Trends in the Australian banking system: implications for financial system stability and monetary policy

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1. Introduction

The broad goal of monetary policy is to achieve the highest possible rate of non-inflationary economic growth. To achieve this goal, the conduct of monetary policy in the post-war period has concentrated predominantly on counteracting standard demand and supply shocks. However, recent events have demonstrated that financial shocks can have a major detrimental impact on the growth performance of an economy. A fragile financial system can greatly magnify the effect of real shocks and make it difficult for the central bank to pursue its price stability objective.[2] Thus financial stability considerations are important for the conduct of monetary policy.

Over the past decade and a half, the Australian financial system, and the banking sector in particular, has undergone substantial changes which have influenced the stability and efficiency of the system. These changes have altered the probability of a systemic crisis occurring – some positively, some negatively – and have influenced the likely magnitude of such a crisis.

The driving forces behind these changes have been financial deregulation, technological progress and globalisation, supported by increased demand by consumers for a greater variety of sophisticated financial products and services. The influence of these forces has been manifest in three major developments in the structure of the Australian financial system. First, pressures have increased for further consolidation within the banking sector. Second, there has been a trend towards the development of conglomerates that can supply a wide range of financial products within the same organisation. Third, competitive pressures on traditional banks have increased, partly from large non-bank financial firms offering bank-like products, and partly from smaller specialist financial firms that are able to compete successfully with banks by unbundling and re-bundling financial products.

The paper draws out the implications of these developments for the stability of the financial system, and for policy. It discusses how they are likely to affect the probability of a systemic event occurring and the economic magnitude of such an event should it occur. It also discusses some implications for monetary policy.

In Section 2 of the paper we present a broad definition of system stability and introduce the possibility of a trade-off between system stability and the efficiency of financial intermediation. We then discuss the interaction of standard monetary policy and policies for financial system stability, and we emphasise the importance of financial system stability for achieving monetary policy objectives.

In Section 3 we describe the four major driving forces for change in the financial system: financial deepening, globalisation, deregulation and technological advances. We discuss recent trends in both market structure and product availability in the Australian banking sector in light of these forces of change.

Section 4 of the paper focuses on the implications of consolidation for the efficiency and stability of the financial system, while Section 5 discusses the implications of conglomeration, and the rise of the

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[2] Such information is not new, as the experience of the 1930s attests.

competitive fringe. In Section 6 we then draw out the implications of these changes for both system stability policy and more traditional monetary policy.

2. Monetary policy, financial system stability and efficiency

Before discussing the linkages between monetary policy and the stability of the financial system, it is worthwhile to discuss what we mean by system stability.[3] We can define a crisis as being a sufficiently widespread disruption of the normal operation of financial intermediation such that there are significant macroeconomic effects. Stability can then be defined in terms of the expected macroeconomic losses that arise from financial system disturbances. Thus in measuring the degree of stability it is necessary to consider both the probability of various financial disturbances and the size of the macroeconomic costs arising from such disturbances. Both the probabilities and costs of financial disturbances are likely to change through time under the influence of ongoing developments in the financial system.

It is unlikely that a financial system can be perfectly stable, such that the probability of macroeconomic losses arising from financial system disturbances is reduced to zero. With sufficiently heavy-handed regulations in place, it may be possible to reduce this probability to very low levels. However, it is likely that this would be at the expense of reducing the efficiency of financial intermediation. In general, the objective of policy should be to enhance both the stability and efficiency of the financial system, recognising that in some cases there may be a trade-off between the two. An overly regulated financial system may be very stable, which itself is beneficial for growth, but this may be at the cost of inefficient intermediation which is detrimental to growth. In many cases, developments in the financial system are likely to increase both stability and efficiency.

2.1 The interaction between monetary policy and system stability

The primary aim of monetary policy is to maintain the highest possible non-inflationary growth rate. Instability of a financial system can impinge on that goal both directly through a breakdown in financial intermediation, and indirectly through an interruption of the transmission mechanism.

Concerns about the stability of the financial sector have been paramount at various times in the first half of this century. In the late 1920s in the United States, credit growth helped fuel the run-up in stock prices, and then the impact of the stockmarket crash was greatly amplified by subsequent bank failures. At the time, this influence of the intermediation process on monetary policy goals was emphasised by Irving Fisher (Fisher 1933). More recently, there has been a growing literature on the "credit channel" of monetary policy which, in part, builds on Fisher's debt-deflation model.[4] However, that literature tends to emphasise the balance sheet positions of debtors. The experience of the past decade highlights the key role that the balance sheets of banks can play in the transmission process.

Over most of the post-war period, such concerns have been of second order in monetary policy deliberations. Shocks such as the OPEC oil price rises and increased inflationary pressure from an over-heating real economy have been the focus of policy-makers' attention. However, financial shocks have increasingly been coming to the fore in the wake of the banking-sector problems in a number of OECD countries in the late 1980s and early 1990s, and particularly in light of the Japanese experience in the 1990s. The current crisis in Asia highlighs the importance of the two-way interaction between financial system instability and macroeconomic instability, the speed at which

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[3]   For a recent discussion of the issues related to defining financial system stability see Crockett (1997). Mishkin (1997) describes financial instability as occurring when information flows are disrupted to such an extent that the financial system cannot channel funds to productive investment projects in an efficient manner.

[4]   Bernanke and Gertler (1995) summarise this literature.

crises can unfold and the impact of contagion, both within and across countries. The financial system has been of concern not only as a direct source of instability but also in worsening the impact of a real shock.

Because of these links between the real sector of the economy and the financial sector, monetary policy needs to be cognisant of the potential for financial system instability. One of the major threats to financial system stability has been the substantial and prolonged deviation of asset prices away from fundamental levels. Changes in the nature of intermediation can have implications for the behaviour of asset prices. This was particularly evident in the asset price bubbles that developed in a number of OECD countries (including Australia) in the late 1980s. These were, in large part, fuelled by the increase in intermediation following deregulation of the financial system in the first half of the 1980s (see Section 3.2 below).

To emphasise this linkage between financial instability, asset prices and monetary policy, Kent and Lowe (1997) develop a Fisherian model in which monetary policy-makers may want to raise interest rates in response to an emerging asset price bubble with the intention of bursting this bubble before it becomes too large. This helps to reduce the possibility of an even larger bubble developing and the likely eventuality that its collapse would lead to significant financial instability and therefore a prolonged period of weak output performance and inflation below target. In this way monetary policy, with the sole objective of stabilising inflation around a target, can act to help prevent major financial instability. However, Kent and Lowe also emphasise that adopting other policies to ensure financial system stability will reduce the likelihood and the effect of asset price bubbles. Monetary policy may be a second-best method of dealing with such occurrences.

Alternatively, there may be circumstances in which there is upward pressure on inflation in the short term, but with the financial system already in a weak condition. In this case it may be inappropriate to tighten monetary policy in response to concerns about short-term inflation, because such a response would exacerbate the problems in the financial system and lead to a sustained downturn over the medium term. This suggests that monetary policy with a medium-term horizon needs to take account of the stability of the financial system in ways that may imply a non-standard response to short-term inflationary pressures.

The financial system also plays an integral role in the standard textbook description of the transmission mechanism of monetary policy. A critical process in the transmission mechanism is the increased use of bank-intermediated credit to fund consumption and investment spending following a decrease (say) in interest rates. It is generally implicitly assumed in such expositions that the financial sector is sufficiently stable to act as a reliable conduit of monetary policy actions. However, a breakdown in the process of intermediation will reduce the potency of monetary policy actions.

There are also important interactions that run from monetary policy to financial system stability. High rates of inflation of goods and services prices are clearly bad for system stability. They distort the incentives of individuals to invest in worthwhile projects (in part through the interaction between inflation and the tax system). They can also lead to speculation in asset markets, funded through borrowing and growth in the value of collateral. Variable rates of inflation can also lead to unanticipated wealth transfers between debtors and creditors, which may jeopardise their financial situations.

