Financial Development and Growth

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FINANCIAL INTERMEDIATION PLAYS AN IMPORTANT ROLE IN ECONOMIC ACTIVITY. POOR PERFORMANCE BY THE FINANCIAL SECTOR CAN BE VERY COSTLY FOR SOCIETY. FOR EXAMPLE, BANKING CRISES IN VARIOUS COUNTRIES IN THE 1970S AND 1980S, PROVOKED BY DEREGULATION OF BANKS, SOMETIMES EXACTED A HIGH COST, IN MANY CASES ESTIMATED TO BE GREATER THAN 10 PERCENT OF GROSS DOMESTIC PRODUCT (GDP).[1] ON THE OTHER HAND, A HEALTHY BANKING SECTOR HAS BEEN ASSUMED TO CONTRIBUTE TO THE GROWTH OF THE ECONOMY. ECONOMISTS SINCE BAGEHOT ([1873] 1991) AND SCHUMPETER ([1911] 1936) HAVE THOUGHT SO, AND UNTIL RECENTLY ECONOMISTS DID NOT SERIOUSLY QUESTION THE LINKAGES BETWEEN THE FINANCIAL AND REAL SIDES OF THE ECONOMY. THIS PROPOSITION HAS BECOME FAR MORE CONTROVERSIAL THAN MIGHT BE EXPECTED, THOUGH, AND LATELY BOTH THEORETICAL AND EMPIRICAL WORK HAS BEEN REDIRECTED AT THIS ISSUE. THIS ARTICLE PROVIDES A CRITICAL SURVEY OF SOME IMPORTANT THEMES AND STUDIES IN THE LITERATURE OF FINANCIAL INTERMEDIATION AND GROWTH.[2]

In recent years with the renaissance of interest in growth theory by economists there has been a reappraisal of factors that matter for growth. Traditional growth theory says that as capital grows diminishing returns set in and long-term growth is determined by factors other than capital, such as technological progress, that are independent of policy intervention. Thus, growth theory at least as it applied to policy analysis was effectively dead in the water. But in the mid-1980s economists took a new look at the determinants of growth by broadening the notion of capital to include knowledge, technological progress, and the like. Under this definition diminishing returns can take a long time to materialize and growth is susceptible to many influences, including policy.[3]

The justification for this methodological shift was twofold (Barro and Sala-i-Martin 1995). First, as an empirical matter, traditional growth theories could not explain the variety of countries' long-term growth experiences. Second, since even small differences in growth rates upheld over generations will cause appreciable differences in living standards, finding policies that mattered became crucial.

Economists have examined various explanations for growth, including the role of financial intermedi-

aries. This emphasis has accompanied big strides in understanding financial intermediaries. Presumptions that financial intermediaries matter for real economic activity were contradicted by theoretical models showing that they are inessential to a benchmark world of no market frictions. Modern theories explicitly show how financial intermediaries overcome market frictions and lower the cost to society of transferring information or wealth between households and firms. Many of the arguments boil down to the idea that in one way or another financial intermediaries give individuals or firms access to economies of scale that they would not have otherwise. Thus, intermediaries enhance economic efficiency and ultimately growth because they help allocate capital to its best possible use. How well financial intermediaries perform their functions and enhance efficiency helps explain differences across countries' economic performance.

After discussing frictions that give financial intermediaries an important efficiency-enhancing role (and frictions such as government intervention that may constrain financial efficiency), this article shows how these roles can be integrated into modern theories on growth. Most importantly, this article provides an illustrative model that is meant to capture current thinking about the ways in which financial intermediaries affect growth. This simple model shows how households, firms, and financial intermediaries interact to determine equilibrium growth rates and various interest rates and rate spreads. It is used to discuss the effects of financially repressive policies such as reserve requirements, interest rate controls, directed credit flows, and entry limitations such as barriers to interstate banking, conventionally termed financial repression (McKinnon 1973).

Finally, the discussion briefly surveys some of the recent empirical literature on growth and financial intermediation. This literature has shown that different measures of financial development are positively correlated with economic growth rates. Although there have been some initial attempts to quantify the effect of financial repression, more work needs to be accomplished before precise policy recommendations can be made. Also, some puzzles remain. For instance, it has been shown that the effect of financial intermediation on growth becomes weaker as countries become more developed, perhaps because of problems with measuring financial development or because financial intermediaries actually have larger effects in less-developed countries than in more-developed ones. Other empirical work suggests that financial intermediaries differ across countries in their cost efficiency and the degree of competition, all of which might affect their roles in economic efficiency and growth.

It may be noteworthy to remark that for several reasons this article uses the terms financial intermediation and banking interchangeably. As a practical matter financial development is usually measured by banking variables because of a lack of alternative data. In addition, banks are usually the most important form of intermediation in both less-developed and developed countries. Finally, as stressed by Stiglitz (1993), the focus on banks emphasizes primary capital markets in which new capital is raised as opposed to secondary capital markets on which claims are traded.[4] Primary capital markets are directly linked to economic development, and most primary capital functions in developing countries are performed by banks.

Efficiency Arguments for Financial Intermediation

In a world of perfect competition, perfect information, and no market frictions, there would be no role for financial intermediaries. Individuals could take their savings and invest them in projects and firms with payoffs that are optimal given individuals' time horizons and preferences. Even with uncertainty, financial intermediaries are unnecessary. Financial markets could be created that would provide funds for firms at one point in time in return for repayment at another. These markets could be specialized further to trade contracts that exchange funds subject to all imaginable types of contingencies. Such markets would provide efficient diversification of risks. In this benchmark world the efficient markets hypothesis, where prices reflect all available information (Malkiel 1992), holds as well as the famous Miller-Modigliani theorem (1961) that says real economic decisions are independent of the methods of financing, thus leaving only a passive role for the financial sector, as shown in Fama (1980).

Presence of Market Frictions. This perfect world is built upon unrealistic assumptions, of course. The key to explaining why intermediaries exist is to introduce imperfections or frictions into this world. Doing so means relaxing the assumptions of perfect information, perfect

1. *See Goldstein and Turner (1996) for a discussion of these banking crises.*
2. *This article has benefited from many excellent surveys that emphasize different aspects of the literature. In particular, see Galetovic (1994), Pagano (1993), and Levine (1997) as well as Allen and Gale (1994), Arestis and Demetriades (1997), Bhattacharya and Thakor (1992), Demetriades (1997), Gertler (1988), and Greenwood and Smith (1997).*
3. *This is the so-called endogenous growth theory, which is developed by Romer (1986) and Lucas (1988).*
4. *Of course, abstracting from securities markets (such as the important role of initial public offerings for the success of Silicon Valley start-ups) simplifies things greatly. See Boot and Thakor (1997), Greenwood and Smith (1997), Levine (1997), and Stiglitz (1996) for some current theoretical arguments on the relationship of financial intermediaries and financial markets.*

competition, or frictionless markets and showing how intermediaries can improve on the outcome. When conditions are less than perfect, economic exchange is costly, and if it is sufficiently costly it may not occur at all. Financial intermediaries make these exchanges affordable, thus offsetting the underlying market frictions.

