

**THE IMPACT OF FINANCIAL INTERMEDIARIES ON RESOURCE
ALLOCATION AND ECONOMIC GROWTH**

Philip Lowe

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Economic Research Department

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ABSTRACT

This paper examines the links between economic growth and the nature of a country's financial system. It is argued that long-run growth has its roots in resource accumulation, and in particular in knowledge accumulation. The financial system plays an important role in influencing both the amount and type of resource accumulation which actually takes place. In particular, financial market regulation distorts the incentives of financial intermediaries which, in turn, distorts the type of resource accumulation that takes place. It is also argued that the size of the gains derived from the development of the financial sector rests heavily on the ability of intermediaries to effectively screen and monitor lending proposals. Finally, the paper explores some of the implications of Australia's financial market liberalisation.

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1. INTRODUCTION

Interest in the theory of economic growth and the theory of the operation of financial markets has increased significantly in recent years. This has led to a greater appreciation of the role of knowledge accumulation in the growth process and deeper understanding of the incentive problems that plague financial markets. The advances in these two important areas of economic theory have, however, occurred essentially independently of one other¹. Typically, in the new growth models, financial markets are implicitly assumed to operate smoothly in the background. There is little consideration given to the implications for resource allocation of imperfect information, asymmetric pay-offs and financial market legislation. This is an important omission as resource accumulation does not occur independently of the financial system. The activities that lead to the accumulation of technology and knowledge involve risk and often require external finance. The availability of that finance and the conditions under which it is obtained help determine the nature of resource accumulation. In general, the incentives that financial intermediaries face do not guarantee the socially optimal accumulation of the key resources that propel sustained growth. These incentives are distorted both by regulation and by the very nature of loan contracts. This paper explores some of the relationships between the nature of a country's financial markets and the allocation of its financial resources and thus ultimately the country's rate of economic growth. As a case study, the paper also examines some of the effects that the financial deregulation which took place in Australia in the 1980s has had on the allocation of resources within Australia.

¹ Recent research has made some attempt to connect these two areas. Endogenous growth models with some type of financial sector (either financial intermediaries or a stock market) have been developed by Greenwald and Stiglitz (1989), Greenwood and Jovanovic (1990), Bencivenga and Smith (1991) and Levine (1991). These models focus on the "liquidity insurance" that a financial sector provides. In contrast, work by King and Levine (1992) focuses on the role that intermediaries play in project selection.

It has long been recognised that the financial system influences economic development through two key mechanisms. The first is the ability of the financial system to transfer resources from those who wish to delay consumption today to those who wish to bring future consumption or investment forward to today. Without this transfer, all investment would have to be self-financed. This would necessarily constrain investment as many investment projects are beyond the resources of individuals. As a result, the capital stock would be lower, as would per-capita incomes. Second, and even more fundamentally, the financial system provides the economy with a medium of exchange that is universally accepted. Without it, the degree of specialisation would be constrained and barter would be the predominant form of trade.

These two basic functions of the financial system are well understood. For an economy to achieve sustained growth there must be confidence in the payments system and the financial system must be able to transfer resources from savers to investors. As McKinnon (1986) argues, for the system to be able to perform these tasks effectively, the inflation rate should be low and there should be confidence in the banking system. This requires a central bank that is essentially independent and cannot be forced into inflationary finance of government budget deficits. It is key that the government maintain strict control of the country's fiscal position. Failure to maintain this control can undermine the willingness of individuals to hold currency, increase uncertainty in the economy and lead to significant misallocation of resources. It is also important for the currency to be convertible. Convertibility increases confidence in the payments system, facilitates international trade and prevents the costs associated with black markets and substitute currencies.

Taking these conditions as given, this paper examines some of the factors that determine the efficiency with which the financial system transfers funds from savers to investors. The rate at which an economy grows is a positive function of the efficiency of this process. While a number of nations have been able to achieve considerable expansion of the capital stock through domestic savings, not all of these nations have experienced the expected high economic growth. Part of the problem is in the allocation of savings. Financial resources have been used by governments for political purposes, to promote income redistribution and for social goals. Equally importantly, the allocation of resources by financial markets has not always been socially optimal because of financial market regulation, problems

induced by asymmetric information between borrowers and lenders, and the inability of financial intermediaries to screen and monitor loans effectively.

Both Stiglitz (1989) and King and Levine (1992) argue that one of the key roles of financial intermediaries is the choosing between competing sectors of the economy, between competing firms and between competing investment projects. If intermediaries operate under restrictive regulations then this "choice" is affected by how the regulations impact on the incentives of the intermediary. Even in deregulated financial markets, intermediaries retain a role in "choosing" between conflicting demands because the allocation of savings on the basis of price is not always possible. The work of Stiglitz and Weiss (1981) highlights one of the problems. With a loan contract the borrower does not repay the loan if the investment is a failure, but gets to retain the profits (less the agreed payments to the bank) if the project is a success. This asymmetry means that the borrower will be willing to borrow at interest rates that make the project have negative expected social value. If the bank is unable to screen its customers then it may well lend to customers who are undertaking such inefficient projects. In the context of endogenous growth models, inefficiencies in financial markets slow the rate at which society accumulates knowledge and thus also slow the economy's rate of growth.

The following sections of the paper explore various aspects of the impact that financial intermediaries have on economic growth through their role of allocating savings. Section 2 begins by presenting Romer's (1989) model of endogenous growth. In this model the accumulation of knowledge leads to economic growth. While consumer preferences, the current state of technology and the stock of skilled labour all influence the rate at which knowledge accumulates, no role is given to the financial sector. However, in reality there are likely to be important interactions between the financial system and the nature and extent of resource accumulation. These interactions are explored in Section 3.

Ideally, it would be useful to undertake some formal testing of the models that predict a link between financial structure and economic growth. This, however, is a difficult task. The models make predictions concerning steady-state growth rates. They typically say nothing about the transition phase to a new steady state; this transition phase could, however, take many years. It is difficult to test the models using data for a single country because datasets with the required variables are

generally of insufficient length. More support for these models has been found using cross-country studies. King and Levine (1992) report results that suggest that the scale and efficiency of financial intermediation are robustly and significantly correlated with economic growth in a cross-section of countries. Again, however, this work is not without its problems. Foremost amongst these, is the general sensitivity of the results of studies of growth rates to the inclusion/exclusion of particular variables. More convincing formal econometric support for the various theories appears to require either longer datasets or an improvement in econometric techniques. Thus, rather than embark along the road of formal empirical tests, Section 4 examines some of the implications of the liberalisation of financial markets that occurred in Australia in the 1980s.

Australia makes an interesting case study of the consequences of financial deregulation. Until the 1980s, the Australian banking sector was subject to considerable regulation. Controls were placed on both lending and deposit rates and on the growth of bank balance sheets. These controls were primarily used as a macro-economic management tool. However, as the financial system developed, the regulations became increasingly ineffective. The adverse resource allocation effects of the regulations also came to be more appreciated. As a consequence, the regulations were removed in the first half of the 1980s. Section 4 reviews some of the implications of this liberalisation. Finally, Section 5 summarises and concludes.

2. GROWTH THROUGH KNOWLEDGE ACCUMULATION

The traditional neoclassical view of economic growth is associated with the work of Solow (1956 and 1957). He argued that differences in capital-labour ratios were the key determinant of cross-country differences in the level of per-capita incomes. In Solow's model, the rate at which per-capita income increased in the steady state was explained by exogenous technological progress. This exogeneity assumption meant that there was no consideration of how or why technological progress took place. The new generation of growth models explicitly address these issues by modelling the technology and knowledge accumulation processes. In so doing, they add considerably to our understanding of the economic growth process.

In these models, **knowledge** is defined in various ways. In the Romer (1989) model, knowledge is equated with the number of blue-prints for intermediate goods

that have been developed. In the model presented by Lucas (1988), knowledge is defined as the stock of human capital. In other models it is defined as production knowledge gained from learning-by-doing and in others as the level of technological sophistication. In the discussion that follows, the term **knowledge** is used in a generic sense to include each of these forms of knowledge.

Romer assumes that the economy has three sectors: a sector producing final goods, a sector producing differentiated intermediate goods and a research sector producing "blueprints". The final good is produced using unskilled labour (L), skilled labour (H_1) and all possible varieties of intermediate goods that are currently available. The production function for final goods, which exhibits constant returns to scale, is given by:

$$Y(H, L, x) = H_1^\alpha L^\beta \int_0^\infty x(i)^{1-\alpha-\beta} di \quad (1)$$

where $x(i)$ is the input of variety i of the intermediate good. An important characteristic of this production function is that output increases when the number of varieties of intermediate goods increases, even if the total input of intermediate goods is held constant; that is, there are returns to variety in intermediate goods.

The intermediate goods are produced with constant marginal cost with capital being the only input. The capital stock increases through time as consumption is foregone. Before an intermediate good can be produced, it must be developed by the research sector. Once developed, the firm that wishes to produce the intermediate good buys the design from the research sector. The increase in the number of new designs (which is equated with an increase in knowledge) depends upon three factors: the stock of existing knowledge (A), the amount of skilled labour used in the research sector (H_2) and the productivity of that labour in creating new varieties (δ). The increase in the number of new varieties is given by:

$$\dot{A} = \delta H_2 A \quad (2)$$

This production function exhibits increasing returns to scale. However, producers of the blueprints are required to pay only for the skilled labour; they are able to use the existing stock of knowledge (A) for free. This allows the existence of a competitive research sector.

Increases in the stock of knowledge have two important effects on the economy. First, the increasing stock of knowledge makes it easier to produce new knowledge (that is, new varieties) and second, it increases the number of varieties of intermediate goods available to final good producers. This in turn increases output.

Consumers are assumed to have a standard intertemporal constant elasticity utility function given by:

$$\int_0^{\infty} U(c)e^{-\rho t} dt \quad \text{where } U(c) = \frac{c^{1-\sigma} - 1}{1-\sigma}, \quad \sigma \in [0, \infty) \quad (3)$$

Each consumer is assumed to be endowed with fixed quantities of unskilled and skilled labour. In each of the industries profits are zero. Finally, equilibrium is assumed to exist in the market for skilled labour; that is $H_1 + H_2 = H$, where H is the stock of skilled labour in the economy.