On the other hand, while low inflation is beneficial for system stability, it does not guarantee it. This was demonstrated in Japan in the early 1990s. Further, the effectiveness of monetary policy in Japan has been significantly curtailed despite the presence of low inflation, because of the state of the financial system. Good monetary policy is necessary for system stability but it is not sufficient. Therefore, central banks (with standard monetary policy objectives in mind) need to devote considerable attention to issues relating to system stability.

3.   Trends in the financial system

In this section of the paper we review recent trends in the Australian financial system and the factors driving these changes.[5] The main factors that we identify are financial deepening, globalisation, technological progress and deregulation.

3.1   Forces of change

3.1.1   Financial deepening

As real incomes of households have increased, there has been an increasing demand for a greater variety of sophisticated financial products. This has led to general financial deepening. The pressure for change in this regard has been ongoing for a long time, but was not realised under the financial repression prior to the early 1980s. In Australia there have been additional factors that have fostered greater financial depth, including legislative changes affecting compulsory superannuation and a growing realisation of the need for individuals to self-fund their retirement, rather than rely entirely on the public provision of pensions.

Figure 1
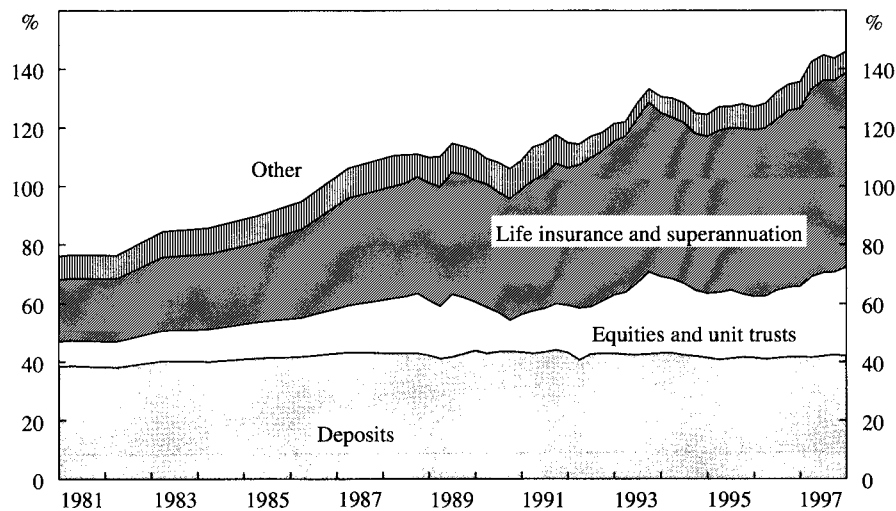**Household financial assets**
As a percentage of GDP

Figure 1 illustrates the extent of financial deepening that has occurred since the deregulation in the early 1980s (a description of the data and sources for this and other figures and tables is contained in the Appendix). The rise in household financial assets held in the form of superannuation is particularly apparent.

3.1.2   Globalisation

Globalisation has both demand and supply-side effects. On the demand side, liberalisation of the capital account, the floating of the Australian dollar, and increased trade openness have caused non-financial firms to demand more sophisticated financial products and services to help them compete in the global market for general goods and services, and particularly to help them manage risk (Lowe 1995).

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[5]   For a more detailed discussion see Edey and Gray (1996) and Reserve Bank of Australia (1996).

Domestic financial institutions have also made increasing use of foreign sources of funds (Figure 2). Deposits remain the major source of bank funding; however, when new sources of funding opened up following deregulation, the proportion of liabilities accounted for by Australian dollar deposits fell from a peak of nearly 75 to less than 60%. Funding decisions are now made on the relative costs across a wide spectrum of potential sources, both domestic and foreign, which serves to increase the efficiency of the intermediation process.

On the supply side, domestic financial firms now have to compete with foreign financial firms – both in the domestic marketplace and in the world marketplace for financial services. Before 1985, the Australian financial system was essentially closed to foreign entrants. In 1985 and 1986 fifteen foreign banks began operations in Australia. Further liberalisation and entry occurred from the early 1990s, to the point where today, there are no limits on the number of foreign bank branches or subsidiaries operating in Australia.[6] However, foreign bank branches can only take deposits in the wholesale market.

Figure 2
Bank liabilities to non-residents
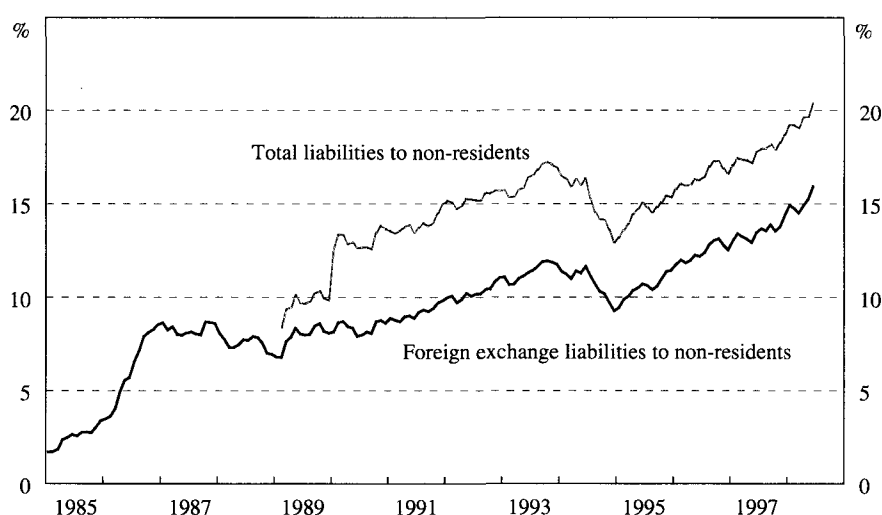As a percentage of total liabilities

Table 1 shows the increased presence of foreign banks in the Australian financial market, in terms of numbers. However, their share of business, after an initial surge, has increased only gradually. Some foreign banks have subsequently exited, while more recent growth has come about through new entrants.

Table 1
Authorised foreign banks in Australia

	1984	1986	1988	1990	1992	1994	1996	1998
Branches	2	3	3	3	3	8	17	24
Subsidiaries	0	15	15	15	14	13	13	12
Total	2	18	18	18	17	21	30	36
Share of total bank assets (%)		6	9	12	11	11	15	17

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[6] Nevertheless, applicants for a banking authority have to satisfy the criteria set down in the Australian Prudential Regulation Authority's Prudential Statements J1 and J2 that they "make a worthwhile contribution to banking services in Australia, and not merely add to the number of banks."

To date, globalisation appears to have had a bigger (more visible) impact on the wholesale market. On the whole, foreign entrants into the domestic financial market have utilised their experience with international markets to participate in large wholesale transactions, rather than in retail transactions. Large non-financial corporations are also more able to access foreign markets directly in their financial dealings.

Foreign entrants have the potential to reduce the risk of systemic instability because they are diversified globally. Consequently, their balance sheets should be better placed to withstand any idiosyncratic shock to Australia, and thus reduce the probability that they pose a risk to the system. On the other hand, their exposures to other countries may result in them importing troubles in foreign financial systems into the Australian system.

3.1.3 Technological advances

Advances in information technology have reduced the cost of transmitting, processing and storing information. This has reduced the costs of providing a range of financial services and transformed the way in which these services are produced and delivered. Advances have also been made in the development and pricing of complex financial products used for risk management – in part this is closely related to improvements in computer power, but it also owes to the application of more sophisticated financial and mathematical methods, and to the use of more highly trained personnel in the field of finance.

One obvious manifestation of technological advance is the increased use of derivative products. Figure 3 shows that banks' derivative activity in Australia has almost tripled over the past ten years.