Though no single general model explains why banks exist, the fundamental frictions that give rise to financial intermediaries can be classified into two categories, as either a technological friction or an incentive friction, discussed in more detail below. Technological frictions prevent individuals from having access to economies of scale. In other words, individuals are prevented from activities that would be cheaper per person if more people participated in the activity. Incentive frictions occur because information is costly and individuals are differentially informed and act in their self-interest, and contracts are incomplete because not all contingencies can be spelled out, not every action is accountable, and because the specific legal environment matters.

In a world of perfect competition, perfect information, and no market frictions, there would be no role for financial intermediaries.

Reducing Technological Frictions. The role of financial intermediaries in overcoming technological frictions was introduced by Gurley and Shaw (1960). In their analysis financial intermediaries transform primary securities issued by firms into indirect financial securities desired by final investors. Financial intermediaries transform bonds and stocks issued by firms into demand or savings deposits for households. They help transform savings into investments by repackaging wealth and transferring capital and information.

One way in which intermediaries help individual savers is by giving them access to large investment projects via the so-called funds-pooling mechanism. Individual investors might be too small to be able to afford securities issued by firms, especially if these cannot be divided into small affordable units. By pooling together the funds of many small savers, financial intermediaries overcome this indivisibility of firms' securities. Because it is less costly for financial intermediaries to transform securities, gather funds and pool them, and invest those funds on behalf of savers than it is for individuals to hold securities issued by firms directly, financial economies of scale arise. Thus, financial intermediaries improve the efficiency of the economy by letting savers invest in large projects and making more of these projects possible.

Another important way in which intermediaries benefit small savers is by making riskier investments available to them via what is called the risk-pooling mechanism. Although riskier projects tend to yield higher returns than low-risk projects, individuals might not want to take on much risk when their available funds are too small to effectively insure themselves. Intermediaries can provide the risk-reducing benefits of diversification by holding a portfolio of loans to many entrepreneurs of all different types of risk and giving depositors less risky claims against it. The intermediary can offer this service at lower cost than savers can manage individually. Savers therefore have access to economies of scale not otherwise available to them.

An intermediary can also help investors by providing access to long-term projects through liquidity management. Some projects require long-run commitment of capital because they can take a long time before yielding results, but savers have shorter and uncertain time horizons. They do not want their funds tied up and, as a precaution in case of unexpected demands, prefer to have investments that are liquid. While long-term projects often yield higher returns, they can be costly because they can be illiquid, or hard to turn into quick funds. Intermediaries can provide liquidity for these investments by pooling savers with different liquidity needs, in essence diversifying across liquidity risks and thus giving savers access to the higher returns.[5] In other words, pooling provides financial economies of scale by reducing the cost of illiquid investments; savers gain by the lower costs, and efficiency is enhanced because more investment will occur in long-term projects.

A final way in which an intermediary can improve investors' access to worthwhile investments is by means of the so-called screening mechanism. Savers by themselves usually have too little time and income to inform themselves about all good and bad investment opportunities. Doing so would require searching, collecting, and then processing information on firms, managers, economic conditions, and so on. Because of economies of scale, financial intermediaries can collect large amounts of information, provide expertise in evaluating, screening, and sorting prospects, and monitor firms' actions at a lower cost than individuals can. By economizing on information acquisition costs, financial intermediaries help capital move to its highest value, thus improving allocative efficiency (see Diamond 1984 and Boyd and Prescott 1986). They can provide information from not only intermediaries who hold savers' funds but also investment analysts, credit rating agencies, auditing firms, and other institutions.

In summary, scale economies imply intermediation that improves allocative efficiency, or the degree to which resources flow to the most productive investments. Without intermediation, individuals generally would not

have the means to finance a single firm or exploit scale economies in monitoring. Financial intermediaries provide individuals access to economies of scale by pooling their funds and creating small-denomination securities that allow households to hold diversified portfolios, invest in firms with economically efficient scales, and increase their asset liquidity. Without this pooling of capital from savers, many businesses would be constrained to economically inefficient scales and time horizons. Thus, financial intermediaries overcome frictions, improve resource allocation, and bring markets closer to the efficient-markets view of the world.[6]

Reducing Incentive Frictions. The foregoing arguments for financial intermediation are based on the assumption that there are no conflicts of interest in the behavior of savers and firms. However, it is not always in firms' best interest to reveal all, and investors typically have less-than-complete information about firms. With asymmetric information, conflicts of interest are possible. Thus, if financial contracts were to apply equally to different types of firms, *adverse selection* might occur in that only firms of lower quality would demand the contracts. Higher-quality firms would stay away from the contracts because they would not get terms that reflected their higher quality. There are also issues of *moral hazard* because it is not always in firms' best interest to behave honestly. For example, managers may not report whether they are dillydallying or whether the firm is pursuing risky or questionable strategies, nor do they always truthfully reveal how their projects turned out. Considerable resources are required for monitoring firms in order to ensure practices and decisions in savers' best interests. Financial intermediaries can help reduce problems associated with asymmetric information or moral hazard by offering financial contracts that are not available in markets and providing economies of scale in monitoring and control.

Markets sometimes fail to resolve incentive problems efficiently because, as noted above, for individuals the amount of time needed to monitor performance and control behavior is too costly. Individuals may rely on publicly available information transmitted though markets rather than gathering information themselves, and as a result fewer individuals may make loans. In addition, firms may hold back from borrowing because it would increase the likelihood of their being monitored by lenders. Reconciling differing incentives is costly, and when it is required, resources are diverted from investment projects themselves. Financial intermediaries perform an important role in mediating divergent incentives between lenders and borrowers that arise from imperfect information and incomplete contracts.

Information theories emphasize what is known as the monitoring and control role of banks. In the monitoring function intermediaries collect information to verify desirable behavior and compliance with covenants. They also use this information in their control function to improve performance under the contract terms by punishing undesirable behavior and collecting from borrowers who do not repay in full on time. Diamond (1984) shows that households delegate financial intermediaries as monitors to take an active role in firms' activities to get information and maintain discipline to avert incentive problems. He argues that there are economies of scale for monitoring and controlling firms. A single financial intermediary can perform these duties at least as effectively as many individual lenders and more cheaply because effort is not duplicated. Some information theories stress the role of commitment and emphasize the role of banks in offering financial contracts not available in competitive markets. Mayer (1988) observes that intermediaries make long-term relationships possible by devising contracts that ensure that firms fulfill their commitments.

To summarize, both asymmetric information and incompleteness of contracts create incentive frictions that potentially cause savers' and firms' behaviors to be incompatible. Financial intermediaries provide contracts and discipline that enhance the economy's ability to achieve efficient risk sharing.

