and manage the risks embedded in risky loans that depositors would be unable to monitor themselves. Banks in effect facilitate the economic exchange between depositors and borrowers by playing a role that balances up the information asymmetry.

⁸ See Kindleberger's (1996) discussion of Hyman Minsky's model.

However, there is always the question: who monitors the monitors? In the financial system, a number of mechanisms perform this role: shareholders, and those appointed by them (boards of directors and auditors), creditors, rating agencies, and regulators.

Experience suggests that market-based solutions – sometimes with regulatory prompting and encouragement – can often result in a better performing financial system than over-relying on regulatory interventions. The Reserve Bank attempts to find a balance between self and market discipline operating in the banking system, and regulatory discipline as an additional pillar. The general principles we aspire to in all that we do with our prudential regulation role thus include:

- Keeping efficiency issues at the centre of our attention;
- utilising the synergies amongst our monetary policy, macro prudential, supervision and market operation roles;
- maintaining a system overview as well as knowing individual institutions well;
- seeking to utilise market forces as far as possible rather than oppose them;
- recognising that we have many common interests with supervised institutions;
- using incentive-based techniques as much as possible; and
- making sure that we maintain high analytical standards in our regulatory design.

In summary, we approach financial system regulation from the standpoint of its role in enabling economic activity - by supporting the processes by which people and firms can engage in welfare improving specialisation and trade.

5 Financial stability assessment and the role of the Reserve Bank

Assessment

We define the preconditions for financial stability as being that all financial risks are being adequately identified, allocated, priced and managed. If these preconditions are in place, then that should also imply that a plausible range of financial losses can be absorbed without financial system disruption.

This financial stability definition is around preconditions rather than outcomes, hence it is not like the definition of price stability in the Reserve Bank's Policy Targets Agreement. Our definition of financial stability is also an *ex ante* (rather than *ex post*) definition. Its value thus lies in prompting questions for policymakers and financial system users in relation to whether an apparent imbalance or misalignment may be a source of financial instability.

The financial market monitoring and research that the Reserve Bank and other market participants undertake helps form views on the likelihood that financial risks are not being adequately identified, priced, allocated, or managed. Such judgements are formed on the basis of indicator models, stress testing, past experiences, banking surveillance, and other forms of analysis. These judgements are augmented by the regular contact the Bank has with market participants and financial institutions, managing foreign exchange reserves, implementing liquidity management, and operating elements of the payment and settlement system.

At the macroeconomic level, imbalances such as inflation pressures and large surpluses or deficits on the current account of the balance of payments, can make the financial system more susceptible to shocks that test the resilience of the financial system. To assess how risky these imbalances are requires a good understanding of the causes of the imbalance, and of the underlying financial drivers. Again, understanding the 'why' matters more than knowing the 'what'. This assessment combines judgement, research, forecasting and economic models.

Table 1
Framework overview

Financial System	Risks	Identify	Allocate	Price and/or manage	Powers and purposes	Actions
<i>Financial stability exists when risks are adequately identified, allocated, priced and managed.</i>						
Markets Institutions Payment systems	Liquidity Credit Operational Market	Identify market failure/source of financial risk	Ensure risks are allocated to those who are willing, aware, and best able to manage them	Form view of how well risk is priced; and/or how well risks are being managed.	RB Act (1989) RB capital and balance sheet	Prevention Correction Crisis management

Objectives and powers

The Reserve Bank has a number of roles that relate to maintaining financial stability. The overall role of the Reserve Bank can be viewed in terms of promoting the stability of New Zealand’s monetary and financial system – comprising the monetary unit of account, and the markets, institutions, and systems that make monetary exchange possible. These roles include:

- Maintaining low and stable inflation (ie, maintaining the purchasing power of our money liabilities);
- acting as banker to the banks (and the government);
- prudentially supervising registered banks and being prepared to manage a bank failure;
- overseeing the payments and settlement system; and
- maintaining a reserve of foreign currency for financial crisis management.

The Bank’s activities thus fall into prevention, correction, and crisis management areas. Most of the Reserve Bank’s efforts are aimed at preventing financial crises and promoting financial stability. This broad framework is outlined in table 1; for a more detailed list of the Bank’s activities see table 2 at the end of this section.