Romer shows that the equilibrium growth rate in this economy (g) is given by:

$$g = \frac{\delta H - \Lambda \rho}{\Lambda \sigma + 1} \quad \text{where } \Lambda = \frac{\alpha}{(1 - \alpha - \beta)(\alpha + \beta)} \quad (4)$$

The growth rate is increasing in the stock of human capital (H) and in the productivity of human capital in creating new knowledge (δ). The more efficient is the society in using its existing knowledge to create new knowledge, and the more resources it has to devote to knowledge creation, the faster will be its growth rate. The growth rate is negatively related to the rate at which individuals discount the future (ρ). A higher discount rate leads to reduced capital accumulation and thus a reduction in the production of intermediate goods. The growth rate is increasing in the elasticity of intertemporal substitution ($1/\sigma$); that is, as consumers become more willing to substitute consumption between periods, the growth rate increases as consumers are prepared to forgo consumption today for higher consumption tomorrow.

Romer's model has many interesting implications for economic growth and the role of government in encouraging growth. Unlike the Solow growth model, the preference parameters (ρ and σ) affect the steady-state growth rate. More patient societies will grow faster. Romer also shows that since researchers are not able to capture the full returns to society of their innovations, the growth rate of the

economy will be less than socially optimal. Government subsidisation of research and development thus may be desirable. Further, the model suggests that policies aimed at increasing the efficiency with which the economy translates its existing resources into faster knowledge accumulation are likely to speed the steady-state growth rate.

The work of Romer and others has been important in re-emphasising the role of knowledge accumulation in the growth process. It emphasises that the decision to create knowledge is one made in response to market forces. It also emphasises that there are important positive externalities for society from the creation of knowledge, and thus left solely to the market, there may be insufficient accumulation of knowledge. The Romer model, in ignoring financial markets, is typical of models in this framework. Savings, in the form of foregone consumption, are assumed to be costlessly and efficiently transformed into capital to be used in the production of intermediate goods. Financial markets are implicitly assumed to be working in the background allowing individuals to substitute consumption between periods. In addition, knowledge creation happens the moment the resources are devoted to research and there is no risk involved in the innovation process. Since knowledge creation occurs instantaneously it does not have to be financed through financial markets.

Clearly, the attention given by governments to the operation of the financial system suggests that financial markets should not be pushed into the background when considering economic growth. Given that research and development and knowledge accumulation are risky activities and that the "inventor" may have a considerable information advantage over the lender, questions concerning the incentives of financial intermediaries become important. In terms of the above model, a more efficient financial system, through say its ability to improve the screening of lending projects, may increase the productivity of existing knowledge and human capital. This can be represented by an increase in the parameter δ . As equation (4) shows, increases in δ lead to faster economic growth.

More generally, the financial system, through its roles of screening proposed lending projects, facilitating intertemporal substitution in consumption and investment and influencing the degree of uncertainty in the economy, has an important influence on the rate of economic growth. These issues are considered in more detail in the following section.

3. THE ROLE OF THE FINANCIAL SYSTEM IN KNOWLEDGE ACCUMULATION AND GROWTH

The depth of a country's financial markets depends on a variety of factors. These include the nature and extent of controls on financial intermediation, the nation's legal and accounting rules and the level of per-capita income. As many economists have noted, there is a positive relationship between the level of per-capita income and the extent of financial intermediation. The causation runs two ways; wealthier countries can afford more sophisticated financial systems and the depth of the financial system helps an economy to grow. This section discusses various aspects of this two-way relationship.

The following five issues are discussed in some detail:

- (i) the effect of interest rate ceilings on resource allocation.
- (ii) the role of financial intermediaries in screening loan proposals.
- (iii) the role of the financial system in providing liquidity insurance.
- (iv) the implications of differences in private and social returns.
- (v) the risks of financial liberalisation.

In each case, the discussion focuses on how the financial system affects resource allocation. Given the lessons from the Romer model, particular attention is given to the interaction between the financial system and the accumulation of knowledge. The discussion is heavily biased towards domestic financial markets and away from international financial markets. This is not to say that access to world capital markets is not important for resource accumulation and economic growth, for indeed it is. At a very basic level, access to international capital markets permits national investment to exceed national savings and thus it allows the achievement of a given level of national income earlier than could have been achieved through reliance solely on domestic savings. Integration into world capital markets can also make it more attractive for foreign capital to undertake investment domestically. This foreign capital often brings access to technology that previously was unavailable to the country. Thus, the extent to which a country has access to both world financial

and goods markets has a potentially large impact on economic growth. To keep what is already a wide range of issues from increasing further, many of these important international issues are pushed into the background in the following discussion. The focus is primarily on the behaviour of domestic financial institutions.

3.1 Interest Rate Ceilings

The work of McKinnon (1973) and Shaw (1973) identified interest rate controls as one of the most important causes of financial repression. Since then, there has developed a voluminous literature on the effects of these controls. This literature has largely focused on the implications for national savings of ceilings on loan and deposit rates. It has been argued that these controls reduce the incentive to save. As a result, national savings are lower and, without access to world capital markets, actual investment is lower. Whether or not lower interest rates actually lead to reduced savings and capital formation has been the topic of much empirical research. Lee (1991) provides a useful summary of this work. He concludes that while the evidence on the existence of a positive relationship between interest rates and savings is mixed, there is probably a quite weak but positive relationship. Perhaps more importantly, he concludes that "*there is overwhelming evidence supporting the positive effects of real interest rates on the volume of financial savings*" (page 8). A similar conclusion is reached by the World Bank in the 1989 World Development Report.

It is possible that repression of the banking sector does not have adverse implications for resource allocation if other forms of finance can substitute for bank loans. Typically, controls on interest rates lead to the establishment of some type of unofficial or 'kerb-market' that is able to supply intermediated credit to borrowers. In many cases, this market acts on the fringe of the official sector and because of the risks involved, it has to incorporate a large risk premium into its borrowing and lending rates. As a result, access to this market is often limited. Equity finance is also often not an option. The information problems involved in the issue of equity and the inability of equity investors to obtain widely diversified portfolios mean that stock markets are typically underdeveloped in financially repressed economies.

Given these constraints on other forms of finance, interest rate controls do have important implications for allocation of savings. Provided that the interest rate

ceilings are binding, the financial intermediaries must ration credit. This need to ration has important consequences for the type of projects that get financed and thus on the growth rate of the economy.

When banks are required to ration credit they choose which projects receive the limited supply of available finance. Shaw (1973) argues that the rationing process is expensive to administer, is vulnerable to corruption and intensifies the risk aversion and liquidity preference of financial intermediaries. As a result, the banks' loan allocation process is unlikely to be socially optimal. There will be a bias against projects with high expected returns but with relatively high risk. While the expected return of a project is important from a social perspective, it is irrelevant to the bank provided that the bank is assured of receiving its principal and interest. Banks will thus favour projects with low risk.

The following example clarifies this point. Suppose there are two borrowers that require one unit of funding at the maximum interest rate that can be charged (\bar{R}) by the bank. The interest rate ceiling, however, means that the bank can only raise sufficient deposits to fund one of the loans. Further, assume that the first project has an expected rate of return of R_1 , that $R_1 > \bar{R}$, and that there is no uncertainty concerning the project's return. The second project is assumed to have a higher expected rate of return than the first project, however it is risky. Suppose that its expected rate of return is given by $R_2 > R_1$ and that there is a 50 per cent chance that the project will yield $R_2 + \alpha$ and a 50 per cent chance that it will return $R_2 - \alpha$. Lastly, assume that neither borrower has any collateral, private returns equal social returns and that bank is risk neutral.

If the bank lends to the first project, its rate of return on the loan will be \bar{R} . If the bank lends to the second project, its expected rate of return depends upon the size of α . If α is large enough to make $R_2 - \alpha < \bar{R}$ then there is a 50 per cent chance that the borrower will be unable to pay the bank the complete principal and interest. In this case, the bank's expected rate of return on this second project is less than \bar{R} . Because of the interest rate control, the bank is unable to charge the higher return-higher risk borrower an interest rate sufficiently high to compensate for the risk. The lower risk-lower return borrower thus obtains the rationed credit.

In the above example, the problem could be mitigated by the second borrower having collateral to back the loan. This, however, just pushes the problem one step

back. Banks extend the rationed credit to those with the greatest amount of collateral and not to those whose projects have the highest expected rates of return.

Clearly, the way in which the bank allocates the country's savings is sub-optimal in the above example. This has implications not only for the level of national income but also for the growth rate of income. Research and development are typically risky activities. Sometimes they will lead to a break-through, other times they will yield nothing. These activities also involve up-front costs that are only later recouped. Thus, they must be financed. If the activities that lead to knowledge accumulation are riskier than other types of activities then the need to ration credit is likely to result in under-investment in these relatively risky activities.

In the Romer model presented above, the growth rate is slower than is socially optimal since inventors do not take into account the positive externality that their research generates. When interest rate ceilings exist (and banks can effectively screen potential borrowers) the problem is compounded because the financial intermediaries ignore the social returns of the projects for which they lend. If banks cannot charge different borrowers different interest rates then risky, but high expected return activities will be under-funded by financial intermediaries.

3.2 Ability to Screen

In the above discussion it was assumed that banks knew both the expected return and the distribution of the returns for each project and that the bank could distinguish between borrowers. It was argued that in this case interest rate ceilings were likely to lead to the financing of safer projects with lower expected returns. The assumption of perfect information is a strong one. In fact, much recent research concerning financial markets has focused on the asymmetric information between the borrower and the lender. Potential borrowers are assumed to know much more about their project than anybody else. This asymmetry in information is at the core of one of the most important reasons for the existence of financial intermediaries. That is, financial intermediaries exist because of their ability to cost-effectively screen proposed investment projects, to assess the collateral of various loan proposals and to monitor the performance of projects for which funds have been

lent². The efficiency with which the banks perform this screening and monitoring function has important implications for the efficiency with which the country's savings are allocated.

Perhaps the most influential work on the effects of asymmetric information on credit markets is the work of Stiglitz and Weiss (1981). They show that if banks are **not able** to screen projects then increasing the rate of interest that borrowers are required to pay may actually reduce the return to the bank. This result reflects the fact that as the interest rate increases the quality of the pool of customers seeking loans from the bank deteriorates. This occurs through investors with safe projects deciding not to borrow (adverse selection) or through each investor choosing a more risky project (moral hazard).