Imperfect Efficiency

It has been argued that financial intermediaries improve economic efficiency by overcoming frictions, thereby giving households access to economies of scale that they could not attain by themselves. How well financial intermediaries perform this role affects economic performance. However, markets in which there are economies of scale do not always work well because by nature they tend to be imperfectly competitive. With economies of scale larger firms tend to be more efficient or have lower average costs than smaller firms, so there is a tendency for firms to grow large relative to the size of the market. Firms that achieve efficiencies ahead of their rivals will gain a competitive advantage they can exploit by continuing to stay ahead, growing ever larger until only a small number are left to dominate the market.

In this way scale economies also imply market power and noncompetitive pricing. Market power may also arise

5. Diamond and Dybvig (1983) show that individuals have different liquidity needs, but verifying them is prohibitively costly so that banks cannot write insurance contracts. Banks offer liquid deposits to savers and have the right mix of liquid and illiquid investments that provides complete insurance to savers.

6. Allen and Gale (1994) show that institutions that arise as a result of the presence of various frictions do not bring conditions completely back to a frictionless Miller-Modigliani world.

through specialization by financial intermediaries. For example, private or inside information can allow financial intermediaries to differentiate themselves from rivals. Knowing more than their competitors, innovative firms can adjust the quality of products or services or create new products and markets and temporarily gain some market-pricing power.

Markets with economies of scale and product differentiation may still work relatively efficiently. Baumol, Panzar, and Willig (1982) show, for example, that when barriers to entry are low, markets are contestable in the sense that the threat of potential competition will force existing firms to act competitively. However, entry into the financial services sector is made difficult by the costs of required investments in structures and equipment but perhaps more importantly by investments in obtaining proprietary information, developing or hiring expertise in monitoring and making loans, and establishing a good reputation (Vives 1991). Diamond's (1984) analysis suggests that new banks are implicitly discouraged from entering the market by the fact that larger banks can do a better job of diversifying risks than can smaller banks. Sussman and Zeira (1995) model another potential barrier in showing that banks have local economies of scale with advantages for monitoring the closer they are to their clients, advantages especially in making loans to smaller businesses. In addition, Petersen and Rajan (1995) argue that commitment models imply efficiency in markets with economies of scale but also that there is less competition because banks gain an information monopoly over firms to whom they have made prior loans, and they eventually exploit their positions.

Financial intermediaries enhance economic efficiency and ultimately growth because they help allocate capital to its best possible use.

Perhaps more importantly than economies of scale, legal constraints and government regulations affect the efficiency of financial intermediaries. Governments have historically and extensively intervened in the banking sector. One rationale for intervening is that markets may fail to work well due to the presence of frictions, and another is that intervention promotes financial stability by lowering the probability of bank failure. Historically, through legal restrictions on entry and allowing collusive activities, governments have tended to make banking markets less contestable and thus less competitive. For instance, the United States until recently has had restrictions on entry (interstate banking rules) and branching that made markets less contestable. Other highly developed and less-developed countries allow or have allowed collusion between banks. Bingham (1985) shows that, except for Italy, Switzerland, and the United Kingdom, industrial countries have regulated or allowed collusion that distorted deposit rates. Such governmental actions affect the efficiency of credit allocation. In some Latin American countries governmental controls on interest rates and credit allocation have been very severe, and economists since McKinnon (1973) and Shaw (1973) have worried about the costs of repressed financial sectors on growth and efficiency.[7]

Background to Modeling Growth and Financial Intermediation

The previous section explained that efficient financial intermediation helps channel resources toward activities with high rates of return. More financial resources go to profitable projects that are larger in scale, longer in maturity, and with riskier prospects than if intermediation were less efficient. Likewise, efficient intermediation means that investment costs less so that savings transformed into investment go further. Finally, efficiency also means that information is processed well, allowing good investment opportunities to be identified and then helping ensure that businesses act in ways that do not conflict with savers' interests.

Early Development of the Ideas. Some of these ideas are not new but have been put forth by classical economists to understand and compare the performance of various financial intermediation systems. The roles played by financial intermediaries and the services provided in enhancing efficiency have been used to explain the economic growth of some countries. One of the earliest to connect finance and growth was Bagehot, who argued that financial intermediation was critical for the rapid industrialization of England in the early nineteenth century: "Political economists say that capital sets towards the most profitable trades, and that it rapidly leaves the less profitable and non-paying trades. But in ordinary countries this is a slow process. . . . In England, however, . . . capital runs as surely and instantly where it is most wanted, and where there is most to be made of it" ([1873] 1991, 6). In other words, information flowed rapidly and was used to divert funds from poor-quality investments to high-quality investments, thus enhancing the overall efficiency of investment.

Bagehot also stressed the importance for growth and development of readily accessible pools of funds that are sufficiently large to allow risky and large-scale projects: "We have entirely lost the idea that any undertaking likely to pay, and seen to be likely, can perish for

want of money; yet no idea was more familiar to our ancestors, or is more common now in most countries. A citizen of Long in Queen Elizabeth's time . . . would have thought that it was no use inventing railways, . . . for you would not have been able to collect the capital with which to make them. At this moment, in colonies and all rude countries, there is no large sum of transferable money; there is no fund from which you can borrow, and out of which you can make immense works" ([1873] 1991, 20). Bagehot's argument, intriguingly, also implies that financial development may be necessary for inventions that lead to growth.

Schumpeter is more explicit on this point, writing that financial intermediaries promote growth by identifying and redirecting funds toward innovative projects. "The banker . . . stands between those who wish to form new combinations and the possessors of productive means. . . . He makes possible the carrying out of new combinations, authorizes people, in the name of society as it were, to form them" ([1911] 1936, 74). He continues, "The essential function of credit . . . consists in enabling the entrepreneur to withdraw the producers' goods which he needs from their previous employments, by exercising a demand for them, and thereby to force the economic system into new channels" ([1911] 1936, 106). Schumpeter also stresses that "the relation . . . between . . . credit creation by banks and innovation . . . is fundamental to the understanding of the capitalist engine" (1939, 111).

On the New Growth Theory. Modern theories of growth build on the ideas provided by classical economists like Adam Smith and Joseph Schumpeter, such as technological progress through specialization and innovation and the role of market power as an incentive for innovations.[8] In traditional growth models, capital was narrowly defined as physical capital only. Capital goods are inputs into production that are themselves produced goods or reproducible; other inputs such as land and labor are not capital by this definition. In these models, as the economy grows and capital accumulates, diminishing returns to capital inevitably set in so that further increases of output can be achieved only by ever-larger investments. As the stock of capital rises over time the returns to capital fall until investment is no longer profitable. Thus, investment-led sustained growth is not possible. Growth is determined by technology and demographics, both of which were assumed to be exogenous, or forces not determined in the economy but acting on the economy, although it was generally recognized that this was a simplifying assumption. In essence, growth was assumed rather than explained. Furthermore, these models were inadequate on empirical grounds, predicting global convergence of economies that is counter to the evidence from cross-country studies.