Figure 3
Banks' derivative activity
Gross, notional principal outstanding
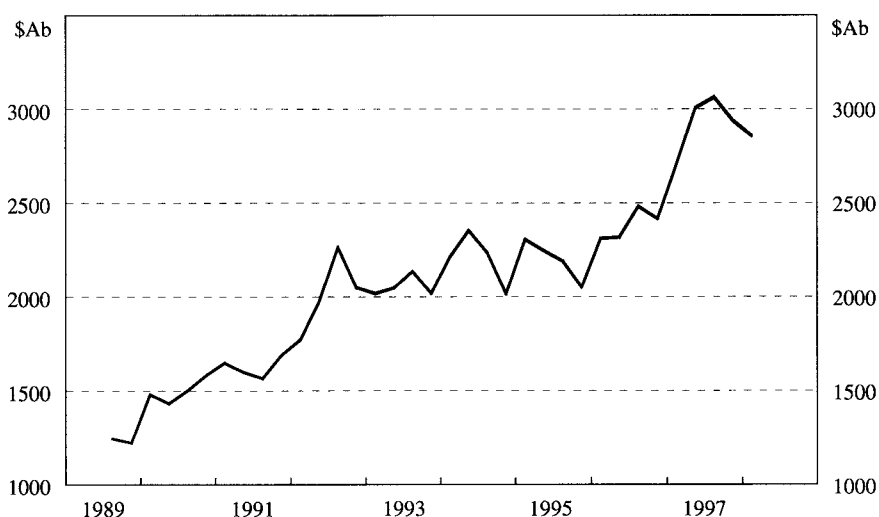
Other technological developments that have delivered cost savings to banks and thereby increased the efficiency of intermediation include the geographical separation of back- and front-office operations and the increased use of Automatic Teller Machines (ATMs) and Electronic Funds Transfer at Point Of Sale (EFTPOS).

3.1.4 Deregulation

The impact of the above three factors on the structure of the financial system would have been significantly curtailed in the absence of the deregulation of the system that began in the early 1980s.

Prior to the 1980s, banks were regulated in terms of the types of products they were allowed to offer and the prices they were allowed to charge. Credit was rationed through direct controls, and banks competed for business through the provision of extra services such as extensive branch networks, rather than on price. Non-bank financial institutions (NBFIs) were less heavily regulated and were increasing their share of the market at the expense of banks. This made the implementation of monetary policy, which primarily relied on control of the banking sector, problematic. As a proportion of the financial system, banks' market share declined over the 1960s and 1970s (Table 2).

The main transformation of the financial system followed from the report of the Campbell Committee in 1979. The primary reasons put forward for deregulation were to increase monetary policy effectiveness and reduce the inefficiencies in the financial system created by the differing regulatory treatment of banks and NBFIs.

Table 2
Assets of financial institutions
Percentage of total*

	1955	1960	1970	1980	1985	1990	1995	1998
Banks	64	54	46	42	41	44	46	43
NBFIs	10	17	20	30	28	19	14	12
Life and superannuation	22	23	25	19	19	22	27	29
Other managed funds	1	2	1	1	4	6	6	8
Other	3	4	7	8	8	8	7	8

* The total excludes assets of the Reserve Bank of Australia.

Initially, interest rate ceilings on bank deposits were removed. The restrictions on minimum and maximum terms of deposit were also progressively removed from 1980, with the process completed by 1984. On the asset side of the balance sheet, the quantitative controls on the growth in banks' advances were formally ended in 1982, with the last credit directive issued in September 1981 (Grenville (1991)). Other important regulatory changes affecting the composition of banks' balance sheets and their cost structure were the replacement of the Liquid Government Securities (LGS) ratio with the Prime Assets Ratio (PAR) in 1985 and the replacement of statutory reserve deposits in 1988 with the requirement to hold non-callable deposits that paid a market rate of interest.[7]

Following deregulation the banks regained market share in the financial system (their share rose from 41 to 46% over the decade to 1995).[8] However, this did not occur at the expense of a decline in assets of other financial institutions. Rather, the banks gained a larger share of the increasing depth of the financial system.

3.2 Developments in the financial system

In general, the above four factors have worked in concert to bring about changes in the structure of the financial system. Technological innovations have made it possible for banks to convert some of their activities into "commodities" that can then be shifted onto the wholesale market (for example, securitisation of home loans) and, in turn, can potentially lead to the globalisation of this business. Volatility in financial variables such as exchange rates and interest rates, and increased exposure to international trade has led to an increase in the demand for risk management services. Technological change has played a role in meeting this demand.

[7] For more detail on the process of deregulation see Grenville (1991) and the appendix in Battelino and McMillan (1989).

[8] The figures in Table 2 are influenced by the conversion of NBFIs (particularly building societies) to banks following deregulation and also the reabsorption of non-bank affiliates onto bank balance sheets (Edey and Gray (1996)).

The combination of these forces helped underpin the asset price bubble that developed in Australia in the late 1980s. Macfarlane (1989, 1990) discusses the relative roles of demand and supply factors that contributed to the bubble. On the supply side, there was a large expansion in credit (Figure 4) as domestic banks took advantage of their new-found ability to respond to the competition from NBFIs and new foreign banks sought to establish their presence in the market. Furthermore, there was increased direct access to overseas sources of funds to finance speculative asset purchases.

On the demand side, the interaction of the tax system with relatively high rates of inflation encouraged individuals to invest in assets to hedge against inflation. The deregulation of the financial system removed the constraint that had existed on this behaviour in the past.

The replacement of a quantity mechanism with a price mechanism in allocating the supply of credit also contributed to the emergence of the asset price bubble. The price mechanism took longer to have an impact in the face of high and increasing rates of return. As long as the growth in asset prices persisted, lending seemed profitable even at high real rates of interest. In the past, the direct quantitative restrictions limited such developments, although asset price bubbles did occur in the early 1970s. At that time, as quantitative restrictions applied to the banking system, the speculative lending associated with the earlier episodes of asset price inflation was confined primarily to the non-bank sector.

Figure 4
Real bank credit growth
Percentage change over four quarters
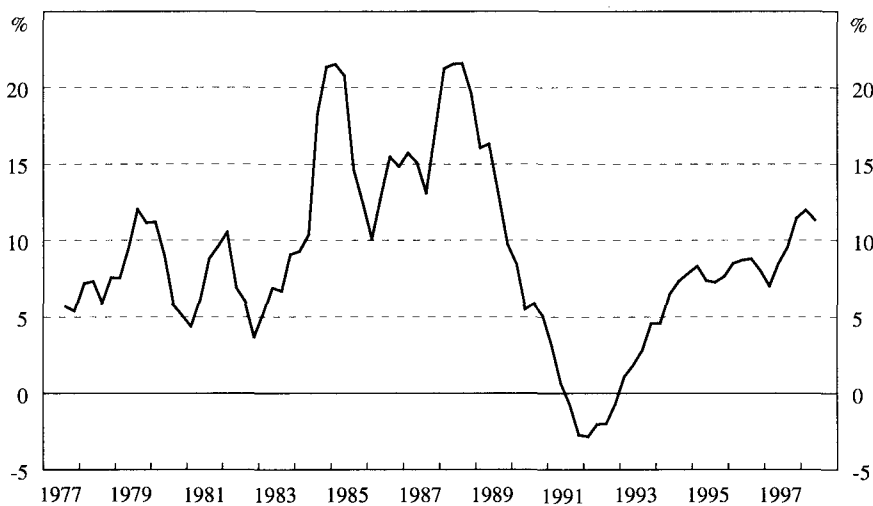
The recession of the early 1990s saw the bursting of the asset price bubble and a move to a low-inflation environment. A number of banks were left in a substantially weakened position, in part due to earlier expansion on the back of weak credit assessment techniques. Impaired assets rose substantially, and the returns on equity dropped sharply (Figures 5 and 6).

The banks attempted to rebuild their balance sheet positions by maintaining relatively high margins. This helped provide opportunities for new players to enter the market. These firms competed successfully with banks through specialisation in the provision of only one or two product lines. This unbundling of services was also aided by technological innovations.

Unbundling occurred across many types of services, including the provision of mortgage finance, payment services (through credit cards) and deposits (for example, cash management accounts with cheque facilities). This process was aided by the globalisation trend – many of these techniques were "imported" from overseas – as well as innovations in information technology. Although not large in volume terms, specialist new players appear to have had a significant impact by increasing the degree of contestability and thereby acting to reduce bank margins and unwind cross-subsidisation of bank

services. For example, in the housing loan market, mortgage managers currently account for around 9% of new housing loan approvals.[9] This has placed downward pressure on housing loan interest rate margins, with the margin between the standard rate paid on mortgages and the cash rate having fallen from around 4% in 1992 to just over 1½% in August 1998.