In the Stiglitz and Weiss model, all projects have the same expected return but projects vary in terms of their riskiness. The more risky the project, the lower is the sensitivity of the borrower's return to the interest rate charged. If the borrower has limited liability then for outcomes in which the project is a failure, the interest rate charged is irrelevant because no interest is paid. Since the loan is only paid off when the project is a success, it is the return in the successful state that is important for the borrower when considering whether or not to borrow. Since risky projects have higher probabilities of failure, they must have better outcomes in the good states. As a result, borrowers with risky projects are prepared to pay higher interest rates.

The bank recognises this problem and may be unwilling to increase the loan interest rate to clear the market for fear of attracting risky projects. As the result of setting a non-market clearing rate the bank must ration credit. Since it cannot distinguish between projects, the allocation of the rationed funds is random. This situation is commonly referred to as **equilibrium** credit rationing. In contrast, Section 3.1 was concerned with **disequilibrium** credit rationing.

This discussion has assumed that all projects have the same expected value. While this is a useful assumption for highlighting the effects of asymmetric information on

² Diamond (1984) develops a theory of financial intermediation based on intermediaries minimising the cost of monitoring.

bank lending, it is not realistic. An economy has a range of potential projects that can be undertaken. Some projects have high expected rates of return, others have low or negative expected rates of return. The ability of banks to screen the quality of projects plays a role in determining the return received by the country on its savings.

Consider the following example. There are two types of projects that exist in equal quantities and each requires 100 units of financing. One project is a "good" project; it has a high expected return and a low variance. The second project is a "bad" project; it has a low expected return and a high variance. For simplicity, assume that the borrowers undertaking both types of projects have no collateral to offer. There are two possible outcomes for each project. In the unfavourable outcome the good project returns 80 and the bad project returns 67. In this case neither type of borrower is able to repay the full loan. For the borrower with the good project there is a 10 per cent chance that the unfavourable outcome will occur. For the borrower with the bad project this probability is 40 per cent. In the favourable outcome the return to the good project is 123 and the return to the bad project is 130. Finally, it is assumed that private returns equal social returns. The following table summarises the possible outcomes.

Cost of Projects = 100

	Good Project		Bad Project	
	Favourable State	Unfavourable State	Favourable State	Unfavourable State
Probability	0.9	0.1	0.6	0.4
Return	123	80	130	67
Expected Return	118.7		104.8	

Since borrowers only pay interest in the good state, they are prepared to borrow at interest rates that exceed the social return on their projects. Borrowers with good projects are prepared to borrow at rates up to 23 per cent while borrowers with bad

projects are prepared to pay up to 30 per cent. The social rates of return on these projects are 18.7 per cent and 4.8 per cent respectively.

Suppose that the bank **cannot** distinguish between the two projects but knows that the two projects exist in equal quantities and knows the distribution of returns for each project. Further, initially assume that interest rates are such that both types of borrowers apply for loans. Thus, there is a 50 per cent chance that a project is a good type and a 50 per cent chance that it is a bad type. If the loan rate is denoted by R_L then the expected return to the bank from a loan is:

$$\begin{aligned} \text{Expected Return to Bank} = & 0.5 \times [(0.1 \times 80) + (0.9 \times 100 \times (1+R_L))] + \\ & 0.5 \times [(0.4 \times 67) + (0.6 \times 100 \times (1+R_L))] \end{aligned}$$

If the bank is risk neutral, the loan rate must be set so that the expected return to the bank equals the bank's cost of providing the funds (R_c). This implies that:

$$R_L = 0.10133 + 1.333 R_c$$

Thus, if the cost of providing loans is 5 per cent then the loan rate will equal 16.8 per cent. At this rate, both types of projects apply for and receive finance. This is despite the fact that the social return of the bad project (4.8 per cent) is less than the social cost of funds (5 per cent). Now suppose that the cost of providing a loan increases to 10 per cent. According to the above formula the loan rate should increase to 23.47 per cent. However, at this interest rate those with the good projects no longer find it profitable to borrow. Since the bank knows the distribution of returns, it would know that at the high deposit rate only those with poor projects would be applying for loans. Thus, at a deposit rate of 10 per cent the bank would need to charge a loan rate of 38.66 per cent. At this rate, those with bad projects would no longer wish to borrow. As a result, if the cost of providing a loan is 10 per cent there will be no financial intermediation³.

³ In this example there will be no financial intermediation if the cost of providing funds exceeds 9.65 per cent. By slightly altering the pay-offs it is possible to have some range of interest rates after which good borrowers drop out of the market, that bad borrowers are still both prepared and able to, obtain finance.

This example highlights two important points. First, it highlights a critical problem for countries with under-developed financial systems. If the financial intermediaries lack the skill needed to assess the quality of projects, it may be difficult for an intermediation industry to be profitable unless interest rates are controlled. The inability of banks to screen, leads to those with good projects subsidising those with bad projects. The higher the cost of providing loans, the greater is this subsidy. As interest rates rise it becomes unprofitable for those with good loans to pay the subsidy. Once the subsidy is not being paid, those with bad projects may be unwilling to borrow at loan rates that are needed to ensure bank profitability. All financial intermediation may cease.

The cost of providing a loan may be high for a variety of reasons. Intermediaries may have a shortage of capital and may be seen as relatively risky. Thus, investors will demand a risk premium before they are willing to deposit funds with the intermediary. This risk premium increases the cost of providing funds to borrowers. Second, the intermediary may be operated inefficiently. Poor internal controls and procedures and high operating costs may mean that while deposit rates are low, loan rates may be quite high. Third, if there is reasonably free access to international capital markets it is difficult to sustain risk-adjusted interest rates that are significantly different from world interest rates. High world interest rates are thus likely to lead to high domestic deposit interest rates. If, for any of these reasons, the cost of providing a loan is high, a strong financial intermediation industry may find it difficult to be profitable unless there are some interest rate controls.

The second general point made by the above example is that the inability of banks to screen causes savings to be allocated poorly. With a moderate cost of providing loans, the financial intermediary provides funds to both types of projects. That is, it finances projects with both positive and negative net social value. It is even possible that projects that have a negative expected gross rate of return get financed. In terms of the growth model presented in Section 2, these distortions can be thought of as reducing the efficiency with which the economy translates its existing resources into new knowledge. That is, they slow the rate at which the economy accumulates the key resources needed for economic growth.

The ability of banks to screen loan applicants is central to the efficacy of the financial system. An inability to screen can result in either the failure of financial intermediaries to develop or, if they do develop, in an inefficient allocation of

savings. The ability to screen has three essential components. First, the intermediary must be able to assess the quality of the project, second it must be able to assess the value of collateral offered as security and third it must have the ability to monitor the project through time.

For intermediaries to be able to perform these tasks effectively the nation must have a strong legal system. For intermediaries to be able to assess the value of a firm's collateral, the system of property rights must be clearly defined and widely accepted. If there is uncertainty regarding the current ownership of the particular assets offered for collateral or if there is uncertainty about future changes in property rights then banks will have difficulty in assessing the security behind their loans. Given that, by its very nature, collateral is only used in the "bad case" scenarios, banks must value the collateral at its value in those bad cases. Uncertainty about property rights therefore prejudices the value of collateral.

A second aspect of the legal system that is important for financial intermediaries to effectively perform their tasks concerns the laws regarding truthful reporting and accounting standards. If widely accepted accounting standards do not exist, it becomes difficult to assess the current position of the firm and the likely outcome of the project. Banks become uncertain as to whether a firm's financial statements reflect the true position of the firm or just "creative accounting". This makes the screening task more difficult. The task is also made more difficult if the country does not have strong penalties for deliberate misreporting by a firm of its current financial position and its likely future developments. If such laws do not exist then the intermediary needs to screen projects, not just on the basis of expected outcomes but also on the probability that the borrower is lying. This makes the screening process more costly and in all probability, less effective.

Given that a widely accepted and enforced system of property rights and accounting rules has been established, the structure of the banking system can play an important role in minimising the costs arising from asymmetric information. In particular, the adoption of a **universal**, as opposed to an **arms-length**, banking system is likely to reduce the costs associated with screening problems. The universal system involves the providers of finance having an active role in the internal management of the firm. For instance, a representative of the bank may sit on the board of the firm and the bank may own shares in the firm. This allows the bank to actively monitor the

performance of the firm's managers and their investment decisions. It also serves as a signal to other investors that the firm is being soundly managed.

The German and Japanese banking systems are examples of the universal system while the Australian and US systems are examples of the arms-length system. However, DeLong (1991) argues that prior to World War I the US banking system was more like the universal system. He suggests that this was partly responsible for the rapid growth in the United States. Financial institutions, by having their representatives on the boards of firms were able to make managers more accountable and ensure that long-term, but high-return investments were undertaken.

While the universal system should help minimise distortions arising from asymmetric information and conflicts between the incentives of managers and owners it is not without its costs. Amongst these is the potential for intermediaries to use their market power over firms with which they are associated to extract monopoly returns. The system may also be more fragile to large shocks. If banks hold significant share holdings in firms and the share market declines, the capital of the banks is reduced. This may make the banks less willing to lend. Notwithstanding these problems, the universal system does offer significant gains in terms of monitoring, provided that the financial institutions have the capability and knowledge to screen projects once the asymmetry in information is removed.

3.3 Risk Sharing and Liquidity Insurance

Financial intermediaries are able to improve the allocation of a nation's savings, not only through their ability to screen projects, but also through their ability to aggregate idiosyncratic risk and thus reduce the value of liquid balances that individuals wish to hold.

Investment is a risky activity. It typically leads to a stochastic flow of revenue. While a particular investment may have positive net present value, the stochastic nature of the returns means that there may be periods when revenue unexpectedly fails to cover costs. If there is no external source of finance and the investor does not hold sufficient liquid balances, the project would have to be liquidated in such a period. This liquidation would have to occur even though the project still had positive net present value. As a result of this risk, individual investors are required

to hold savings in liquid balances as a form of liquidity insurance. The size of these liquid balances is reduced if financial intermediaries exist.

The above argument has been formally modelled by Bencivenga and Smith (1991). They show that the introduction of a financial intermediation industry permits the economy to reduce the fraction of its savings that it holds in unproductive liquid assets. Banks borrow from, and lend to, a large number of individuals and as a result face a fairly predictable withdrawal pattern. Thus, they can economise on liquid asset holdings and are able to provide temporary finance to projects that have a short-term liquidity problem. An economy with financial intermediaries is able to economise on liquidity insurance and therefore is able to devote more of its savings to higher return illiquid assets. This, in turn, increases the steady-state growth rate of the economy.