Modern endogenous growth models avoid the problems of earlier theory by broadening the definition of capital to include human capital, intangible capital such as knowledge, and other things that yield quality enhancements to inputs and output from within the system. The critical innovation is that for the expanded notion of capital there need not be diminishing returns (at least over long periods), although there may still be diminishing returns to individual capital inputs. Thus, as capital rises, returns will not fall to the point where investment is unprofitable, so investment continues and sustained growth is possible.

The endogenous growth literature has explored several forces that offset the propensity for diminishing returns to capital. Explanations that have gained attention recently include knowledge and allow technological progress to be endogenous. One explanation is that there are spillover effects to investments in capital, broadly defined, that prevent the returns to investments from falling (Romer 1986). Firms learn from the process of making investments. Workers' learning on the job creates knowledge that becomes publicly available and spills over to other firms. Thus, "learning by doing" increases the stock of knowledge and human capital, offsetting the tendency for diminishing returns. Another explanation is that imperfect competition in markets for innovative goods allows firms temporarily to earn above-normal profits, encouraging technological progress and sustained growth. Innovation shows up as increases in the quality of goods and inputs or as specialization. With the ability to differentiate their product, innovative firms achieve market power over their prices. The incentive to innovate is to gain market power in order to earn the above-normal profits until competitors catch up. The desire to get ahead and then stay ahead is self-reinforcing and leads to sustained growth. Simply put, it is the battle over market share and profits through constant innovation that propels economies forward.

Linking Financial Activity to Economic Growth. While innovation and knowledge creation are the forces behind capital accumulation and growth, financial intermediaries can also affect the process.[9] To the

7. See Espinosa and Hunter (1994) and Roubini and Sala-i-Martin (1992) for some recent views.

8. Schumpeter expresses this point succinctly in his statement that "without development there is no profit, without profit no development" ([1911] 1936, 154). While he was referring to economic development, this argument applies as well to financial development.

9. The role of venture capitalists in Silicon Valley is a good example of how innovation can lead to growth and financial intermediaries can facilitate innovation.

extent that innovation and knowledge creation are financed with external funds, growth will depend on the efficiency of the financial sector, which is directly related to the extent to which financial economies of scale have been realized and on how developed the sector is. Growth will also depend on how well financial intermediaries can increase the quality of aggregate investment by enhancing profitable opportunities, which is accomplished partly through the information role of intermediation, the monitoring and control functions discussed previously. But it also importantly depends on how well technological frictions are overcome. For instance, better risk diversification means that more funds can be shifted to long-term projects. However, even if few of the important activities for growth are externally financed, financial intermediaries can have an effect because they transform the quality of investments and also because the information side of the business also adds to the common stock of knowledge and human capital. Ultimately the spillover effects will lower the costs and raise the quality of investments. Finally, financial development is also driven by innovation, and financial innovation develops from the same incentives that drive technological innovation, namely, the possibility of temporary market power and above-normal returns. In other words, noncompetitive forces are central for innovation in the financial sector.[10]

Recent theoretical work on financial activity and growth emphasizes that the emergence of financial intermediation spurs higher growth. For instance, Greenwood and Jovanovic (1990) highlight financial intermediaries' risk-pooling and monitoring functions. By pooling savings for diversified investment projects and by monitoring the behavior of the borrowing firms, banks ensure higher expected rates of returns to promote growth. Saint-Paul (1992) considers similar portfolio diversification via the stock market. In both models financial intermediation costs are fixed or less than proportional to the volume of intermediated funds, and economic growth and financial development reinforce each other while raising welfare. Bencivenga and Smith (1991) follow Diamond and Dybvig (1983) to elaborate the liquidity management role of banks. Financial intermediaries reduce low-return investment due to premature liquidation and redirect funds into longer-term, high-yield projects, leading to faster growth. Levine (1991) incorporates both portfolio diversification and liquidity management aspects to show the role of financial intermediaries in pooling consumers' liquidity risks via the securities market, concluding that setting up a stock market is growth enhancing. Chen, Chiang, and Wang (1996) generalize Schumpeter's view to show that by allowing for a more sophisticated and specialized production process, financial intermediation results in more investment projects and spurs economic growth. Thus, despite very different channels through which the real and the financial sector interact, a consensus that betterment in financial markets is associated with faster real growth has developed.

A Simple Model

To understand how financial intermediation can be modeled in an endogenous growth framework, this study sketches a simple model. The model shows how decisions of households, firms, and financial intermediaries interact to determine growth rates and real interest rates. Making several simplifying assumptions allows focusing on critical components. For instance, capital is broadly defined as including physical and human capital, knowledge, quality, and so on. The model also does not deal with uncertainty and international capital markets, although these could easily be incorporated into it. Finally and possibly most critically, the model analyzes only long-run effects and not short-term and transition effects that also can be very important.

This highly simplified model is designed to show (1) when there is a positive relationship between financial development and economic growth and (2) how changes in tastes, technologies, and an array of financial and monetary policies affect the endogenous growth rate, the loan and deposit rates of interest, and the spread between the two rates. Results indicate that betterment in financial services either by improving the productivity of the real sector via a variety of channels or by reducing the cost of financial intermediation enables faster growth. A higher cost of financial intermediation causes the equilibrium growth rate to decrease, the deposit rate to fall, and the loan-deposit interest rate differential to widen. A financial innovation that increases the productivity of firms raises the growth rate and both interest rates but reduces the interest rate differential.

The model also suggests some useful policy implications. When a ceiling is imposed on loan rates, growth tends to fall and both the deposit and loan rates are lower, with the differential widened. A cap on deposit rates or an increase in the reserve requirement ratio reduces the growth rate and the deposit rate and leads to a higher interest rate differential. A limit on the entry of banking firms may have ambiguous effects on economic growth and deposit rates, but it surely raises loan rates and the interest rate differential.

A Sketch of the Analytic Structure. For the analysis it is important to look at the equilibrium conditions from the three important sectors: firms, households, and financial intermediaries. The first sector discussed is the production sector. The assumption is that firms have a linear production function—that is, increases of inputs cause output to increase proportionately. This assumption means that there are no diminishing returns to scale, capturing a central element of endogenous growth theo-

ry. In other words, the marginal product of capital, designated by the term A, does not fall when capital inputs are increased. It is also assumed that firms act competitively. They maximize profits by setting the marginal productivity of capital equal to the (marginal) cost of capital, which is the real interest rate they must pay to the owners of capital, or the real loan rate, R^L. Thus,

$$R^L = A. \quad (1)$$

To concentrate on the finance and growth nexus it is assumed that the productivity of capital, A, is not affected by the firm's stock of capital or by the economy's growth rate but can be enhanced by technological progress and innovations. The financial sector and the government can also affect the productivity of capital. For example, as is argued earlier, financial intermediation can raise the quality of investments, meaning that productivity, A, will rise. The government also can affect firms' choices by affecting productivity directly or indirectly through regulations on intermediaries. For instance, taxes on capital will tend to lower the productivity of capital broadly defined while government investments in infrastructure will tend to raise firms' productivity.