Figure 5
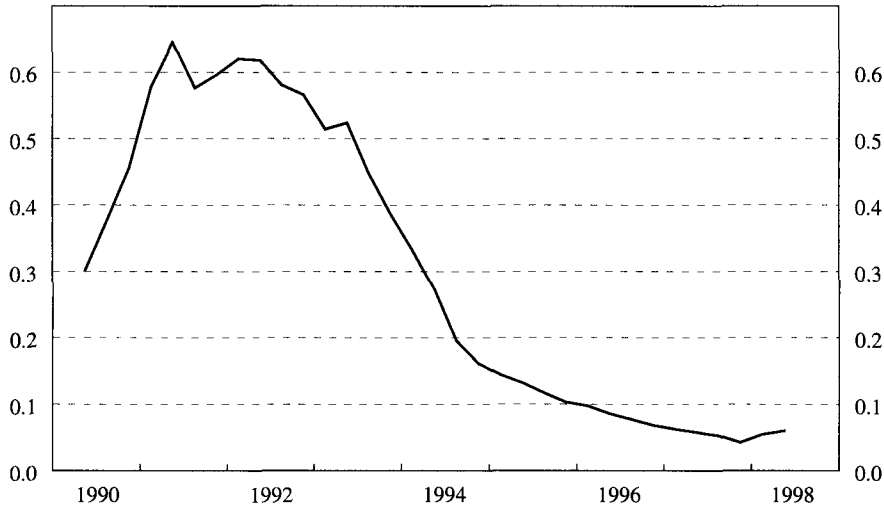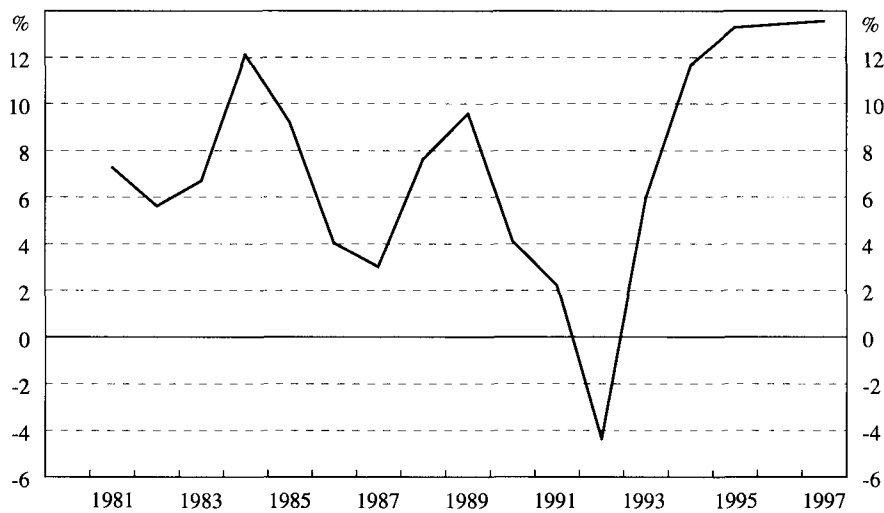**Ratio of banks' net impaired assets to capital**
Major banks

Figure 6
Real return on shareholders' funds
Major banks

The weak state of some banks' balance sheets in the early 1990s resulted in some consolidation. The largest example of this was the merger in 1991 of a state-owned bank (that was at the time the fifth largest bank in terms of assets) with one of the major banks. Further, each of the four major banks has acquired at least one smaller bank over the 1990s.[10] In addition, some large NBFIs have converted to banks. The net outcome of this process has been the maintenance of a high degree of concentration in

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9   Mortgage managers provide housing loans which are funded by mortgage-backed securities rather than deposits.

10   National Australia Bank acquired a number of banks overseas.

the banking system over the 1990s — the four majors holding two-thirds of total bank assets — after a slight drop in the 1980s.

Over the 1990s, there has been a reduction in banks' branch networks and staffing levels. In part this reflects pressures for rationalisation driven by technological advance and a reversal of earlier over-expansion which had been a way of attracting customers in the heavily regulated environment.

Looking forward, there are three principal pressures on the financial system. First, there is pressure for mergers amongst the largest banks. Second, there is pressure for financial institutions to increase their scope through the formation of large conglomerates, combining a traditional bank with other financial institutions such as life offices or superannuation funds. Third, counterbalancing these first two pressures, technological developments are significantly reducing the costs of unbundling financial services, creating opportunities for smaller niche institutions. Each of these three forces for change has an impact on the efficiency and the stability of the financial system.

In response to the significant developments and current pressures in the financial system that we have outlined above, in 1996 the Australian Government initiated the Financial System Inquiry (commonly referred to as the Wallis Inquiry). The Inquiry documented many of the changes that we have discussed above. In broad terms the Inquiry's recommendations sought to create a flexible regulatory structure more responsive to the current forces for change, with the goal of promoting greater efficiency in the financial system. One of the problems highlighted was the increasingly difficult task of distinguishing between the activities of banks and non-banks, coupled with diversity in the ways in which different types of financial firms were regulated. The Inquiry's recommendation in this regard was to establish an independent supervisory authority (outside of the central bank), with the task of overseeing a wide range of deposit taking financial institutions, insurance companies, life offices and superannuation funds. In addition, the Inquiry recognised the need for greater competitive neutrality across the financial system. The Australian Government accepted this recommendation and established the Australian Prudential Regulation Authority (APRA) which commenced operations from 1st July 1998. This saw the responsibility for supervising banks and protecting depositors move from the Reserve Bank of Australia to APRA.

At the same time as the establishment of APRA, the Reserve Bank of Australia gained extensive regulatory powers to help ensure payments system stability and efficiency. These powers are exercised by the newly formed Payments System Board within the Reserve Bank. In addition, the Reserve Bank maintains the responsibility for ensuring that shocks to any part of the financial system do not ultimately threaten the stability of the Australian economy (Reserve Bank of Australia (1998), p. 7).

4.   Consolidation: efficiency and system stability

Although the Australian Government has abandoned the "six pillars" policy that ruled out mergers between the four major banks and the two largest insurance companies, it has rejected the possibility of mergers between the four major banks until competition has increased sufficiently. In this section of the paper, we focus on the broad implications of consolidation for the stability and efficiency of a financial system. We leave a discussion of the implications of financial conglomeration and the rise of the competitive fringe to Section 5.

The debate regarding the impact of mergers between banks has been a long-standing one, both in Australia and around the world. This debate has typically emphasised the effect of mergers on efficiency. We begin the section with a discussion of efficiency in Section 4.1. In Section 4.2 we introduce a broad framework to analyse policy questions relevant to both efficiency and system stability, recognising that there may be a trade-off between these two objectives. In Section 4.3 we use this framework to analyse the impact of consolidation on system stability.

4.1 Consolidation and efficiency

Many studies find a positive and significant relationship between market concentration and measures of bank profitability. There are two alternative hypotheses that might explain this result – with different implications for economic efficiency.[11]

The Structure-Conduct-Performance (SCP) hypothesis is that a more concentrated market permits banks to behave in non-competitive ways so as to boost their performance (usually in terms of profits).[12] If this hypothesis is true, consolidation will lead to higher prices for consumers and a reduction in economic efficiency.

The Efficient-Structure (ES) hypothesis is that some banks have greater efficiency, and hence profitability. These banks increase their market share, either by gradually forcing out less efficient banks or by merger and acquisition. According to the ES hypothesis, it may be that some banks are inherently more efficient than others, perhaps through idiosyncratic management ability. Alternatively, it may be that there are economies of scale or scope which allow larger banks to force out smaller banks.[13] In either case, the ES hypothesis implies that greater concentration will be accompanied by a mixture of higher profits and lower prices (and/or better services) for customers and hence greater economic efficiency over time.