In the Bencivenga and Smith (1991) model, the financial intermediaries either exist or they do not exist. There is no concept of them operating more or less efficiently. However, the more effective are the financial intermediaries in insuring against liquidity risk, the greater is the share of savings that can be devoted to illiquid high yield assets. Obviously, the greater is the stability and confidence in the banking sector, the lower is the need to hold liquid balances. Similarly, liquid balances can be reduced if the macroeconomy is sound and there are instruments available that allow financial intermediaries to minimise risks.

To date, little attention has been given to the stock market. However, just as financial intermediaries reduce the need for the holding of liquid balances so does the existence of a stock market. In a recent paper developing the implications of the existence of equity markets for economic growth, Levine (1991) argues that a stock market will increase the steady-state growth rate by reducing the need to hold liquid balances and by facilitating the accumulation of human capital. He argues that the amount of human capital is related to the amount of physical capital. If idiosyncratic liquidity shocks cause an entrepreneur to cease or scale back production, some human capital is lost. The stock market allows the entrepreneur to sell his/her stock to cover a liquidity problem and thus allows the firm to continue without the loss of physical and human capital. As a result, human capital accumulates more quickly and the steady-state growth rate is faster.

A similar idea is developed by Greenwald and Stiglitz (1989). They argue that, in some cases, the asymmetric information between the owner/managers of a firm and outside potential investors are so great that a stock market will not develop. Individuals are not able to diversify away the idiosyncratic risk of their particular project. This leads firms to under-invest as a form of insurance. The smaller scale of operations means that human capital accumulation through on-the-job training is lower, as are productivity gains achieved through learning-by-doing. Similarly, investment in research and development will be lower. As a result, the financial market distortions that prevent socially optimal risk sharing from taking place lead to lower productivity improvements and a slower steady-state growth rate.

The models of Bencivenga and Smith (1991), Levine (1991) and Greenwald and Stiglitz (1989) take the economy's financial structure as exogenously given. In contrast, Greenwood and Jovanovic (1990) derive the degree of financial intermediation endogenously. They argue that financial intermediation is expensive and that low income economies have difficulty in paying the costs involved. With few intermediaries, project selection is poor and as a consequence growth is slow. As income gradually increases, the economy can afford more financial intermediation. As a result, the quality of project selection improves and growth accelerates. In maturity, the economy has a fully developed financial sector and grows faster than it did when income was lower. In this model the degree of financial intermediation both causes growth and is a function of growth. While the paper does not address the question of appropriate government policy, it is likely that policies aimed towards reducing the cost of financial intermediation would allow the achievement of higher growth rates and possibly higher utility.

3.4 The Implications of Differences in Private and Social Returns

In the growth model presented above, the social return to the development of a new blue-print exceeds the private return. As a result, the rate of development of blue-prints is slower than is socially optimal. Thus, economic growth is also slower than optimal. In the model, subsidising the production of blueprints will speed both the rate at which they are developed and the rate at which the economy grows.

A difference between social and private returns characterises many activities in the real world. A popular example is the accumulation of human capital (or education). It is often argued that individuals are not able to capture for themselves, the full

value to society of their education. Since education is an activity that typically involves incurring a cost before the benefits are obtained, finance is often required. Even if financial institutions worked perfectly and financed all "projects" with positive net present value, there would be insufficient resources devoted to education as individuals would not have the incentive to obtain the socially optimal amount of education. One policy response to this problem has been for the government to subsidise education either directly or through the financial system. If the financial system is used, governments can either subsidise education loans made by commercial banks or the government can take over the role of the financial intermediary completely and provide direct finance.

Some governments have used this distinction between private and social returns to justify widespread intervention in financial markets. Certain industries or sectors are seen as providing dynamic social gains that exceed the private gains. In some cases, this has led to financial markets and financial policy becoming an important tool of industrial policy.

There is no doubt that there is a strong theoretical argument for intervention when social and private returns diverge. The argument is particularly strong if the distortion not only affects the current level of income but also affects the growth rate of income. In addition, even when the private returns equal the social returns, there may be a role for government if the incentives of financial institutions do not permit projects to be financed which have high social returns. As the above discussion suggests, these problems may be particularly severe in developing countries.

In practice, however, government intervention introduces its own incentive problems. The allocation of credit may be made, not on the basis of economic considerations, but rather on political and social grounds. Further, it is often difficult for government officials to accurately assess the relative social and private returns of various projects. The assessment process can easily become derailed by non-economic considerations. If the allocation of credit is completely controlled by government then the discipline of the market may be lost and financial intermediaries may have difficulty in developing the skills needed for good credit assessment. The development of these skills is an integral part of the development process, for it is difficult for the government to continue controlling the allocation of financial resources as the level of national income increases. Notwithstanding these difficulties, there does exist an important role for the government in the credit

allocation process, particularly in the early stages of development. The challenge for government is to ensure that this role is not abused⁴.

3.5 Costs and Risks of Financial Market Liberalisation

There is a general presumption that financial liberalisation, through its ability to deepen a country's financial markets, leads to faster growth. Nevertheless, liberalisation of financial markets can have a number of adverse effects on the macroeconomy. Blundell-Wignall and Browne (1991) provide a useful summary of these effects.

The costs and risks associated with liberalisation can be broadly categorised into three related areas. First, the removal of liquidity constraints may make monetary policy more difficult to implement and the resulting higher levels of debt may complicate the response of the economy to various types of shocks. Second, in liberalised financial markets, asset prices are often volatile and may become misaligned, leading to misallocation of resources. Third, if intermediaries use a poor screening technology then liberalisation may allow more poor projects to be financed. The implications of poor project selection were discussed in Section 3.2. The following discussion centres on the other two potential costs.

Domestic financial liberalisation removes the liquidity constraints faced by individuals. As a result, individual consumption becomes less sensitive to current income. This is also true for countries as a whole as the opening of the economy to international markets breaks the nexus between national savings and investment. While in general, the removal of the liquidity constraints should increase individual and national welfare, there are a number of risks and potential problems. First, the operation of monetary policy may become more complex. No longer can the monetary authorities run monetary policy through direct controls on interest rates and credit. Instead, monetary policy is forced to operate directly through market mechanisms; that is by changing financial prices to induce wealth effects and intertemporal substitution. The responses of the economy to these changes in financial prices are often slow and variable making the monetary policy problem

⁴ Collier and Mayer (1989) discuss various aspects of the role of government in the financial system.

more complex than in a highly and effectively regulated system. On the other hand, if the regulations are being circumscribed by other financial institutions then a price based monetary policy may make monetary policy more effective than direct controls over a limited range of financial intermediaries.

A second potential risk relating to the removal of liquidity constraints concerns the degree of fragility of the corporate sector to various types of shocks. When debt levels are high, adverse shocks to the economy may create more severe recessions and recessions with greater persistence⁵. Higher debt levels imply lower firm collateral and thus higher agency costs. These costs are amplified if firms enter a recession with highly geared balance sheets. As a consequence, firms may find it difficult to obtain finance in recessions, even for projects with positive net present value. In addition, the managers of a highly leveraged firm that suffers an adverse shock, may be unwilling to take risky but profitable investment decisions. If the managers have significant firm-specific capital they may be unwilling to entertain the increased probability of bankruptcy that the risky investment entails.

There are also potential problems on the international front from the increase in debt made possible by financial liberalisation. McKinnon (1986) argues that many developing countries over-borrowed in the liberalised markets of the 1970s. This over-borrowing was made possible by governments guaranteeing repayment of international borrowing. These guarantees removed the incentives for lenders to properly screen projects. As a result, many projects were undertaken which probably should not have been undertaken. The resulting debt-overhang has necessitated tight macro-economic adjustment programs to have been put in place in a number of countries.

The second class of risk arising in liberalised financial markets centres on the risks of resource misallocation arising from the behaviour of asset prices. In liberalised markets, many key financial prices are set in auction markets. Theory suggests that these prices are determined by fundamentals and react quickly to news concerning changes in these fundamentals. For example, share market prices should be set on the basis of the present discounted value of expected future dividends. An increase in **expected** future dividends should lead to an increase in share prices. Because

⁵ Bernanke and Gertler (1990) provide a formal model of this effect.

asset prices respond to expectations they are often volatile. In addition, asset prices may become misaligned and deviate from fundamentals for long periods of time. Blundell-Wignall and Browne (1991) discuss the costs of this volatility and misalignment. They argue that the uncertainty generated by volatile asset markets may contribute to a shortening of investment horizons. This may lead to projects being financed which generate returns quickly but whose returns are lower than those of more longer-term projects. This could be a particular problem for research and development projects, whose returns are often obtained only after a long gestation period. Misalignment of asset prices, particularly exchange rates, also generates considerable concern. If exchange rates move away from fundamentals for long periods of time, the allocation of resources between the traded and non-traded sectors becomes distorted. For example, an overvalued exchange rate reduces the competitiveness of a country's traded good sector. If gaining access to foreign markets is an important part of the process of learning-by-doing, or in achieving economies of scale, this overvaluation can have extremely adverse consequences for growth. Similar problems can occur in other asset markets, particularly the stock market and the housing market.

4. THE AUSTRALIAN EXPERIENCE

Australia's financial system has undergone a significant transformation over the last decade. It has moved from being from a system dominated by directed lending, quantity controls and interest rate ceilings to a freely functioning market system. This section explores some of the implications of these changes. It begins with a brief review of the nature and rationale of the previously existing regulations and summarises the changes that have taken place over recent years.