The household sector is also very straightforward. Households choose consumption and savings to maximize their lifetime well-being. Although households' employment, education, and fertility choices are very important, again the model abstracts from them for the sake of simplicity. Households adjust their consumption across time and their savings until they are indifferent between consuming more today and saving more, that is, until the market return on their savings is equal to the return they require to sacrifice current consumption for future consumption.

The required return on savings is made up of two parts. The first part depends on how impatient individuals are no matter what their consumption pattern is. More impatient people require a higher return, designated by I, to give up current consumption in exchange for savings. The second part is that individuals require a premium to save more than they normally would. In other words, to get individuals to increase the rate at which consumption grows through additional savings they have to be compensated. This variable is called the growth premium and denoted by the product G^*P, where G is the per capita growth rate of consumption and P is the rate at which this premium affects households' preferences over time. With this notation, the condition for optimal consumption growth and savings can be written,

$$R^D = I + P^*G, \quad (2)$$

where R^D is the households' gross rate of return on deposits, which with banks is the market rate of return to saving.[11] Again for simplicity, the focus is limited to deposit holdings. Other forms of savings can be easily incorporated but do not add much insight at this level of generality. Also, note that demographics may influence preferences and government may also play a role in households' willingness to save. For instance, an older society may be more impatient to consume. Alternatively, taxes on household income may raise the growth premium.

Adding financial intermediaries or a banking sector is just a matter of including a condition that relates loan rates to deposit rates. Profit-maximizing banks adjust the volume of their loans and deposits until the rate differential is just equal to the unit cost of intermediation, denoted by C. Thus the optimality condition is

$$R^L = R^D + C. \quad (3)$$

The determinants of the costs of financial intermediation are important in the analysis to come. Some of these costs are normal costs of running a business, such as administrative costs, and others are unique to financial intermediation, such as the cost of information gathering. Regardless of whether the costs arise from banks overcoming technological or incentive frictions, they may depend on the scale of loan or deposit activities. Larger banks may be more efficient and better able to diversify loan risks or the risks of early withdrawals, both of which cause the loan-deposit rate differential to fall. On the other hand, banks that are larger, especially relative to a small or local market, may have some market power to set either loan or deposit rates. The result is a rise in the loan differential, which can be proxied by a rise in the cost of intermediation.[12] The cost of intermediation may also depend on the growth rate of the economy. One might think that when the economy grows faster over long periods of time, more efficient and less

10. See Allen and Gale (1994) for a different perspective.

11. This condition is also known as the Euler equation, after the mathematician who came up with the mathematical procedure, or the Keynes-Ramsey rule, after the economists who saw how to apply the procedure to optimal consumption decisions.

12. Berger and Hannan (1994) find that after controlling for efficiency there is a significant positive correlation between loan-deposit spreads and concentration in the United States. Note also that we highlight the possibility of imperfect competition with financial intermediaries but not with producers. Extending the model in this direction will not affect the results at this level of generality (Jones and Manuelli 1997). Most growth models, however, do not consider imperfect competition in both product and financial markets. Recent attempts to do so include Sussman and Zeira (1995) and Becsi, Wang, and Wynne (forthcoming).

CHART 1
Determination of Equilibrium

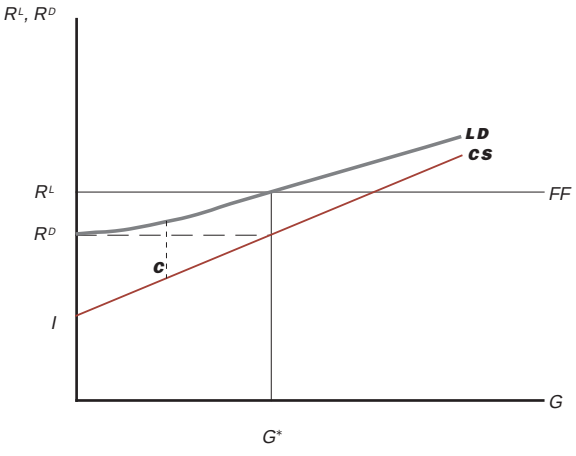
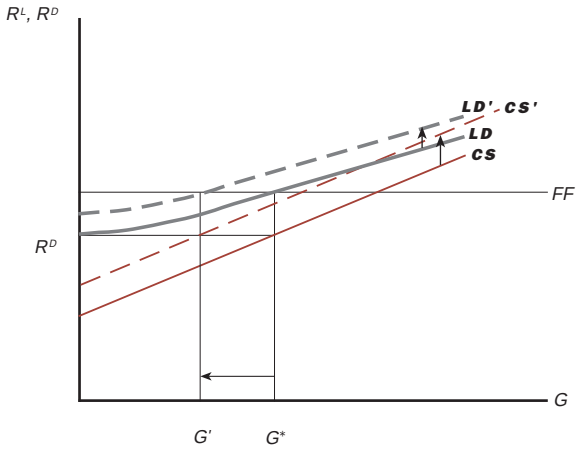


CHART 2
Increase in Impatience



costly intermediation is required.[13] Thus, intermediation depends on growth and growth depends on intermediation. That is to say, there are feedback effects from and to growth.

All these equations can be graphed, and an equilibrium with financial intermediation can be determined. In Chart 1 the horizontal axis measures the growth rate, G, and the vertical axis measures real interest rates, R^L and R^D. The firms' equilibrium condition, equation (1), is the line labeled *FF*, which is drawn horizontally, meaning that productivity is independent of growth. For example, a line drawn with a slight upward tilt to it initially that becomes horizontal after some point would indicate that the effect of growth on productivity is positive to a point but then levels off, reflecting positive knowledge spillovers in that individuals' knowledge enhancement reinforces that of others to generate an ever-higher level of aggregate knowledge (Romer 1986). The curve showing the optimal consumption-savings rule is denoted *CS* and graphs equation (2). It is drawn with a vertical intercept, I, for the impatience of the economy, below the intercept of the *FF* curve and with an upward slope of P. Finally, the real loan-rate curve, *LD*, graphs equation (3) by adding the loan-deposit differential to the *CS* curve, which captures only deposit rates. As drawn, the differential narrows as growth increases, indicating that scale effects on costs dominate, and financial efficiency increases with growth. The equilibrium loan rate and equilibrium growth rate are determined by the intersection of the *LD* and the *FF* curves, and then the equilibrium deposit rate is the rate consistent with the equilibrium growth rate. Finally, the equilibrium rate of consumption growth equals that of output (under conditions of long-term balanced growth in the absence of externalities).[14]