On balance, a review of the evidence from a multitude of studies does not strongly support one hypothesis in favour of the other (Berger and Humphrey (1997)). A consistent finding is that although some consolidations improve cost efficiency, others worsen the performance of the combined institutions. The net effect across all institutions is no significant gain in cost performance. In addition, these studies find that cost efficiency is a better explanator of financial institution profitability than market power, but together these two effects explain only a small proportion of variation in performance across institutions.

Recent studies distinguish between cost efficiency and profit efficiency, and show that the latter may improve with mergers and acquisitions (Akhavein, Berger and Humphrey (1997)). Cost efficiency improves when costs per unit of output fall for given output quantities and input prices. Profit efficiency is more general because it includes cases where profits increase in response to changes in the output mix. Akhavein et al. show that mergers between large banks in the US provided some diversification benefits. By itself, this should reduce risk. However, the response of the merged bank has typically been to shift the production mix towards higher risk products, that is, away from securities towards loans (Berger (1998)). As a consequence, profits increased but without a substantial reduction in the overall risk of the bank.

Most of the empirical studies of mergers and banking efficiency are based on foreign markets.[14] The nature of the Australian banking industry makes it difficult to apply the overseas evidence to the Australian situation. There are a number of points worth mentioning in this regard. First, the Australian market is increasingly becoming a national market (see below). The largest banks already have extensive geographic and product diversification, and thus further consolidation will produce smaller diversification benefits than suggested by overseas studies. On the other hand, this high degree of geographic diversification may imply greater duplication of branch networks, so that mergers in Australia could generate greater cost savings through branch closures. Second, many of these foreign markets remain relatively unconcentrated compared to the Australian market. Third, many studies conclude that substantial economies of scale exist, but only up to a relatively small size

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[11] For an earlier discussion see Berger and Hannan (1989).

[12] In addition, inadequately supervised managers may choose to use market power to provide benefits for themselves and other employees while not necessarily increasing profits (Berger and Humphrey (1997)).

[13] For a recent discussion of the ES hypothesis see Goldberg and Rai (1996).

[14] Walker (1998) is one of the few studies of economies of scale in the Australian banking industry. He concludes that significant economies of scale exist. However, his study is based on a very small sample of twelve banks – many of which are (or were) government-owned – over a period which straddles the significant deregulation of the mid 1980s.

(Berger, Hunter and Timme (1993)). While there is a wide variation in the exact size of this cut-off point, the largest Australian banks are clearly above this point.[15]

There are two additional arguments to consider with regards to the impact of consolidation on efficiency. These are recent trends which may imply greater contestability of the market, and the implications of new technology. The potential for both of these developments to increase efficiency may not yet have been captured by existing studies.

4.1.1 Contestability and the competitive fringe

To determine the degree of contestability, it is first necessary to define the extent of the market. It is then possible to examine the ease with which either existing smaller suppliers and/or new entrants can provide effective competition to the large Australian banks. A strong competitive fringe, or even the potential for this fringe to develop, may ensure competitive behaviour in a market dominated by a few large suppliers.

The first distinction to be made is the difference between the retail and wholesale markets. There are a number of reasons to believe that the Australian banking wholesale market is strongly contestable. First, the market has a sizeable competitive fringe of domestic banks, foreign banks and non-banks providing a wide range of wholesale products and services. Second, the wholesale market is a national one and does not require an extensive branch network in order to conduct business. Finally, there are few barriers to entry, particularly for larger foreign-owned banks experienced in the provision and development of new and sophisticated products.

The degree of contestability in the Australian retail banking market is arguably lower than in the market for wholesale banking. However, this depends in part on the precise definition of the retail market both in terms of the degree to which retail banking products are viewed by customers as being "bundled", and in terms of the extent of geographic boundaries.

The Australian Competition and Consumer Commission (ACCC) has defined the product dimension of the market to be "the cluster or bundle of services provided by banks to their retail customers" (ACCC (1996), p. 15). The argument was that there are no close substitutes for a cluster of services that includes loans, deposits and payments. While there is undoubtedly some convenience value to bundled services, there is evidence that a sizeable proportion of consumers use unbundled banking products (Wallis (1997)). Furthermore, although demand for transaction accounts is relatively insensitive to price (p. 437), this is not the case for home loans for which price differentials have more substantial wealth effects (p. 438). The success of mortgage managers and other providers of non-bundled products (including cash management trusts, credit card services, etc.) suggests that fringe providers are able to apply competitive pressure to banks. This is especially true when banks cross-subsidise or otherwise overprice certain products. Many of these developments are the result of technological innovations, which may not yet have been fully reflected in existing studies of the competitive effects of consolidation. Increased contestability across many retail product lines is likely to remain a continuing trend for some time.

In 1995, the ACCC determined that the relevant market for retail banking was state based, rather than national. More recent developments suggest that for many products the relevant market is becoming increasingly national. Improvements in technology have reduced the cost of data transmission, and hence the cost of delivering many financial products. In addition, there is no reason why previously state-based banks cannot establish branch networks in other states.[16]

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[15] The smallest of the four largest Australian banks has domestic assets of about US$ 50 billion. The cut-off in terms of assets is estimated to range up to US$ 500 million.

[16] There is evidence that this has already occurred for some banks. For example, the proportion of branches of the State Bank of NSW (now the Colonial State Bank) outside of its home state rose from 3% in 1990 to 16% in 1997.

4.1.2 New technologies

Recent advances in technology may imply that there are economies of scale even for larger banks, thereby creating pressures for further consolidation. However, if these advances have not yet been fully exploited, they may not have shown up in existing studies of cost efficiencies. While it may be true that the most recent technological advances imply cost efficiencies from scale, it is also possible that technological advances in the future may work in the opposite direction. To demonstrate this point we draw parallels between developments in technology and market structure in the banking and steel-making industries. The steel-making industry has already progressed through three distinct phases of technological innovations – the latest phase is helping to reverse an earlier trend towards consolidation.

The mass production of steel began with small decentralised production facilities located near to where inputs were mined (Ashton (1969)). This was necessary because of the high costs of transporting these inputs. In a similar fashion, until recently, back-office operations in banking were located in individual branches because of the high cost of communicating and storing data.

Falling transportation costs and advances in production technology led the steel industry to move towards large centralised production facilities that were able to take advantage of economies of scale. Similar advances in communication and computing technologies have recently allowed many back-office operations in banking to be undertaken centrally in order to take similar advantage of economies of scale.[17]

It is not clear that further consolidation in banking is necessary to take advantage of these economies of scale. It may be feasible in the future for banks to contract out some of these services to a single large provider that can take full advantage of economies of scale.[18] However, there are at least two constraints on this practice becoming widespread: the issue of efficient access (including pricing) which might be difficult to establish; and the problem of proprietary rights to information gained by the firm running such a system.

More recently in the steel industry, new technology (embodied in mini-mills) has allowed a substantial portion of production to move back to smaller decentralised facilities (Barnett and Crandall (1986)). These facilities can benefit from being closer to customers and more responsive to their requirements. Similarly, in the financial sector the fixed costs of providing risk-management services may have fallen considerably over the previous decade.[19] In particular, many products, which even two decades ago were not priced correctly, have now become standardised,[20] and there appears to be a greater availability of highly trained personnel in the field of finance. A fall in the fixed costs of head-office risk-management operations would make it easier for smaller banks to enter the market for these services. Whether this type of change eventuates in the case of back-office operations in banking is purely speculative. However, given the trend of rapid advances in computing technology, this prospect is not implausible.

So far in this section of the paper, we have focussed most of our attention on the impact of consolidation in terms of the domestic banking market without considering the international market for banking services. However, there is an argument that domestic consolidation is necessary in order for banks to become large enough to compete successfully in the global market for financial services. In part, this reflects the need for substantial capital investment to keep banks at the forefront of

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[17] For example, many back-office operations of Australian banks operating in New Zealand are being gradually shifted to Australia.

[18] There is some evidence that this is already occurring in Australia. For example, Westpac's loan-processing facilities currently provide capacity to at least one other institution. Also, the ANZ Banking Group has recently outsourced many of its electronic card operations (Australian Financial Review, 15/9/98, p. 33).