4.1 History of Regulation

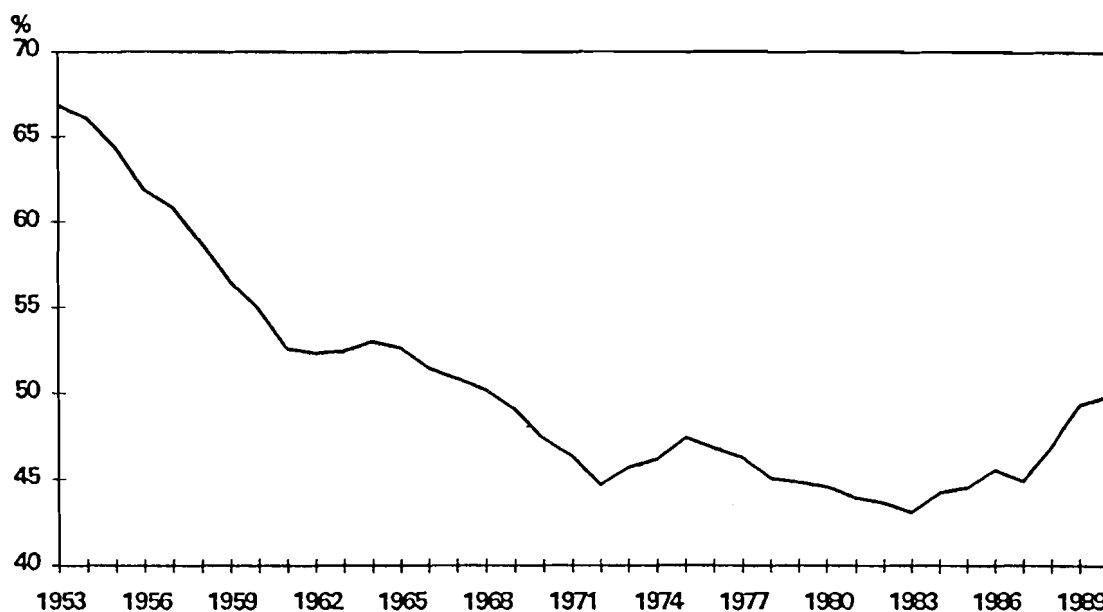
The system of regulation that governed the operation of Australian financial intermediaries grew out of the need for the government to control the allocation of financial resources during World War II. In the years following the end of the war, this rationale no longer remained, yet the regulation continued. While this reflected a number of factors (see Grenville (1991)), the principal reason was that regulation

of financial intermediaries was seen as an effective method of controlling the business cycle⁶. It was thought that control of the growth rate of nominal demand could best be achieved through direct control over the growth rate of bank advances.

The regulations took a variety of forms. There were both qualitative and quantitative lending directives. During certain periods, limits were imposed on the overall rate of growth of bank balance sheets. Banks were also directed to lend primarily for trade finance and not for long term business investment. There were ceilings on bank deposit and loan interest rates and there were limits on the maturity of interest-bearing deposits that banks could offer their customers. Control was also exercised over bank entry and there were restrictions on the portfolio allocation of banks' balance sheets. These portfolio restrictions, together with directives concerning lending growth, were the principal tools of monetary policy. Finally, the exchange rate was "managed" and there were extensive foreign exchange controls.

The evolution of these regulations and their implications for the effectiveness of monetary policy are discussed in considerable detail in Grenville (1991), Valentine (1991) and Harper (1991). These papers highlight the fact that the controls on the banking sector led to the establishment of non-bank financial institutions. These institutions were subject to fewer regulations than banks and their balance sheets grew much faster than those of the banks. Graph 1 shows that over the period of regulation there was a gradual downward trend in the banks' share of the total assets of financial intermediaries. The growth of non-bank financial intermediaries meant that the monetary policy based on controlling the balance sheets of only the banks became increasingly ineffective. This led to a gradual movement in the first half of the 1970s away from direct controls towards a more market based monetary policy.

⁶ Grenville (1991) also notes that the motives for regulation included the desire to sell government securities, the maintenance of prudential standards and the need to allocate credit to priority areas. Harper (1991) argues that the continued regulation reflected the then current state of "intellectual opinion ... that governments should exercise control over the banking system as part of their responsibility to manage the macro-economy".

Graph 1: Banks' Assets as a Share of the Assets of all Financial Intermediaries

The move to a market based system was, however, not without its problems. With an essentially fixed exchange rate and the economy becoming increasingly integrated into world capital markets, the scope for independent market based monetary policy was restricted. As Grenville (1991) notes, attempts to tighten policy by selling bonds were frustrated by the inflow of foreign capital. While various schemes were implemented to slow the inflow of capital, they only provided temporary breathing space. The problems continued to grow as Australia became more integrated into world markets. These difficulties prompted a partial return to direct controls in the second half of the 1970s. Perhaps predictably, this policy met with only limited success and had a relatively short life. In the first half of the 1980s, the exchange rate was floated, all interest rate controls were removed and credit directives ceased.

The seriousness with which Australian governments have viewed the importance of financial markets is reflected in the three commissioned studies into the operation of the financial system over the last one and a half decades. In 1979, with concern growing over the effectiveness of the existing regulations with regard to both resource allocation and monetary policy, the government commissioned a wide ranging study of the financial system. This report (Australian Financial System Inquiry (1981)), became known as the "Campbell Report". It was followed in 1984 by a second study (Australian Financial System Review Group (1984)). Finally, a third report (Parliament of the Commonwealth of Australia (1991)), commonly

referred to as the "Martin Inquiry", was commissioned in 1990. Unlike the first two reports, which were concerned with the effects of regulation, this third report assessed the effects of deregulation and the extent of bank competition.

4.2 Impact of Regulation on Financial Intermediation

It is widely accepted that the control on interest rates paid and received by Australian banks meant that they had to ration credit. The discussion in Section 3.1 suggested that those investors who had the safest projects and those with the most collateral would be first in line to receive rationed funds from the banks. This certainly seems to have been the case in Australia⁷. Nowhere was this more obvious than in the market for housing loans. Successive governments had controlled the housing loan rate in an attempt to improve the access of lower income groups to housing finance. However, the interest rate controls meant that the banks had to ration the housing credit they extended. The Campbell Committee concluded that this rationing meant that the regulations had been "*counter-productive in achieving their welfare objectives, while hurting the community at large by impairing the efficiency of the financial system*" (page 647). That is, banks preferred to lend to their safest customers; those with a large amount of collateral. The interest rate controls had the effect of subsidising housing loans for high income earners while excluding low income earners from the market.

While the effect of interest rate ceilings on the business sector received less attention than their effect on the housing sector, the same problems were at work. Again, the Campbell Committee concluded that "*the interest rate ceiling on overdrafts ... has had the effect of limiting the potential access of small business to bank finance. Once the concessional limit has disappeared ... banks should have greater incentive to make loans to small business*" (page 683). In the regulated environment banks demanded that small business loans be covered by significant collateral and that collateral was generally valued conservatively⁸. Rationing⁹ also

⁷ See Harper (1991).

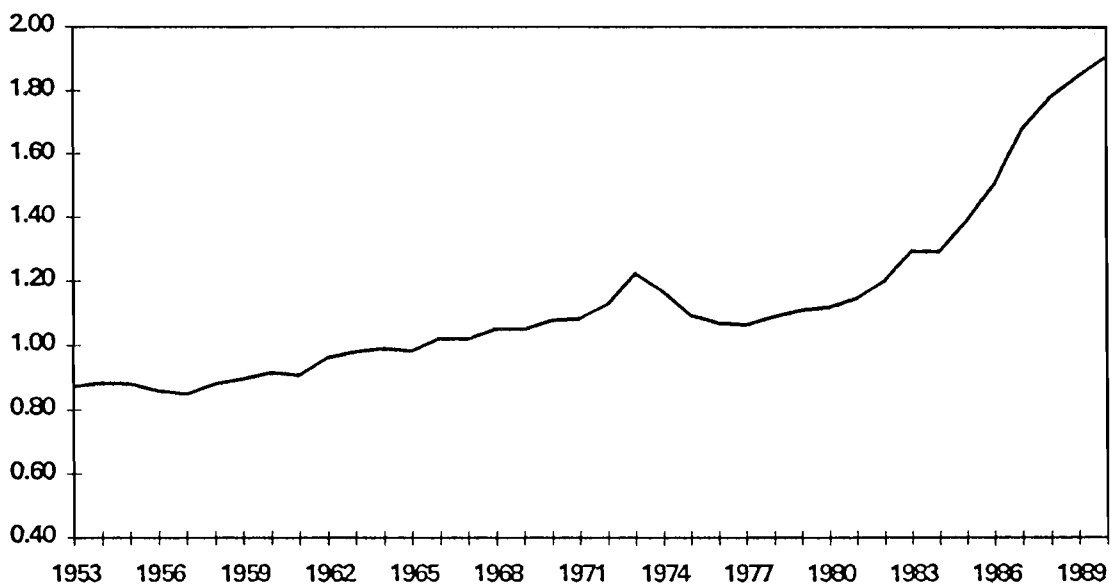
⁸ A brief discussion of bank lending practices both before and after regulation is given by Barton (1989) (Chief Credit Controller, ANZ Bank).

⁹ Econometric evidence that banks were required to ration credit before deregulation is presented in Blundell-Wignall and Gizycki (1992). They estimate a disequilibrium model of the supply and

meant that competition between banks was subdued. With deposit rates often below equilibrium rates, banks could not compete for funds. There was also little incentive to develop innovative financial products. In addition, as part of the rationing mechanism, banks typically required that borrowers have a long and stable deposit history with the bank before a loan would be extended. This limited the mobility of bank customers and made competition less attractive.

As discussed above, the controls on banks led to the growth of non-bank financial institutions. Many of these institutions were in fact established by the banks themselves. The existence of these non-bank intermediaries partially nullified the adverse resource allocation effects of the controls on banks. They could not, however, completely offset the effects of regulation. This can be seen in the ratio of total assets of financial institutions¹⁰ to GDP, which is shown in Graph 2.

Graph 2: Ratio of Financial Institutions' Assets to GDP



demand for business credit and show that, at the then prevailing interest rates, the demand for credit considerably exceeded the available supply; that is, there was disequilibrium credit rationing. They find little evidence of equilibrium credit rationing in the period since deregulation.

¹⁰ Financial assets include the assets of banks (with the exception of the Reserve Bank of Australia), non-bank financial corporations, life offices and superannuation funds and other financial institutions such as cash management trusts and friendly societies.

Numerous authors¹¹ have found there is, in general, a positive relationship between income per-capita and the ratio of financial assets to GDP. In line with this finding, Graph 2 shows that there has been an upward trend in the ratio of the total assets of financial institutions to GDP in Australia over the last 40 years. However, this upward trend was interrupted in 1973, with the ratio actually falling over the following 4 years. The 1973 level was only reached again in 1982. In part, the decline in the ratio after 1973 reflects the high level of the ratio in that year. The early 1970s were characterised by favourable movements in the terms of trade that caused a strong increase in activity and increased demand for finance. However, the fact that it took ten years for the ratio of financial institutions' assets to GDP to again reach its 1973 level also reflects the financial repression induced by the controls on the banking sector. The removal of these controls has caused the ratio to increase at a much faster rate than previously was the case. Between 1983 and 1990 the ratio increased from 1.3 to 1.9. This suggests that while institutions were able to develop under the regulations to partially nullify the effects of the regulations on the extent of financial intermediation, these institutions did not provide a complete substitute.