Economic Implications of the Model. To see the properties of the equilibrium, consider an increase in society's impatience, shown by a leftward shift of the *CS* and *LD* curves in Chart 2. This shift causes the equilibrium growth rate to decrease and the equilibrium loan-deposit differential to widen. For this simple model, the equilibrium loan rate is pegged to productivity and remains unchanged. Impatience means that the deposit rate falls or rises. A more impatient society cuts back on savings and reduces the growth rate of consumption to be able to consume sooner. Lower growth means that banks have fewer projects to finance, so they must scale back their lending activities. A reduction in scale implies that the costs of intermediation increase; and because banks cannot raise loan rates above the profitability of projects, banks may reduce the rates they pay to savers. Notice that if impatience rises until it exceeds productivity in this model there will be no equilibrium growth, suggesting that for economies patience is a virtue.[15]

How do different financial innovations affect the real economy? Suppose that the innovation reduced the cost of intermediation only. This reduction could be through new methods to reduce risks (for example, the use of credit scoring for smaller business loans) or cheaper means for pooling funds (such as replacing branches with Internet banking). Because costs fall, the loan-deposit differential tightens at all levels of growth, and the *LD* curve shifts down and to the right as in Chart 3. Thus, the equilibrium growth rate rises, but there is no change in the loan rate. However, deposit rates rise at the same time the loan-deposit rate spread tightens. Deposit rates rise because in equilibrium the scale of financial activities rises with the growth rate of the economy.[16]

Alternatively, Chart 4 portrays a financial innovation that increases the average productivity of firms.

CHART 3
Increase in Financial Intermediation Costs

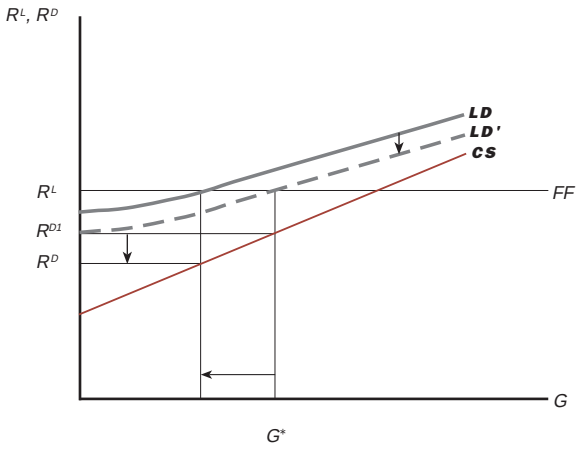
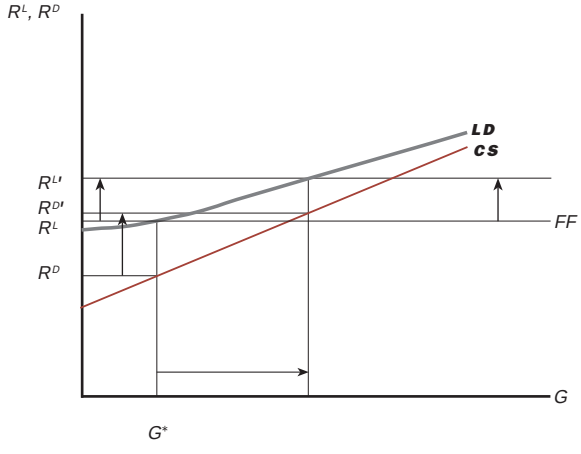


CHART 4
Increase in Productivity



Such an innovation can be thought of as a permanent shock that increases the monitoring and control functions of financial intermediaries and raises the quality of investment outcomes. Banks are now able to be more discriminating and on average fund better projects. Or, it may be that banks can better influence the actions taken by firms—say, because of legal reforms that make contracts more enforceable—and thus achieve better outcomes from investments. In either case, the *FF* curve shifts up due to higher productivity. Again the equilibrium growth rate rises, but now the equilibrium loan rate rises together with the deposit rate at the same time the spread falls. Intuitively, an increase in productivity means both that growth rises and financial intermediaries earn more from their loans. Since the scale of financial activities also rises with increased growth, the cost of intermediation falls. Thus, intermediaries can pay out more to savers by raising deposit rates, which also lures them to increase their rate of consumption.

Thus, no matter what the source of the financial innovation is, it has the same effect on outcomes as a technology shock. Technology shocks and financial innovation shocks imply that long-run growth rates are negatively correlated with the rate spread and positively correlated with deposit and loans rates individually.[17] The positive correlation with loan rates is weaker the flatter the *FF* curve is and the more the financial innovation serves to increase the quality of loans rather than reduce the costs of intermediation. Notice, though, that as long as increases in the scale of financial activities increase efficiency and cause financial intermediation costs to fall, one should expect to see a negative correlation of rate spreads and growth rates. A shock in the economy's patience will also cause the growth rate to be positively correlated with loan rates, but all the other correlations could go either way.

Evaluation of Financial and Monetary Policy. The discussion next turns to several classic forms of government intervention and financial repression. First, consider a ceiling on loan rates typically thought to make credit cheaper. When the loan rate ceiling is binding—that is, below the unconstrained equilibrium rate—the ceiling acts like a drop in productivity or a downward shift of the *FF* curve, best seen by assuming that the *FF* curve is horizontal and reversing the changes in Chart 4. The equilibrium growth rate falls and the loan-deposit spread widens

13. Sussman and Zeira (1995) find that total bank costs per unit of extended credit have fallen with financial development across U.S. states.

14. If there were no banks, equations (1) and (2), or EF *and* CS *curves, would yield a solution for the basic endogenous growth model, which is commonly known as the* Ak*-model, because output is linear in capital,* k*, with* A *the marginal productivity. One can easily find the long-term equilibrium. When financial intermediation is costless, the loan rate equals the deposit rate. In this case, the economy's equilibrium long-run growth rate is equal to* (A – I)/P*. Thus, anything that raises producers' long-term productivity or lowers households' impatience or smoothes consumption-savings trade-offs will raise long-term growth.*

15. Also, if the FF *curve is upward sloping to account for positive knowledge spillovers, the interest rate differential and the deposit rate can either increase or decrease.*

16. Note that if the FF *curve sloped upward, then the equilibrium loan rate would rise too.*

17. A productivity increase will raise loan rates while financial innovation will leave them unchanged. However, if the FF *curve is upward sloping, loan rates will increase in both cases.*