Prevention

Most of the Reserve Bank’s activities are aimed at preventing financial crises and thus promoting financial stability. In the prudential supervision of registered banks an important element is the bank registration process. This is directed to ensuring that banks are, for example, established with appropriate governance arrangements and capability, as well

as having adequate capital for the business to be undertaken soundly and plausible losses are able to be absorbed without disruption. The disclosures that registered banks in New Zealand make also have an important preventative role, by bringing to bear the scrutiny of the marketplace on how banks are identifying, allocating, pricing and managing their financial risks.

The Reserve Bank also plays a direct role in the surveillance of the financial system, through its direct supervisory and banking relationships, participation in the financial markets (particularly in foreign exchange and government securities), and wider financial system and macroeconomic surveillance and analysis. Much of this work is reported on in the Bank’s *Financial Stability Report* and *Monetary Policy Statement*. The Bank thus contributes generally to the provision of information and analysis to the marketplace.

However, no system of policies and procedures can ensure that the conditions for financial stability are met all of the time. From time to time there will be developments where the Bank will become less confident that risks are being adequately identified, priced, allocated, or managed, and where interventions to lessen the potential for emerging financial instability will be called for.

Correction and crisis management

The Reserve Bank’s interventions aimed at *correcting* potential preconditions for financial instability may take a number of forms. Such interventions may range from Governors’ speeches that draw attention to the issue, through to the Bank exercising powers (with the consent of

the Minister of Finance) by which it can give directions to a registered bank or banks.

The Bank may also use its own capital or balance sheet to intervene financially, for example, by intervening in the foreign exchange market, or through providing the markets with access to its bank's bond portfolio in order to bolster liquidity.

There is also overlap between the Bank's monetary policy and financial stability roles. For example, asset price bubbles have the potential to overwhelm monetary policy responses and threaten financial stability. The Reserve Bank Governor recently acknowledged that in rare situations an (asset class) price misalignment may be sufficiently obvious that a monetary policy response in excess of that required for the usual price stability objective could be required; in these cases in particular, a longer term view of the risks to price stability would be appropriate, (Bollard, 2004).

The Bank also has a *crisis management* role. Some categories of extreme and very low probability risk are also inherently difficult for the financial system to price and manage – the so-called 'uninsurable' risks. Most insurance policies, for example, excluded compensation for loss arising from the Y2K problem, a once in a millennium event. A current example of the Reserve Bank's contingency planning of a low probability but potentially very damaging event, is its preparation for any potential pandemic.⁹

While 'lender of last resort', foreign exchange intervention, and bank statutory management are the crisis management activities usually associated with a central bank, a recent additional example is the Reserve Bank's outsourcing policy.¹⁰ A primary motivation for that policy is to better ensure that should a (large) bank become insolvent, or should an important provider of outsourced services no longer able to deliver, that bank could continue to be operated. While such an event may be in the low probability category, it would have significant consequences for the financial system as a whole.

Figure 2, opposite, steps through, in a stylised manner, the typical stages and questions involved in the Bank considering a policy intervention aimed at promoting financial stability. Following that two examples of recent issues are briefly discussed.

Example: Outsourcing

As referred to earlier, the Reserve Bank has recently released a policy regarding outsourcing of key functionality by banks. The market failure that prompted regulation is the risk (ie, negative externality) that third parties may be exposed to in a crisis event where a bank cannot maintain its services. Providers of banking services may not bear all of the risks of a failure in their systems and hence underinvest in core infrastructure. Conversely, users of banking services are in a weak position to assess and hence apply market discipline over this risk. This 'market failure' is material to financial stability because of the centrality of core banking functions to the functioning of the economy overall, and the systemic nature of large banks.