While the ceilings on both housing loans and business loans had undesirable effects, the business loan restrictions are likely to have been considerably more harmful in terms of slowing the rate of economic growth. Small businesses have little ability to access external finance other than through intermediated credit. Because of the costs involved and the information asymmetries, it is difficult for small firms to raise funds on equity markets¹². For many small firms the only alternative to intermediated external finance is retained earnings. While the level of desired investment is a function of many factors, the rationing of credit to small business must have limited actual investment by small businesses.

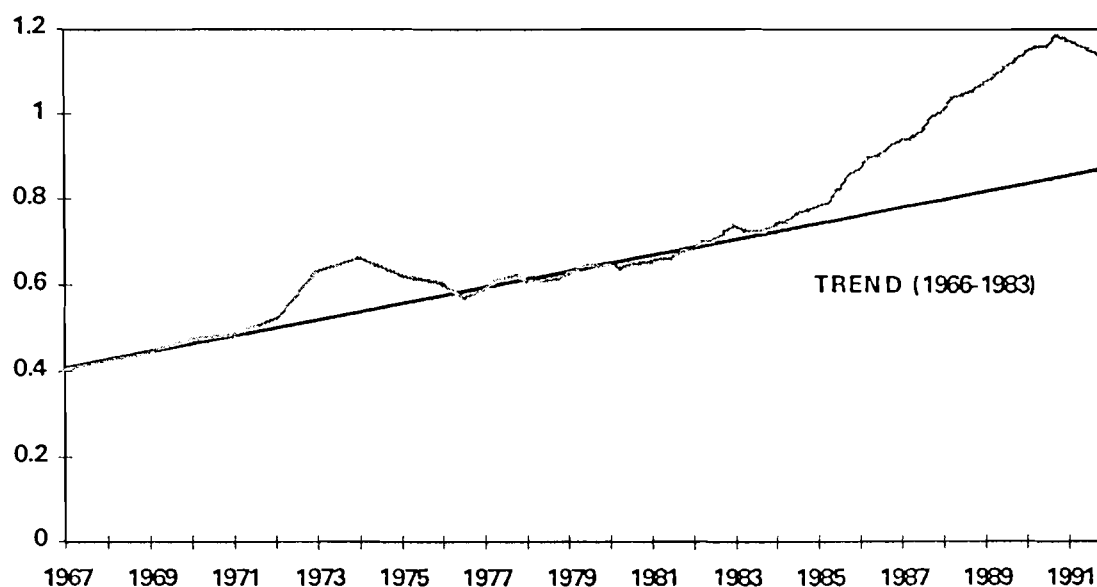
¹¹ For a comprehensive review see Goldsmith (1985).

¹² When a firm attempts to issue equity, outside investors are not sure whether the firm is attempting to raise funds for legitimate and profitable investment or attempting to pass-off overvalued assets. This uncertainty implies that equity must be issued at a discount. The information problems may be so severe that they prohibit equity raisings. These problems are likely to be greater for small firms that have no reputation to help overcome the information problems.

According to the discussion in Section 3.1, the lifting of interest rate ceilings should have had two effects. First, it should have increased the volume of intermediated lending. Second, it should have changed the structure of lending so that a greater proportion of riskier projects gets financed.

Graph 3 shows the ratio of credit to nominal private final demand between 1967 and 1992. The graph shows that in 1966 this ratio stood at 0.4 but by 1992 it had increased to over 1.1. The increase in the ratio has, however, not been at a steady rate. Prior to 1984 the ratio had been increasing by slightly less than 0.02 per year. The only major exception to this was in the early 1970s when, as the result of a mining investment boom, the ratio was significantly above trend. From 1983 the growth in the ratio of credit to private final demand accelerated, averaging approximately 0.06 per year over the next 8 years. Much of this increase can be attributed to the effects of liberalisation. It also suggests that while the growth of non-bank financial institutions in the 1970s may have been able to supply funds to some of the banks' credit rationed customers, the regulations still limited the amount of intermediated credit.

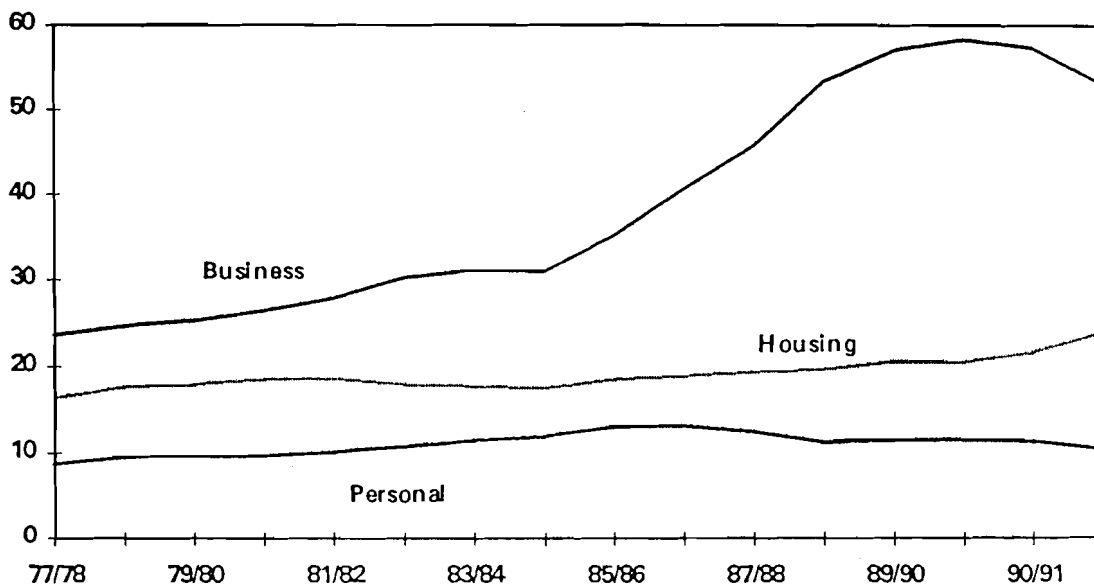
Graph 3: Ratio of Credit to Private Final Demand



Given that financial liberalisation allowed a significant increase in the growth rate of credit, what do we know about the allocation of that increased credit amongst different sectors of the economy? Graph 4 provides some information on this point. It shows the credit extended to various borrower classes as a share of GDP from

1977/78 to 1991/92. The graph shows prior to 1983/84 the rates of growth in the ratios of personal lending, housing lending and business lending to GDP were all similar and did not vary greatly through time. In 1984/85 this pattern began to change. The ratio of housing credit to GDP increases at a slightly faster rate than previously was the case while the ratio of business credit to GDP increases at a much faster rate. In 1983/84 the ratio of business credit to GDP equalled 0.31 but by 1990/91 it had increased to 0.57 per cent. In contrast, the ratio of personal credit to GDP declined after deregulation. This in part reflects classification error. Due to rationing induced by the regulations, small businesses may have substituted "personal credit" for "business credit". In the deregulated environment the need to do this was removed. The graph suggests that the regulation of financial intermediaries placed considerable constraints on the ability of business to borrow.

Graph 4: Credit by Sector
(per cent to GDP)

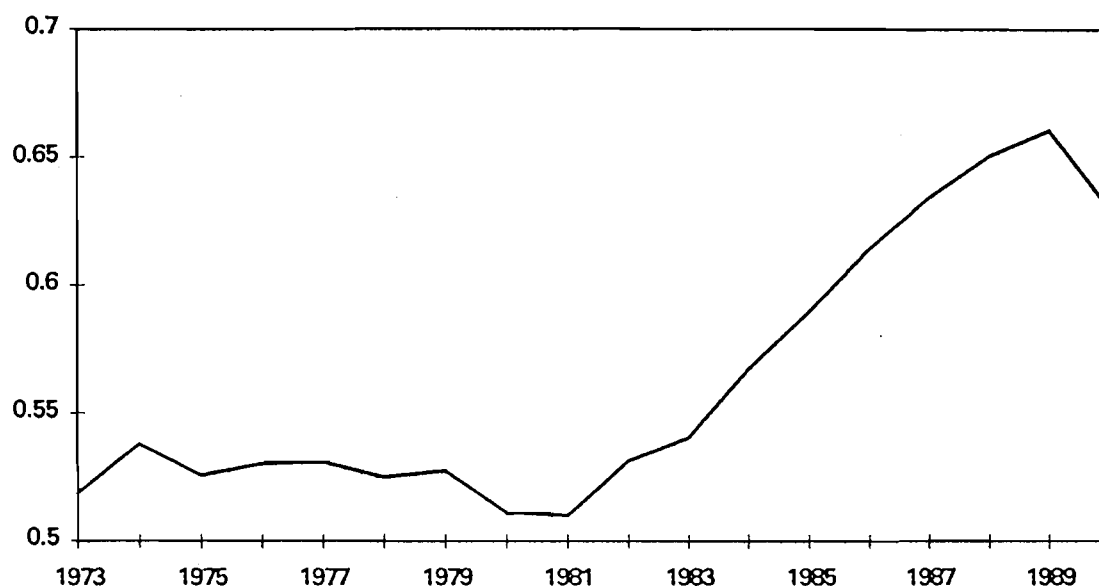


The increased willingness and ability of the banks to lend to business can also be seen in company balance sheets. Graph 5 shows the weighted average ratio of debt to the book value of assets for a stable sample of 110 large Australian companies over the period from 1973 to 1990¹³. The share of debt in company balance sheets

¹³ For further details on changes in the financial structure of Australian firms see Lowe and Shuetrim (1992)

remained relatively constant at a little over 50 per cent until the early 1980s. In 1980 the ratio stood at 0.52 but by 1989 it had increased to 0.66. The increase in corporate borrowing facilitated much faster growth in company balance sheets in the 1980s than had occurred in the 1970s. Over the 7 years to 1990 the average real growth rate in the aggregate size of the balance sheets of the 110 companies was nine per cent per annum. This compares with the an average real growth rate of 1.7 per cent per annum over the 10 years to 1983.