[19] Risk-management services are an important part of wholesale banking. Intermediaries (especially banks) are the principal participants in markets for financial futures and options rather than individuals or firms (Allen and Santomero (1997)).

[20] Developments in finance theory by Black, Scholes and Merton were instrumental in this regard. For a recent discussion of these developments see Schaefer (1998).

international best practice in terms of the optimal use of computing and communications technology and the development of sophisticated financial products. Whatever the merits of this argument, it still needs to be weighed against the *potential* costs of increased domestic concentration. It is also worth noting that there is scope in global markets for niche players to provide specialised products, and more generally for smaller players to take advantage of their ability to maintain closer relationships with their customers.

4.2 A framework for the analysis of system stability and efficiency

The objective of the policy maker is to enhance both financial system stability and financial system efficiency, recognising that in some cases there may be a trade-off between the two. In this section of the paper we introduce a general framework that helps formalise a number of important concepts. Many aspects of the model are clarified in Section 4.3 when we apply it to an assessment of consolidation.

In our model, the policy maker cares about two things: the macroeconomic losses that could originate from disturbances to the financial system, and the efficiency of the financial system. For simplicity, we assume that financial disturbances are associated with the failure of financial institutions, and that the macroeconomic losses are a function of the number of institutions that fail in a particular episode. We assume that the policy maker faces an uncertain world, but knows the macroeconomic costs that could arise with various financial disturbances. The policy maker's task is to choose a set of policies that maximise utility subject to a set of constraints about how the financial system works. The set of policies might include: the maximum degree of market concentration; conditions of entry; or the terms and conditions for central bank liquidity support.

While intentionally simple, the model draws out a number of issues, including the impact that consolidation and conglomeration might have on system stability, the relevance of contagion and the implications of central bank support for institutions experiencing difficulties.

More formally, the problem of the policy maker is to choose a course of action x so as to maximise expected utility subject to a collection of constraints:

(1) $$\max_x \int_i u\big(L(P_i),E\big)f_x(i)di$$

The constraints (which we do not spell out here) describe the trade-off between stability and efficiency.

The policy maker's utility function $u(L,E)$ depends negatively on the macroeconomic loss L, and positively on the efficiency of the system E. For simplicity we assume that the measure of efficiency E is independent of the state of the world i.

The measure of loss L represents the lost output that follows from the failure of some proportion P_i of the financial system and hence a reduction in the extent of intermediation. The greater the proportion of the financial system which fails, the greater will be the loss L.

The state of the world can be characterised by the proportion of institutions that have failed. The policy maker is assumed to know the impact of their actions on the probability density function $f_x(i)$ that a proportion P_i of institutions will fail. The state of the world i is revealed after the policy maker has determined a course of action.

We assume that the relationship between the proportion of the system that fails and the macroeconomic loss L is represented by the function $L(P_i)$, where $L'(\circ) \geq 0$ and $L''(\circ) > 0$. In words, the complete failure of the system results in a loss which is more than ten times greater than the loss from the failure of one-tenth of the system.

The assumption regarding the shape of $L(P_i)$ follows from a reasonable assumption about the macroeconomic consequences of a reduction in financial intermediation and the costs of resolving

financial crises.[21] Provided that contagion is contained, smaller failures are relatively easy to resolve rapidly without substantial disruption to the process of intermediation. When a relatively small number of financial firms fail, the remaining assets of these firms can be sold rapidly, or the failed banks restructured and sold with considerable ease. Losses to depositors and creditors may be relatively minor and meanwhile the process of intermediation in the healthy portion of the system continues largely unaffected. However, in the case of the failure of a substantial proportion of the system, resolution becomes problematic and disruption of intermediation becomes extreme. Invariably, governments cannot sell the assets of the failed banks (particularly large failed banks) without severe consequences for the asset values of the healthy institutions. Restructuring failed institutions may require the government to cover a large amount of non-performing loans. Even after restructuring (and perhaps a break up of larger failed institutions) it may be difficult to find buyers willing to pay a reasonable price during the crisis for such a sizeable portion of the financial system.

The range of policy options x that policy-makers have at their disposal include the maximum level of concentration permitted in the financial system, the ease of entry of new firms, the extent of conglomeration permitted, and the terms and conditions for the provision of central bank liquidity or lender-of-last-resort loans. The policy action can work through a number of channels: it may affect the probability density function $f_x(i)$; it may also influence the loss function $L(P_i)$ – for example, the government may provide some form of support to failed institutions. Policy may also influence the trade-offs implicit in the constraints.

An index of financial system instability

If we assume that the policy maker is risk neutral with respect to the macroeconomic loss, then we can define an index of financial system instability (for a constant level of efficiency) to be:

(2) $S = \int_i L(P_i) f_x(i) di$

The index S is the expected macroeconomic loss that results from financial system disturbances – low values of S indicate stability. This is consistent with our earlier notion that system stability describes both the probability and size of incidents of financial stress in terms of the impact on the real economy. Although risk neutrality on the part of the policy maker is unlikely to be true in practice, this assumption is mostly one of convenience. Otherwise, the policy maker may not be indifferent between two outcomes with the same levels of S if they are based on different variances of macroeconomic loss. Increasing the degree of convexity of the loss function $L(P_i)$ would produce similar results to a model which incorporated risk aversion explicitly.

4.3   Consolidation and system stability

The influence of consolidation on *system* stability remains an open question, and to date has been largely unanswered by existing empirical and theoretical studies (Boyd and Graham (1998)). In this section we use our framework to examine a number of stylised examples relevant to the impact of consolidation on system stability.

For expositional purposes we present a simple version of our more general framework described in Section 4.2. We assume that the financial system initially consists of a number, $n > 1$, of equally sized banks. For reasons outside of the model, there is pressure for these banks to merge to form m banks of equal size (where $1 \leq m < n$). The policy maker must determine whether or not to allow this consolidation to proceed – that is, their policy action can be described as $x = n$ for no consolidation, or $x = m$ for consolidation.

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[21]   This assumption is not essential – the same qualitative results apply if the function $L(P_i)$ is linear, so long as preferences are such that the policy maker is risk averse in terms of economic losses.

To focus our attention on system stability we assume initially that consolidation is neutral with respect to efficiency. Though efficiency is still a crucial consideration, we have already discussed the broad implications of consolidation for efficiency in Section 4.1. We also assume that the policy maker is risk neutral with regard to the macroeconomic loss. These two assumptions simplify the problem to one of determining whether consolidation leads to an increase in system stability.

In the case where $n = 2$ and $m = 1$, there are three states of the world: either no banks fail ($P_1 = 0$); half the banks fail ($P_2 = 0.5$); or all banks fail ($P_3 = 1$). Of course in a system with only one bank, the probability that half the banks will fail is zero.

We assume the loss function is quadratic:

(3) $L(P_i) = P_i^2$

The probability density function for states of the world can be determined from the probability of individual bank failure, which is p_j when there are j banks in the system ($j = n,m$). We simplify the analysis by assuming $p_n = p_m = p$, that is, consolidation does not, by itself, alter the unconditional probability of a single failure. This assumption is appropriate if the merger between two banks provides little scope for reduced risk through greater diversification.

The crucial question, however, is whether a bank failure is independent of other bank failures. This will depend on the nature of shocks that cause bank failures. We consider three cases: a common shock which implies complete dependence; an idiosyncratic shock which implies independence; and an intermediate case which arises because of contagion.

(i) Common (macroeconomic) shock

Given the assumptions that we have made, if a bank failure is caused by a common shock (to the macroeconomy for example), then consolidation will have no impact on system stability. The instability indices, S_n and S_m, are both equal to the probability of individual bank failure p. In other words, if one bank fails, it indicates a bad macroeconomic shock, and all banks will fail.

(ii) Idiosyncratic (management) shocks

On the other hand, bank failure may be entirely due to idiosyncratic shocks. A common element of many cases of bank distress and failure is poor management and operational procedures.[22] Invariably during times of poor macroeconomic performance, some banks experience substantial losses while other banks – doing business in essentially the same market and under the same conditions – survive these periods relatively unscathed. Therefore, variation of management across banks can help to explain some of the variation in banking performance.