Example: Housing market

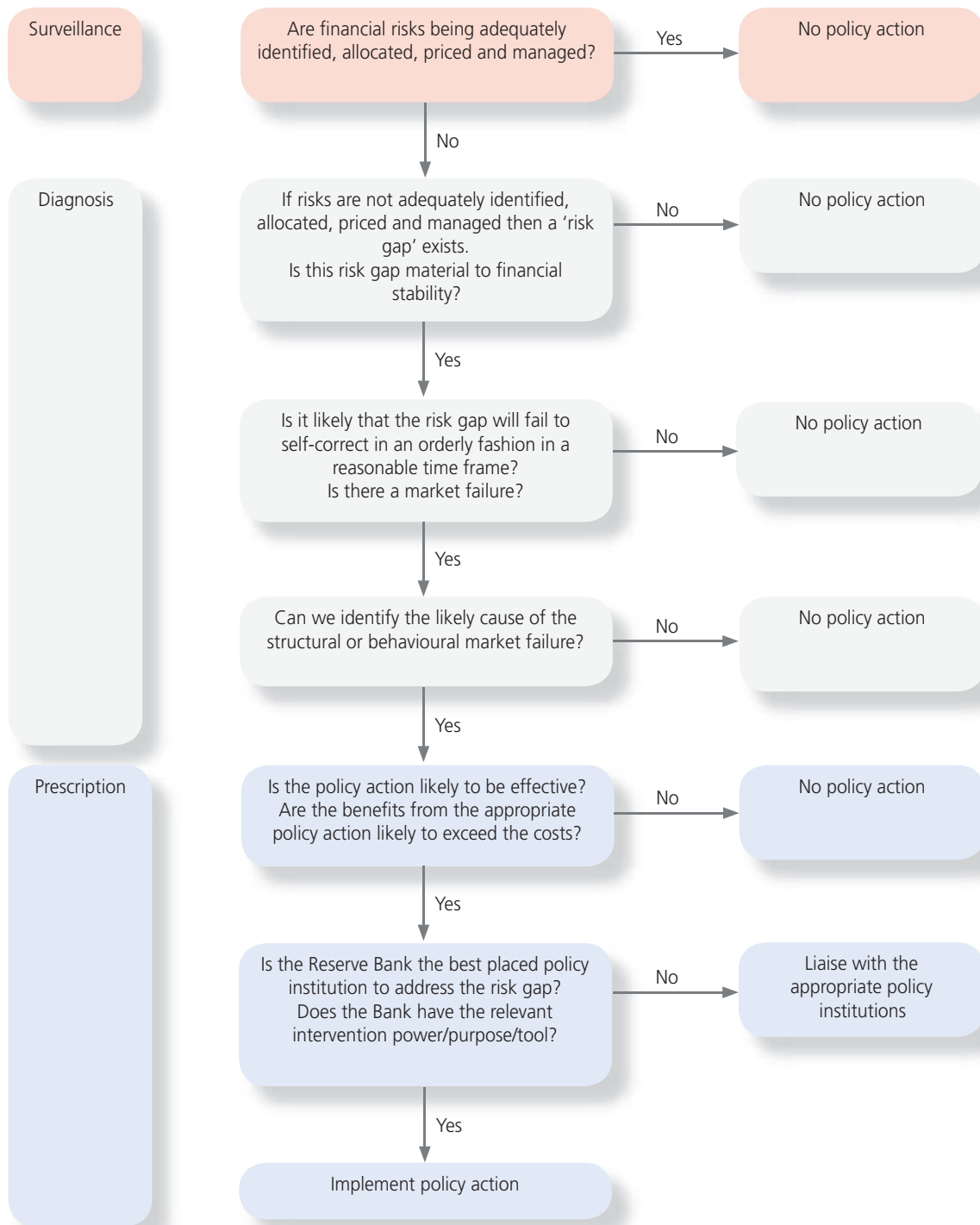
Over recent times the Bank has expressed the view that the housing market is inflated. While economic fundamentals have supported higher prices, it is likely that an element of speculative behaviour has been present in the cycle, with prices outstripping their fundamentals. There has also been some inelasticity of housing supply, and structural aspects of the financial system such as tax policy driving behaviour.

Given the high leverage in household balance sheets, a significant reduction in house prices could be material to wider financial stability. However, our current assessment is that the banking system's lending to households, overall, has accounted for these risks within a plausible range. Hence the Bank has not raised specific prudential concerns with banks. However, the Basel II capital requirements will sharpen the focus of banks and banking supervisors on making sure that banks' capital adequacy is sufficiently sensitive to risk, and that banks hold a sufficient capital buffer at all times to absorb unexpected loss.

⁹ See <http://www.rbnz.govt.nz/crisismgmt> for details on the contingency planning that is being undertaken for this risk.

¹⁰ See <http://www.rbnz.govt.nz/finstab/banking/outsourcing/index.html>.

Figure 2
Stylised overview of the Bank's policy decision process¹¹



¹¹ This flow chart is intended as a broad overview – it is not a precise statement of how policy decisions will necessarily be made.