CHART 5
Deposit Rate Ceiling

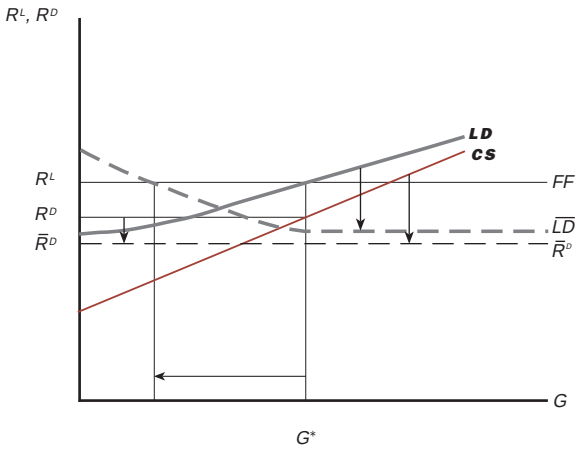
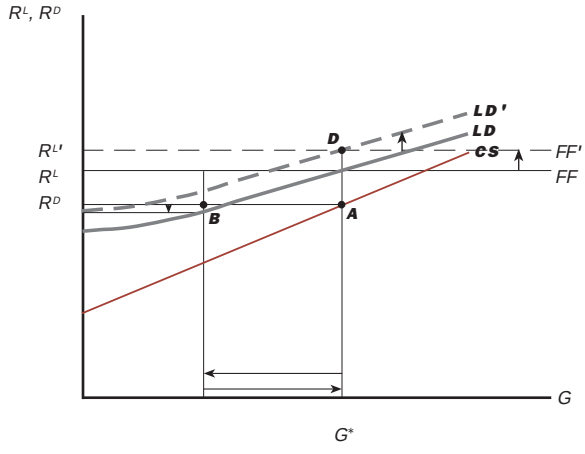


CHART 6
Limit on Entry of Financial Intermediaries



because the scale of financial activities has fallen, causing costs to rise. Second, governments may choose to put a cap on deposit rates. As shown in Chart 5, the effect is to transform the *CS* locus into a horizontal line at the mandated deposit rate, which is assumed to be below the previous equilibrium deposit rate. In this case equilibrium growth and loan rates are determined where the *FF* curve intersects the now-downward-sloping *LD* curve (obtained by adding *C* to the horizontal deposit rate ceiling). While equilibrium growth rates fall, loan rates are unchanged and the interest rate spread widens. In a sense banks are profiting at the expense of growth, which may or may not have been the desired outcome. The fact that the *LD* curve is now downward-sloping produces some interesting effects on its own, implying a negative correlation between loan and growth rates. Third, consider an increase in bank reserve requirements. This move would effectively raise the costs of intermediation and the loan-deposit rate differential at all growth rates. Thus, the *LD* curve would shift upward and to the left in Chart 3, causing growth and the scale of financial activity to fall, the rate spread to widen, and deposit rates to fall.

Fourth, many governments have tried to direct credit by picking and choosing recipient firms and sectors.[18] For this policy to be successful, the government must do a better job of evaluating investments and picking winners than the private sector does. Without the requisite credit expertise or good luck, however, the result will be a decline in the average quality of loans and thus a downward shift in the *FF* curve, again a reversal of the analysis in Chart 4.

Finally, Chart 6 illustrates a limit on the entry of banks, which reduces the number of banks but increases individual bank size. Such a policy may have the effect of increasing the market power of financial intermediaries, and thus the loan-deposit spread rises with an effect similar to a cost increase. This effect is shown as a move from equilibrium *A* to *B*. However, increasing the scale of individual banks might arguably produce economies in lending and lead to improvements in loan quality, possibly through better screening and control. In this case the *FF* curve might shift up, and the combined effect of cost and productivity increases is uncertain for growth and deposit rates but surely leads to increases in loan rates and the rate spread. This last effect is shown as a move from *B* to *D*, illustrating a case where the net growth effect is nil, but it could go either way.

Countries in which financial repression has occurred, most notably in Latin America, have used a combination of these policies, and the negative consequences for growth have been even more severe. Financial sector reforms in Latin America have led to significant increases in real interest rates (Holden and Rajapatirana 1995), an outcome consistent with the model above. However, these effects were accompanied by large spreads between lending and borrowing rates that suggest increased inefficiency of the banking sector. The analysis above also implies that there are only two types of financial repression that might increase growth rates.[19] These policies are limits to entry—if demonstrated to give rise to very large productivity increases—and directed credit, if pursued successfully. Park (1993) argues that these two policies played an important role initially in Korea's strong growth performance.[20]

Empirical Review

The predictions from the model presented here show that financial intermediation increases the efficiency of investment by identifying and channeling resources toward high-return projects and by disciplining corporations. While innovation and knowledge creation are the ultimate forces behind broad capital

accumulation and growth, financial intermediation will enhance growth to the extent that the intermediaries perform their functions efficiently. Thus, countries' growth performance should vary with their level of financial efficiency. Financial efficiency in turn depends importantly on the extent to which financial economies of scale have been realized and on how developed and innovative the financial sector is. Financial development can be measured by the size of the financial sector to the extent that activities transform the quality of investments. Also, as the growth model with financial intermediation illustrated, financial development and efficiency are reflected in lower loan-deposit rate spreads. The growth model also predicts that growth rates are positively correlated with real interest rates and negatively correlated with loan spreads. In addition, it has been shown that government intervention can severely affect the efficiency of financial intermediaries and economic growth and alter these correlations.

Importance of External Financing. In most theoretical models financial intermediaries lend to firms all that is needed for investment. In the real world, however, businesses' retained earnings finance a large part of investment. This situation exists especially in less-developed countries with financial markets that do not operate well and operate at a higher cost to firms than in countries with more-developed financial markets. Mayer (1988) shows that firms in eight industrialized countries over the period from 1970 to 1985 financed most of their investment from retained earnings. He finds that intermediated loans are the dominant source of external funds for firms and that in all countries (except Canada) intermediated loans contribute a greater share of external financing than short-term securities, bonds, and shares combined.[21] There are marked variations in external-financing percentages across countries. Computed on a net (of accumulation of equivalent financial assets) basis, external financing shares ranged from lows of –2.3 percent in the United Kingdom and 14.1 percent in the United States to highs of 32.1 percent in Japan and 48.1 percent in Italy.

It is reasonable to suppose that the share of external financing varies with the relative cost of external financing both overall and for particular forms of finance. The costs of particular forms of financial intermediation depend on technological and incentive frictions as well as legal and regulatory costs and should fall as the efficiency of the sector increases. It is thus surprising that the United States and the United Kingdom, countries with arguably the most efficient financial sectors, have the lowest external financing shares. This puzzle is further compounded by the fact that external financing ratios in the United States were not any different in the 1970s from those in the first two decades of the century (Taggart 1985) and in the United Kingdom were stable over the postwar period (Mayer 1990). While it is arguable that these countries are the most efficient for all types of intermediation across countries (see Berger and Humphrey 1997, who evaluate the few studies that attempt cross-country comparisons of efficiency), it is likely that their efficiency has increased over time.