Almost by definition, consolidation will lead to a reduction in the degree of managerial diversification of the banking system. Such a reduction in diversification may be a good thing for both stability and efficiency if consolidation occurs through the acquisition of poorly managed banks by well-managed banks. However, if higher market concentration implies a reduction in competition, then managers may find it easier to reduce their efforts and the efficiency and the stability of the system may suffer.[23]

If all managers have equal ability and the probability of one bank failing is independent of the performance of other banks, then consolidation reduces the stability of the financial system. In a system with fewer banks we expect to see fewer bank failures; however, if these banks do fail there is

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[22] Dziobek and Pazarbasioglu (1997) found that management deficiencies caused problems in all cases of banking crises they studied, and that correcting these deficiencies was crucial for successful reform.

[23] Management discipline could be maintained in a more concentrated market through the threat of removal by the owners. However, given that distress is often used as a signal of poor management, this seems like an inefficient way of ensuring high management effort and management diversification across the system.

a much larger macroeconomic loss because the banks are bigger in a more consolidated system.[24] This general result is demonstrated using our model for the case of $n = 2$ and $m = 1$ in Table 3. Consolidation increases our index of system instability from $S_n = 0.5(p + p^2)$ to $S_m = p$.

Table 3
Indices of instability

	Proportion of system failure	Loss function	No consolidation	Consolidation
			Probability	
State 1	0	0	$(1 - p)^2$	$1 - p$
State 2	0.5	0.25	$2p(1 - p)$	0
State 3	1	1	p^2	p
Index of instability, S			$S_n = 0.5(p + p^2)$	$S_m = p$

In addition to consolidation leading to less management diversification, highly concentrated markets may make it more difficult for agents to monitor the performance of bank managers.[25] By reducing incentives for management to behave appropriately, a reduction in the ability to monitor management will reduce both the efficiency and stability of the banking sector. If banking performance depends on a common macroeconomic component and an idiosyncratic management component, which are only observed indirectly through their combined impact on banking performance, it will be impossible to perfectly observe management ability (or effort). However, the inference of management ability from a bank's performance will improve with the number of banks in the system. In a market with a sufficient number of banks, the law of large numbers implies that management ability will be reflected in the deviation of a bank's performance from the industry average. In contrast, in a market with only a few banks, bad luck and poor management may be more difficult to distinguish.

(iii) Contagion

Contagion can lead to the failure of otherwise healthy financial institutions. This possibility can be incorporated into our framework as follows. Suppose that the state of the world is revealed in two stages. During the first stage, banks fail on their own account with probability p_n and p_m in the non-consolidated and consolidated cases respectively. In the second stage, conditional on the initial failure of at least one bank, other banks can fail as a result of contagion with probability q_n and q_m.[26]

Once again we assume that shocks that lead to failure in the first stage are independent (that is, due to idiosyncratic management behaviour), and that $p_n = p_m = p$ and $q_n = q_m = q$. In the presence of contagion, it is no longer the case that consolidation always leads to greater system instability. This is easily demonstrated in the case of a system of only two banks which merge into a single institution. (Note that in the consolidated system there is no contagion because there is only one bank.) The system instability indices, S_n and S_m in Table 4 show that consolidation leads to greater instability only if the likelihood of contagion is not too great (that is, $q < \frac{1}{3}$).

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[24] The key to this result is the convexity of the loss function, $L(P_i)$. If this function is linear (for example, if the loss is proportional to the share of the system that fails), then consolidation will not alter system stability.

[25] Tevlin (1996) discusses issues related to management performance, monitoring and incentives.

[26] In a more complex model, the likelihood of failure due to contagion, q, could be made an increasing function of the proportion of the banking system that fails on its own account.

Table 4
Indices of instability – with contagion

	Proportion of system failure	Loss function	No consolidation	Consolidation
			Probability	
State 1	0	0	$(1-p)^2$	$1-p$
State 2	0.5	0.25	$2p(1-p)(1-q)$	0
State 3	1	1	$p^2 + 2p(1-p)q$	p
Index of instability, S			$S_n = 0.5p + 0.5p(p + 3q(1-p))$	$S_m = p$

The intuition for this result is that for a given sized financial system, it is preferable to have many smaller banks if shocks are idiosyncratic. This "management diversity" leads to greater system stability. However, with more banks, there is a greater chance of at least one bank failing, and therefore of contagion, which reduces system stability. The policy maker can attempt to address the problem of contagion directly by providing some form of liquidity support to solvent banks, thereby helping to prevent runs on otherwise healthy banks. In our model this would be captured by a reduction in the probability of failure due to contagion, q_n and q_m. However, governments may face incentives to provide preferential support to larger banks.

The perception that banks might become too big to fail is closely related to the issue of contagion. There are three different effects to consider in this regard. First, there is the potential for greater contagion following the collapse of a larger bank. That is, $q_m > q_n$, which implies that consolidation lowers system stability. Second, governments recognising this effect may attempt to offset it by taking measures to avoid the failure of a large bank. The public perception of a large bank being too big to fail will tend to prevent runs on large banks following the collapse of some other bank – this will tend to increase system stability. Third, if the public perceive large banks as being too big to fail, then depositors and creditors face a reduced incentive to actively monitor and discipline very large banks so as to ensure both efficient and prudent behaviour. This can allow managers to take greater risks, which in our model represents an increase in p_m – implying lower system stability. The net effect of these three opposing forces on system stability is unclear.

In summary we draw a number of broad conclusions from our analysis of the impact of consolidation on system stability.

• There are circumstances in which consolidation may reduce system stability. This is the case if a substantial proportion of shocks leading to bank failure are idiosyncratic, if the probability of a bank failing of its own accord is not affected by size, and if there is little chance of contagion. In this case, consolidation has two opposing effects. A more consolidated system has fewer banks, so that we expect to see fewer bank failures. However, in a more consolidated system the banks are bigger, so that a single bank failure has a much greater impact. If doubling the proportion of the system that fails more than doubles the macroeconomic loss, then this latter "size" effect dominates and consolidation reduces system stability.

• Contagion can introduce a third effect, which may imply that consolidation increases system stability. Contagion describes the circumstance in which the failure of any one bank (on its own accord) leads to the possibility of the failure of otherwise healthy banks. Consolidation reduces the number of banks, which reduces the possibility of at least one bank failing, and therefore, reduces the possibility of otherwise healthy banks failing from contagion. If contagion is sufficiently strong, system stability can increase with fewer banks in the system. On the other hand, if the failure of a larger bank is more likely to cause contagion (than the failure of a small bank), then consolidation may reduce system stability.

- If a merged financial institution is perceived to be too big to fail, the incentives of managers and depositors can be distorted, leading to increased risk taking which reduces the stability of the system. An excessively large institution may impose large costs on any attempt to bail it out in the event of difficulties. On the other hand, the perception that larger banks may receive greater support during crises implies that consolidation can reduce the probability of contagion, thereby increasing system stability.

5.   Conglomeration and the competitive fringe

In this section we briefly consider the impact of conglomeration and the rise of the competitive fringe on the efficiency and stability of the banking sector.

5.1   Conglomeration: efficiency and system stability

The trend towards the formation of large conglomerates has implications for both the efficiency and stability of the financial system. There are a number of arguments to suggest that conglomeration can lead to efficiency gains, whereas in terms of stability there are two opposing forces, the net effect of which is unclear.

There are three reasons why conglomeration is likely to lead to efficiency gains: increased convenience, increased competition and reduced information costs. First, conglomerates can deliver efficiency benefits by providing customers with the convenience of "one-stop shopping" facilities – that is, a multitude of related financial products provided in a single location. Indeed, the marrying of a number of financial products is consistent with the trend towards financial deepening, and with the demand for a greater variety of increasingly sophisticated financial products.

Second, the forces leading to conglomeration have the potential to provide efficiency benefits in the form of greater competition. Just as banks are diversifying into non-bank products such as insurance and superannuation, large non-banks are expanding into banking products. For example, the Australian Mutual Provident Society (AMP) formed a banking arm in 1998 and the Colonial Mutual Life Assurance Society Limited purchased the State Bank of New South Wales in 1994.