Table 2

Reserve Bank activities and the Reserve Bank Act

Prevention	<p>Information and monitoring: Financial Stability Report; Monetary Policy Statement (s 15); Provide advice to the Minister of Finance (s 23, s 33); information and disclosure relating to payment systems (Part 5B)</p> <p>Banks: Prudential regulation (bank registration, capital requirements, connected lending limits, disclosure), outsourcing policy) (Part 5)</p> <p>Liquidity: Provide liquidity to the banking sector through the payment system, open market operations, Bond Lending Facility, issue of currency (s 8, s 25, s 39)</p> <p>Payment and settlement systems: provision of critical infrastructure eg NZ operator of ESAS/Austraclear (s 32, s 39); support for the CLS' adoption of NZD, designated payment systems (Part 5C)</p> <p>Holding portfolio of foreign reserves for intervention purposes (s 24)</p>
Correction	<p>Intervening in the foreign exchange market for monetary policy purposes (s 16, s 17, s 18)</p> <p>Primary function is maintaining price stability (s 8)</p> <p>Impose prudential requirements upon banks (Part 5); ability to impose and alter conditions of registration on banks (s 74); powers to give bank directions (s 113)</p>
Crisis management	<p>Acting as lender of last resort (s 31)</p> <p>Statutory management (s 117) powers to give bank directions (s 113)</p> <p>Foreign exchange intervention (s 16, s 17, s 18)</p>

In addition, the Bank takes the housing market into account in setting monetary policy, through wealth effects and the transmission of existing house prices to the prices of goods and services included in the CPI. This has resulted in monetary policy, at the margin, leaning against large asset price cycles such as in housing.

6 Summary

This article provides the beginnings of a conceptual framework for promoting financial stability. The framework aims to contribute to an understanding of the Bank's actions in the financial stability area, and enhance the transparency of these actions as a basis for accountability and governance. The Reserve Bank's performance in promoting financial stability can be assessed by asking whether financial risks are being adequately identified, allocated, priced and managed.

References

Aliber, R. (2005), "The 35 most tumultuous years in monetary history: shocks, the transfer problem, and financial trauma" *IMF Staff Papers*, Vol 52. Special Issue

Blanchard, O; and Fisher. S., (1989), "Lectures on macroeconomics" MIT Press, Cambridge Massachusetts.

Bollard, A., (2004) "Asset prices and monetary policy", Speech to the Canterbury Employers' Chamber of Commerce, 30 January.

Borio, C and White, W (2004) "Whither monetary policy and financial stability? The implications of evolving policy regimes", *BIS Working Papers* No. 147.

Borio, C (2005) "Monetary and financial stability: so close and yet so far?", *National Institute Economic Review* No 192 (April).

-
- Breedon, D., (1979), "An intertemporal asset pricing model with stochastic consumption and investment" *Journal of Financial Economics* 7 (Sept.), 265-296.
- Draghi, M, Giavazzi, F and Merton, R, (2003), "Transparency, Risk Management and Internal Financial Fragility" *Geneva Reports on the World Economy* 4, International Centre for Monetary and Banking Studies.
- Goodhart, C, (1988), "The Evolution of Central Banks" MIT Press, Cambridge Massachusetts.
- Haldane, A, (2004), "Defining monetary and financial stability" Unpublished.
- Kindleberger, C., (1996), "Manias, Panics and Crashes: A history of financial crises" John Wiley and Sons, Inc. Third Edition.
- Lintner, J, (1965), "The valuation of risky assets and the selection of risky investments in stock portfolios and capital budgets" *Review of Economics and Statistics* 47 (February): 13-37.
- Merton, R, (1969), "Lifetime portfolio selection under uncertainty: the continuous time case" *Review of Economics and Statistics* 51, 247-257.
- Merton, R, (1973), "An intertemporal capital asset pricing model" *Econometrica* 41 (September): 867-887.
- Ramsey, F, (1928), "A mathematical theory of saving" *Economic Journal* 38 No.152 (Dec.), 543-559.
- Samuelson, P, (1969), "Lifetime portfolio selection by dynamic stochastic programming" *Review of Economics and Statistics* 51 (Aug.), 239-246.
- Schinasi, G., (2004), "Defining financial stability" IMF Working Paper, WP/04/187.
- Sharpe, W, (1964), "Capital Asset Prices: A theory of market equilibrium under conditions of risk" *Journal of Finance* 19 (September): 425-442.
- Rubenstein, M, (1976), "The valuation of uncertain income streams and the pricing of options" *Bell Journal of Economics* 7 (Autumn): 407-425.