Graph 5: Ratio of Debt to Total Assets

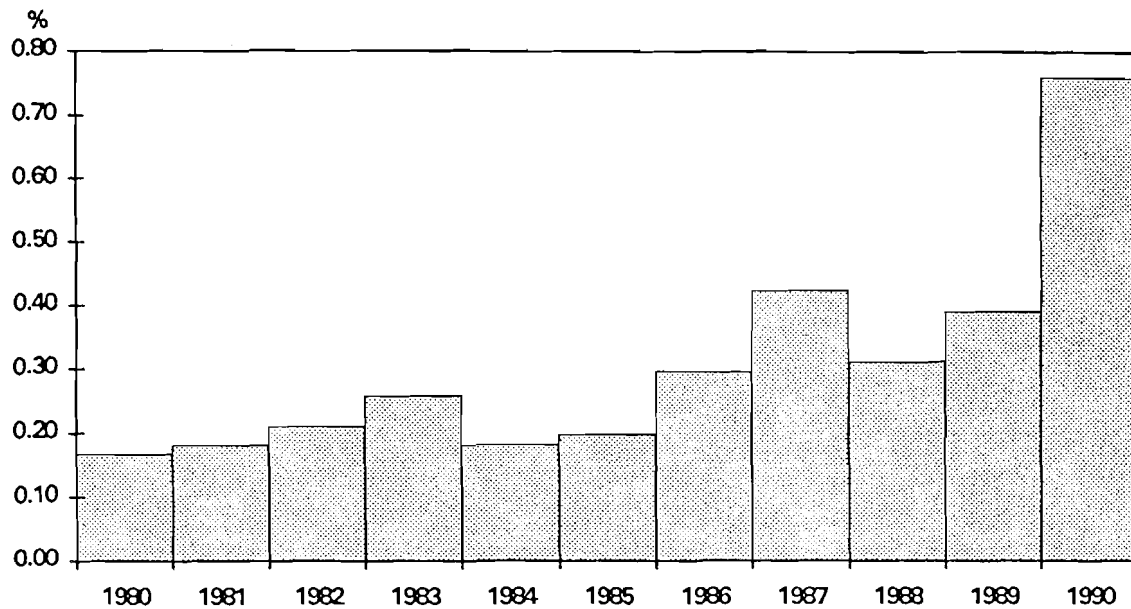


The second implication of deregulation is an increase in the proportion of risky loans made by banks. Provided that a bank is able to satisfactorily screen its customers, it is able to charge an interest rate sufficiently high on risky loans to earn a risk-adjusted rate of return commensurate with the rate of return on less risky lending. While data on the ex-ante risk characteristics of new bank loans is unavailable, some data on the ex-post bad debts expenses incurred by banks is available since 1980. Graph 6 shows the bad debt expenses of major banks as a percentage of their total assets¹⁴. Two points are made by this graph. First, the banks' bad debt expenses as a share of their total assets is counter-cyclical; the recessions in 1983 and 1990 both caused an increase in the bad debts ratio. This is hardly unexpected, as economic contractions cause an increase in business failures

¹⁴ This graph is from Twrdy (1992).

and loan defaults. The second point is that, abstracting from the business cycle, there has been, over the second half of the 1980s, an increase in the share of bad loans. In the six years to 1985, the bad debts expense as a share of total assets averaged less than 0.2 per cent. Over the five years to 1990 this average was over 0.4 per cent. This suggests that indeed, deregulation has led to banks financing more risky projects than was previously the case.

Graph 6: Major Banks' Bad Debts Expenses
(% of assets)



Another implication of financial liberalisation is an increase in competition¹⁵. This should be reflected in lower spreads between deposit and lending rates and an increase in the range of financial products available from intermediaries. Both of these outcomes appear to have occurred in Australia. Harper (1991) argues that following deregulation "*banks developed a veritable cornucopia of new financial products and services*" (page 69). These included a wider range of borrowing options and repayment plans, an increased availability of risk-management tools and a technology driven increase in the range of retail services. With respect to bank

¹⁵ Fahrer and Rohling (1992) formally test propositions concerning the degree of competition in the market for housing finance in the deregulated period. They find that it is possible to reject the hypothesis of perfect competition and perfect collusion. They cannot reject the hypothesis that the industry behaves as a Cournot oligopoly. They also construct a Herfindahl index which suggests that concentration in the housing loan market declined following deregulation.

margins, the Reserve Bank of Australia (1992(a)) argues that the spread between the average lending rate and the average deposit rate has narrowed over the 1980s. The relaxation of the controls on entry also served to increase competition. The number of banking groups operating in Australia increased from 15 in 1983 to 34 in 1988 while the number of merchant banks increased from 48 to 111 over the same period (see Macfarlane (1991)).

The theory discussed earlier suggested that lower spreads, an increased variety of products, an increased capacity to lend, and the setting of loan rates on the basis of risk should lead to a substantial improvement in the allocation of resources. However, the theory also suggested that the ability of the banks to screen projects effectively is a crucial element in capturing the gains from a more developed financial sector. If banks under-invest in their screening and monitoring technologies some of the gains from liberalisation may be wasted. Such under-investment probably took place in Australia in the 1980s. This is reflected in the Reserve Bank of Australia's 1992 Annual Report (1992(b)) that states "*Recent experience underlines the importance of the banks' possessing systems to review and grade the quality of all assets on their books,.... The banks themselves have recognised the value of such systems and are improving their practices in this area*" (page 28).

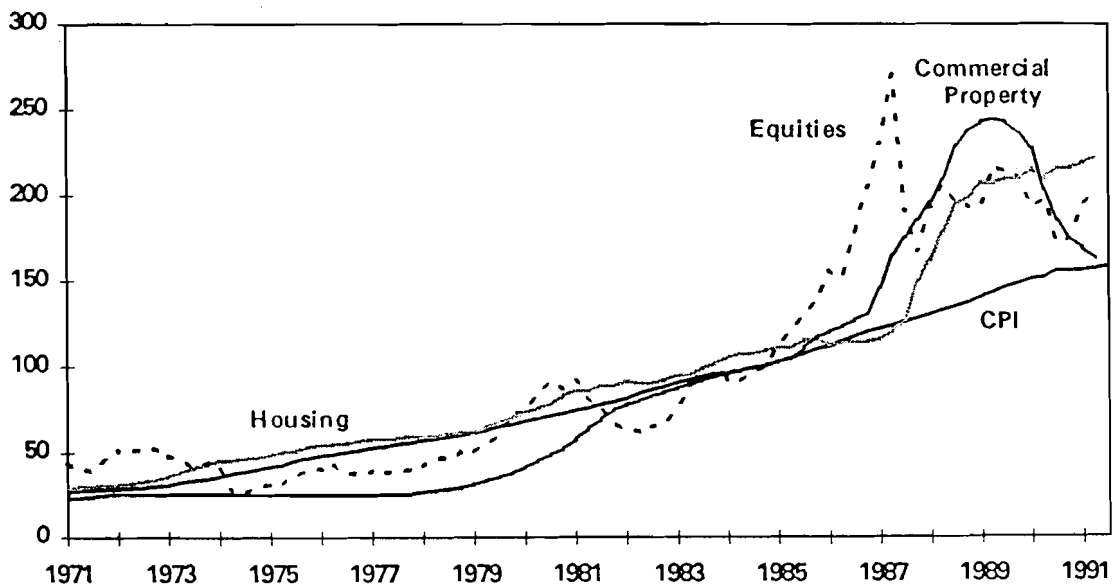
Similar sentiments have been expressed by private bankers¹⁶. Financial deregulation, coupled with the entry of new banks, led to competition for new business. Banks devoted considerable energy to building their balance sheets and increasing their market share. Often this was on the basis of compromised lending standards and inadequate monitoring of existing loans¹⁷.

¹⁶ See Barton (1989) and Ferdinands (1989).

¹⁷ The relaxation of credit standards is generally seen as a mistake by the banks. An alternative view is that the relaxation of credit standards represented optimal behaviour by each bank in its race for market share. By relaxing credit standards, a bank was able to attract new customers. The existence of switching costs means that in future periods, it would have some market power over these new customers. Thus, while in some cases static considerations made certain loans unprofitable, ex-ante dynamic considerations made the establishment of a relationship with a borrower profitable. The willingness of the banks to undertake these risky loans may have been encouraged by a perceived implicit deposit guarantee from the central bank. Even if this interpretation is correct, the lower credit standards had a social cost in that they allowed investment projects to be undertaken which had low social returns.

In Australia, as in a number of other countries, the second half of the 1980s was characterised by a rapid increase in real asset prices. Graph 7 shows the Consumer Price Index (CPI), an index of commercial property prices, an index of housing prices and the share price index. In the second half of the 1980s each of the asset price indices increased faster than the CPI. This increase in real asset prices reflected a number of factors including financial liberalisation. If financial liberalisation does lead to real productivity improvements in the economy then it should be reflected in higher real asset prices. Problems, however, arise when both financial intermediaries and borrowers extrapolate past asset price increases into continuing asset price increases. Lending and borrowing decisions become based on expected capital gains which at some point cannot be realised. The boom and bust cycle in the commercial property market is an example of this process. Poor screening by some financial intermediaries led to the funding of projects that were based on unrealistic continuing increases in property prices. The result of such activity is substantial investment in low yielding assets. When this occurs on a wide enough scale, it harms not only the borrowers and the banks' shareholders, but it reduces the growth rate in the level of national income.

Graph 7: CPI and Nominal Asset Price Indices
(1984/85=100)



It is widely recognised that the combination of financial liberalisation, a drive for market share, real asset price increases and poor screening and monitoring by financial intermediaries wasted some of the gains of financial liberalisation.

Intermediaries have recently tightened credit standards and have developed a greater appreciation of the need to devote significant resources to credit assessment and monitoring of loans. These improvements in the screening technology should leave Australia well placed to reap further rewards from the previous liberalisation of its financial markets.

While the focus of the above discussion has been on resource allocation, no discussion of the effects of financial liberalisation is complete without some consideration of its implications for monetary policy. In a deregulated environment, monetary policy no longer operates through direct quantity controls. Instead, it works by inducing wealth and intertemporal substitution effects. There is much ongoing research on how monetary policy can best be formed in such an environment¹⁸. To address the full range of issues is beyond the scope of this paper. Instead, to conclude this section, I touch briefly on just one issue. In the spirit of the above discussion of the implications of information asymmetries, I examine some of the implications for monetary policy of the interaction between agency costs and the business cycle.