Third, information sharing across different types of business activities within the conglomerate may help to reduce costs. For example, customers may have just one account and file with the conglomerate, helping to cut costs and enabling the conglomerate to tailor its range of products to individual needs.

There are two offsetting factors to consider when determining the impact of conglomeration on the stability of the banking sector. These are diversification, which will reduce the probability of individual bank failure, and contamination, which can lead to contagion flowing from failures in non-core banking activities. Institutions that are involved in a range of business activities should be less likely to fail because of the benefits of diversification. Mishkin (1998) emphasises that banks' diversification into non-core activities is a way of supplementing bank profits that are being eaten into by niche players.

In contrast to diversification, contamination reduces stability. Losses in one arm of the business may impair the ability of the conglomerate to undertake its core-banking activities. Because of this, regulators might force the conglomerate to construct "firewalls" in an attempt to separate the different activities into individual business units – in part, the motivation behind these regulations is to restrict the safety-net provisions of explicit depositor-protection schemes (or implicit central bank support) to the area of banking business. However, effective firewalls will also lead to a reduction in the benefits of diversification.

Experience with firewalls between banks and related finance companies has reinforced the popular perception that all too often firewalls are ineffective.[27] So even if new and effective regulations are put in place to prevent cross-contamination within conglomerates, these firewalls may lack credibility. Without credible fire-walls, the risk of brand-contamination remains – that is, there could be a run on an essentially healthy banking unit within a conglomerate because of a *fear* of contamination from a financially distressed non-banking unit.

5.2 The competitive fringe: efficiency and system stability

We have already argued that technological change and deregulation have combined to increase the contestability of the banking sector. In particular, innovations that have allowed unbundling and re-bundling of financial products have helped to increase the degree of competition from smaller "fringe" financial firms.

These developments imply greater efficiency; however, they also imply that large banks will suffer from lower margins across a range of products as a result of a more competitive fringe. This is consistent with the evidence of falling lending margins over recent years. Smaller banks and non-banks have naturally tended to encroach upon the lower risk and higher profit activities. Offsetting this effect is the potential for expansion and diversification when banks shift into non-core financial activities previously dominated by non-banks.

The development of new financial products – in part driven by technological progress – has increased the ability of non-banks to participate in the process of financial intermediation. One notable innovation has been securitisation, which has offsetting implications for the stability of the system. On the one hand, because securitisation transfers loans off the balance sheets of banks, banks' balance sheets will not be directly affected by an increase in loan defaults, and so the intermediation process should not be greatly impaired. This should serve to increase financial system stability. On the other hand, there may be a tendency to limit securitisation to only high quality assets, thereby weakening banks' balance sheets and reducing the stability of the banking system. Furthermore, some might argue that the investors who buy the securitised loans may not be as well placed as banks to absorb the impact of a rise in defaults, with possible adverse consequences for wealth and spending. However, the net loss of wealth is the same regardless of who is the end holder of the security, whether they are holders of bank shares, or investors (some of whom may be offshore) in the institutions that purchase the securitised loans.

6. Implications for system stability and monetary policy

In this section we draw together the implications of current trends in the financial system for policy. We have presented a wide range of arguments regarding the implications of consolidation, conglomeration and other changes in the financial system on system stability and efficiency.

Certain changes appear to have been associated with efficiency improvements. In particular, following deregulation of the banking sector (and aided by technological innovations and the move towards globalisation) there has been a trend towards greater financial depth, wider availability of increasingly sophisticated financial products, and more recently, greater competition from non-banks and thus lower margins on many core banking products. However, the impact of further consolidation on efficiency remains a widely debated issue. No clear consensus exists on the implications of these changes for system stability.

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[27] In Australia, well known examples include the problems of the Financial Corporation of Australia affecting the Bank of Adelaide in the late 1970s (Stanford and Beale (1988)), and the problems of the Australian Guarantee Corporation affecting Westpac in the early 1990s (Carew (1997)).

One lesson is clear. Monetary policy-makers cannot remain indifferent to developments affecting financial system stability. Furthermore, central banks need to pay some attention to questions of efficiency, since both efficiency and stability have implications for long-run macroeconomic performance. However, some developments may imply a trade-off between stability and efficiency.

One crucial question is what can central banks do to contribute to the stability (and efficiency) of the financial system? Beyond the need to ensure a strong supervisory system (for central banks that maintain this responsibility), there are at least four important contributions that can be made:

(i) *Low inflation and stable growth.* Maintaining low inflation and stable growth is a necessary (though not sufficient) condition for financial system stability. The experience of Australia and some other OECD countries has been that higher inflation rates can encourage the movement of intermediated funds away from projects that are profitable over the longer term, and towards excessive speculation in asset markets. This speculation can lead asset prices far away from levels justified by fundamentals, which in turn can destabilise the financial system.

(ii) *Payments system access.* Central banks can influence the terms and conditions under which financial institutions can participate in the payments system. In this way the central bank can have an influence on the level of contestability, and hence the degree of efficiency of the financial system. At the same time, developments that reduce the risks in the payments system, such as the widespread move towards Real Time Gross Settlement (RTGS), can reduce the possibility that the payments system either initiates or propagates an episode of financial system instability.

(iii) *Emergency liquidity support.* Central banks are the ultimate source of domestic liquidity. In some cases, a preparedness by the central bank to extend emergency liquidity, either through the market or to institutions directly, can play an important role in preventing disturbances having macro consequences. However, care is needed to minimise the distortion of incentives for prudent management and private monitoring of risk, both of which can enhance both stability and efficiency.

(iv) *Contributing to the debate on consolidation and conglomeration.* As the above discussion highlights, there are many ways in which recent trends and pressures might influence system stability, although the net effect of these changes is not clear. Central banks can emphasise the importance of these developments for system stability. These are often overlooked in the ongoing debate, which tends to focus on the more microeconomic issue of efficiency.

A second important question is as follows. Given the structure of the financial system, what should central banks do if they see a rise in system instability? There are two broad approaches. First, monetary policy with a medium-term horizon may need to take account of the stability of the financial system in such a way as to imply a non-standard response to short-term inflationary pressures. The second approach for central banks and financial system supervisors might be to adopt prudential standards that more explicitly depend upon the degree of risk in the financial system. Both of these approaches are worthy topics for future research.

Appendix: data sources

Figure 1: All data from 1988 onwards are obtained from ABS catalogue no. 5232.0 *Financial Accounts*. Prior to 1988, some estimation is required. The level of deposits includes bank, NBFI and cash management trust deposits. Prior to 1988 it is estimated from data contained in Reserve Bank of Australia *Occasional Paper 8* and Reserve Bank of Australia *Bulletin*.

Figure 2: Total bank liabilities are calculated as the sum of Australian dollar liabilities from RBA *Bulletin* Table B1 and foreign exchange liabilities in Table B6. Table B6 provides a breakdown of foreign exchange liabilities into resident and non-resident liabilities. Prior to 1989 a breakdown of Australian dollar liabilities (in Table B1) into resident and non resident is unavailable.

Table 1: Reserve Bank of Australia, internal calculations.

Figure 3: Bank derivative activity is calculated from data contained in RBA *Bulletin* Table B21 and is on a global consolidated basis. It is calculated from banks' global off-balance sheet activity in foreign exchange, interest rate and other market-related contracts.

Table 2: Total assets of financial institutions are calculated from data in the RBA *Bulletin*. They exclude assets of the Reserve Bank of Australia.

Figure 4: Bank credit is defined as the sum of loans and advances by banks to the private sector and bank bills on issue. It is adjusted for breaks in the series. Real rates are calculated using the Treasury measure of underlying CPI inflation.

Figure 5: Net impaired assets for the four major banks are obtained from the Impaired Asset Return and are net of specific provisions. Prior to September 1994 they are reported as Non-performing, Renegotiated and Doubtful Items.

Figure 6: The return on shareholders' funds for major banks is an internal RBA calculation and is on a global basis. Real returns are constructed using the Treasury measure of underlying CPI inflation.

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