The liberalisation of Australian financial markets made possible the large increase in business debt discussed above. This increase in debt is likely to have altered the dynamics of the business cycle and the impact of monetary policy on the economy. In the 1982-83 recession corporate debt-asset ratios were relatively low. As the economy began to recover, the liberalisation of financial markets meant that firms were both willing and able to expand their balance sheets through loans from financial intermediaries.

As the economy entered the current recession, debt-asset ratios were at historical highs and interest cover ratios were at historical lows. The interaction of the recession and the highly-leveraged balance sheets meant that firm net worth was relatively low and bankruptcy risk was relatively high. In Section 3.5 it was suggested that the outcome of such a situation would be a reduced incentive for management to undertake risky investment and a higher cost of funds to those firms wishing to borrow. An implication of this is that a setting of monetary policy that previously could have engineered a recovery in activity may now be unable to do so.

¹⁸ See Macfarlane (1991) and the papers in Blundell-Wignall (1992).

A period of balance sheet "reconstruction" may be required before a strongly based recovery is possible.

The increased riskiness of loans to business in an economic downturn is reflected in a widening of the spread between loan rates and the banks' cost of funds. This introduces a difficult problem for monetary policy particularly during recessions that are the result of previously tight monetary policy. As nominal money market interest rates are eased through monetary policy, banks' loan rates may not fall to the same extent, due to the increased risk premium associated with the recession. To reduce bank loan rates to a particular level requires an easier monetary policy than would be the case if there were no risk premium. As the economy recovers, the risk premium narrows and with no change in monetary policy loan rates fall. This adds further stimulus to the recovery.

The basic problem is that the risk premium is counter-cyclical¹⁹. When the economy is in recession the risk premium is high and when the economy is growing strongly the premium is low. Thus, even if monetary policy is unchanged the loan rate will vary and it will vary in a way that will amplify the cycle. This amplification is likely to be greater the more highly geared are corporate balance sheets and the lower is the capital base of the banks. The counter-cyclical risk premium is also likely to increase the persistence of shocks to the economy. A positive shock that improves corporate and bank balance sheets reduces agency costs and this sustains the boom through lower loan rates. This increased persistence and amplification of the business cycle caused by counter-cyclical agency costs complicates the setting of monetary policy,

5. SUMMARY AND CONCLUSIONS

In order to sustain steady-state growth, an economy must be able to continually improve its technology, to increase its stock of human capital and to accumulate production know-how. To use the terminology employed in this paper, the economy must be able to continually accumulate knowledge. Much of the new endogenous growth literature highlights the fact that this accumulation does not occur by

¹⁹ Blundell-Wignall and Gizycki (1992) discuss the evidence on this issue for Australia.

accident. It is the result of incentives that face individuals. This literature also highlights the fact that, in general, these incentives will not lead to the optimal accumulation of knowledge.

Knowledge accumulation does not take place independently of the financial system. The activities that lead to this accumulation are risky and often require external finance. The availability of this finance, and the conditions under which it is extended, depend upon the incentives of the borrower and of the financial intermediary. These incentives are a function of a variety of factors including the extent of regulation of intermediaries, the legal system, the capital structure of intermediaries, the riskiness of projects and the ability of intermediaries to screen and monitor loans. Just as private incentives do not necessarily lead to the optimal accumulation of knowledge, the incentives that operate in financial markets do not necessarily lead to the optimal allocation of a country's savings.

The task of policy-makers is to design an institutional framework in which the financial system ensures that savings are allocated to projects that maximise social welfare. Such a framework must be based on a stable legal system and widely accepted accounting and disclosure rules. Financial intermediaries must also have the independence and skills to evaluate projects. In the early stages of the development of a financial system these skills may be under-developed and intermediaries may have insufficient capital. This can lead to poor project selection. If this is the case, there is a potential role for government in determining the allocation of savings. However, such a role is only valid if the government has a better screening technology than the developing financial intermediaries and if the incentives which face government are not distorted by political or other considerations.

The Australian experience demonstrates that as the financial system develops, and the economy becomes increasingly integrated in the world economy, the ability to effectively regulate the system through non-price mechanisms declines. It also suggests that regulation distorts the allocation of resources as financial intermediaries are forced to ration credit. When credit is rationed intermediaries have an incentive to lend only for safe projects. If the activities that lead to accumulation of knowledge are relatively risky, the misallocation of savings by financial intermediaries not only has static efficiency costs but it also slows the growth rate of the economy.

Finally, experience also suggests that financial liberalisation is not without its dangers. If the banking system ineffectively screens projects, a poor allocation of funds will result. In addition, individuals and firms private incentives to acquire debt may lead to debt levels that are greater than are socially optimal. As a result, the economy becomes more sensitive to shocks and this increases the difficulty of operating monetary policy. Notwithstanding these dangers, the liberalisation of Australian financial markets has improved resource allocation and made possible a faster rate of economic growth than would have been possible had the regulated system continued.

REFERENCES

- Australian Financial System Inquiry (Campbell) (1981)**, *Final Report*, Australian Government Publishing Service, Canberra.
- Australian Financial System Review Group (Martin) (1984)**, *Report*, Australian Government Publishing Service, Canberra.
- Barton, B (1989)**, "Negative Pledge Lending - A Banker's Perspective", paper presented at Australian Investment Conferences Conference on *Credit Risk Management for Banks and Financial Institutions*, Sydney, 4-5 September 1989.
- Bencivenga, V and B Smith (1991)**, "Financial Intermediation and Economic Growth", *Review of Economic Studies*, 58:195-209.
- Bernanke, B and M Gertler (1990)**, "Financial Fragility and Economic Performance", *Quarterly Journal of Economics*, 105:87-114.
- Blundell-Wignall, A (ed.) (1992)**, *Inflation, Disinflation and Monetary Policy*, Reserve Bank of Australia, Sydney.
- Blundell-Wignall, A and F Browne (1991)**, "Macroeconomic Consequences of Financial Liberalisation: A Summary Report", *OECD Economics and Statistics Department Working Papers*, #98.
- Blundell-Wignall, A and M Gizycki (1992)**, "Credit Supply and Demand and the Australian Economy", Research Discussion Paper 9208, Reserve Bank of Australia.
- Collier, P and C Mayer (1989)**, "The Assessment: Financial Liberalization, Financial Systems, and Economic Growth", *Oxford Review of Economic Policy*, 5:1-12.
- DeLong, B (1991)**, "The Great Universal Banking Experiment", *The International Economy*, V:68-79.
- Diamond, D, (1984)**, "Financial Intermediation and Delegated Monitoring", *Review of Economic Studies* 51:393-414.

Fahrer, J and T Rohling (1992), "Some Tests of Competition in the Australian Housing Loan Market", Research Discussion Paper 9202, Reserve Bank of Australia.

Ferdinands, D (1989), "Managing and Monitoring of Loans", paper presented at Australian Investment Conferences Conference on *Credit Risk Management for Banks and Financial Institutions*, Sydney, 4-5 September 1989.

Goldsmith, R (1969), *Financial Structure and Development*, Yale University Press, New Haven.

Goldsmith, R (1985), *Comparative National Balance Sheets: A Study of Twenty Countries 1688-1978*, The University of Chicago Press, Chicago.

Greenwald, B and J Stiglitz (1989), "Financial Market Imperfections and Productivity Growth", National Bureau of Economic Research Working Paper, #2945.

Greenwood, J and B Jovanovic (1990), "Financial Development, Growth and the Distribution of Income", *Journal of Political Economy*, 89:1076-1107.

Grenville, S (1991), "The Evolution of Financial Deregulation", in Ian Macfarlane (ed), *The Deregulation of Financial Intermediaries*, Reserve Bank of Australia, Sydney.

Harper, I (1991), "Bank Deregulation in Australia: Choice and Diversity, Gainers and Losers", in Ian Macfarlane (ed), *The Deregulation of Financial Intermediaries*, Reserve Bank of Australia, Sydney.

King, R and R Levine (1992), "Financial Intermediation and Economic Development", manuscript.

Lee, J (1991), "Financial Sector and Economic Development: A Survey", *Economics and Development Centre (Asian Development Bank) Report Series #55*.

- Levine, R (1991), "Stock Markets, Growth and Tax Policy", *Journal of Finance*, XLVI:1445-1465.
- Lowe, P and G Shuetrim (1992), "The Evolution of Corporate Financial Structure: 1973-1990", Research Discussion Paper 9216, Reserve Bank of Australia.
- Lucas, R (1988), "On the Mechanics of Economic Development", *Journal of Monetary Economics*, 22:3-42.
- Macfarlane, I (1991), "The Lessons for Monetary Policy", in Ian Macfarlane (ed), *The Deregulation of Financial Intermediaries*, Reserve Bank of Australia, Sydney.
- McKinnon, R (1973), *Money and Capital in Economic Development*, The Brookings Institution, Washington, DC.
- McKinnon, R (1986), "Financial Liberalization and Economic Development" in H-S Cheng (ed), *Financial Policy and Reform in Pacific Basin Countries*, Lexington Books, Lexington, MA.
- Parliament of the Commonwealth of Australia (1991), *A Pocket Full of Change*, Australian Government Publishing Service, Canberra.
- Reserve Bank of Australia (1992(a)), "Bank Interest Rate Margins", *Reserve Bank of Australia Bulletin*, May:1-6.
- Reserve Bank of Australia (1992(b)), *Report and Financial Statements*, 30 June 1992.
- Romer, P (1989), "Endogenous Technological Change", *Journal of Political Economy*, 98:71-102.
- Shaw, E (1973), *Financial Deepening in Economic Development*, Oxford University Press, New York.
- Solow, R (1956), "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics*, 70:65-94.

Solow, R (1959), "Technical Change and the Aggregate Production Function", *Review of Economics and Statistics*, 39:312-320.

Stiglitz, J (1989), "Financial Markets and Development", *Oxford Review of Economic Policy*, 5:55-68.

Stiglitz, J and A Weiss (1981), "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, 71:393-410.

Twrdy, K (1992), "Has Financial Deregulation Improved the Efficiency and Competitiveness of the Banking Sector", Thesis submitted at Macquarie University, 1992.

Valentine, T (1991), "What the Campbell Committee Expected", in Ian Macfarlane (ed), *The Deregulation of Financial Intermediaries*, Reserve Bank of Australia, Sydney.

World Bank (1989), "World Development Report 1989: Financial Systems and Development", Oxford University Press, New York.