There are several possibilities in accounting for the relatively low external financing shares in the United States and the United Kingdom.[22] Mankiw (1988) argues that times of rapid growth create needs for funds that cannot easily be accommodated by retained earnings alone, and more external financing occurs. Mayer (1988) argues that competition may have increased the costs of intermediation and external funds by making long-term financial relationships less likely. Alternatively, one could argue that while financial efficiency implies lower costs of intermediation, the reduced costs are not necessarily passed on to firms if intermediaries have sufficient market power over the price of their services. Another explanation that has not been explored is the effect on financial intermediation costs from government intervention and regulation.

Does Financial Development Promote Growth? While financial intermediaries may not finance a dominantly large share of investment, they still may be important for growth. As economists since Goldsmith (1969), McKinnon (1973), and Shaw (1973) have shown, financial development and economic growth are positively correlated across countries. Goldsmith (1969), analyzing data from thirty-five countries over the period from 1860 to 1963, finds that financial and economic development

18. Throughout this article, we abstract from cases in which funds move (either voluntarily by financial intermediaries or because of government decree) toward government projects and households.

19. A rarely considered alternative is that the government could designate a fixed loan-deposit rate spread, which would cause the LD *curve to become linear, parallel to the* CS *curve. If the designated spread is above (or below) the unconstrained equilibrium spread, growth may rise (or fall). For initially low equilibrium growth rates with a large unconstrained spread, the designated spread would be low and the unconstrained spread and growth would tend to rise. However, at high initial growth rates this policy would slow growth.*

20. For corroborating evidence, see also Demetriades and Luintel (1996).

21. Interestingly, equity markets have been negligible as a source of external funds, and the long-term trend has been downward. See also Corbett and Jenkinson (1994), who provide a more consistent data set for Germany, Japan, the United Kingdom, and the United States over the period from 1970 to 1989.

22. See Gertler and Rose (1991) for a discussion on the factors that determine external financing costs.

are positively correlated over periods as long as several decades. Financial development is measured in his study by the financial intermediation ratio, or the ratio of financial intermediary assets divided by gross national product. To the extent that these assets measure the provision of credit to firms (as opposed to households and government), this measure captures the financial intermediaries' role in overcoming frictions and enhancing growth through quality enhancement. However, as Goldsmith notes, it is an open question whether financial development leads to economic development or vice versa, because each has feedback effects on the other. In a later study Goldsmith (1985) shows that financial development largely occurs during the early stages of economic development when countries have low levels of income.[23] However, even though financial development occurs early and may precede economic growth, it is unclear that it provides causality in an economic sense.

More recently, King and Levine in a series of studies (1992, 1993a, b) look at growth and financial development over various periods starting in 1960 for a comprehensive cross section of countries. They expand the set of financial development measures to better capture the various services provided by financial intermediaries. For example, one measure approximates the liquidity-providing role of financial intermediaries through the ratio of liquid liabilities (currency plus demand and interest-bearing deposits, or M2) to GDP. Another measure, a ratio of credit provision to private firms to GDP, captures monitoring, screening, and control activities as well as the pooling of funds and diversification of risks. The first measure approximates intermediaries' role in overcoming technological frictions while the second approximates their role in overcoming incentive frictions. However, these are very crude measures of the specific roles of banks, such as liquidity provision and firm-specific risk reduction or overcoming divergent incentives. King and Levine find that their measures are positively correlated with real GDP growth rates even after controlling for initial conditions, education, government spending, inflation, political stability, and some other policy measures. They also show that subsequent growth rates are positively correlated with initial liquidity ratios. This finding can be taken as evidence that financial development causes growth, but it may also be reflecting a buildup in anticipation of future growth. In any case, because measures of financial intermediation and growth are endogenous and respond in specific ways to shocks, studying this question might be less informative than understanding the sources of shocks that drive the correlations.

Lately, several studies have found that the correlations between financial intermediation and growth depend critically on the sample of countries considered. Fernandez and Galetovic (1994) split King and Levine's sample between Organisation for Economic Cooperation and Development (OECD) and non-OECD countries and show that the correlations fall and become insignificant for OECD countries. DeGregorio and Guidotti (1992) add more countries to King and Levine's sample and show that, when they divide the sample into three groups based on per capita incomes at the start of the sample period, the correlations rise and become more significant as initial incomes fall.

In both studies it is argued that there might be insufficient variation among developed countries with mature financial sectors to determine their growth effects and that the financial variables do not capture intermediation through nonfinancial or nonbank intermediaries. Either the measures of financial development used are not broad enough or else they are too broad to capture specific efficiency-enhancing roles of financial intermediaries. Alternatively, financial intermediation may have stronger efficiency-enhancing effects in less-developed countries than in developed countries. DeGregorio and Guidotti also show that Latin American countries had a significantly negative correlation. As shown by Diaz-Alejandro (1985), who analyzed the liberalization in Latin America in the 1970s, insufficient regulation and expectations by banks of bailouts resulted in overlending by banks. Thus, a large financial intermediation sector reflected a very fragile system, not financial efficiency. The lesson is that regulation affects the behavior of banks and the system's efficiency. One can interpret the negative correlation either as a negative effect on growth of financial intermediaries or more likely as a sign that insufficient provision of financial services retards growth (Galetovic 1994).

In any case, these studies highlight a potential problem with the post–World War II sample period considered in most of the cross-country studies. Barro and Sala-i-Martin (1995) note that growth rates in the postwar period were atypical because in comparison with rates over the last 100 years they were much above trend. Also, starting in the 1970s, many policy experiments were conducted with more or less successful attempts at deregulating financial sectors. As the previous section showed, different types of liberalization give rise to different correlations with growth, suggesting that empirical studies must control for the specifics of initial policy regimes and policy switches.

Some studies of financial repression and growth have attempted to control for these factors. Roubini and Sala-i-Martin (1992), using dummy variables in standard growth regressions to distinguish between repressed and other countries, find that financial development and growth are insignificantly correlated. However, using dummy variables that distinguish countries with annual real rates less than –5 percent yields a significantly negative correlation. King and Levine (1992) also control for high nega-

tive real rates and policy distortions and find a significantly negative effect.

These studies show that governments can have a negative effect on growth rates through financial intermediaries. To date, the empirical work has not provided estimates for positive government interventions, nor are there any estimates of the effect of specific governmental policies on growth.[24] However, the empirical literature does show that the overall policy package matters for the efficiency of financial intermediaries and for growth.[25]

As the illustrative growth model has demonstrated, real interest rates and loan-deposit spreads reflect the efficiency of financial intermediaries as well as the productivity of investment (and underlying policy experiments). There have been a few studies that analyze the correlation of real interest rates and growth. For instance, King and Levine (1992) find an insignificantly positive association of real interest rates and growth for seventy-three countries over the period from 1974 to 1989. But including financially repressed countries is important for these results. Another indicator of financial efficiency is the difference between lending and borrowing rates. Using this variable in their empirical work, King and Levine (1992) find insignificant negative correlation with per capita GDP growth, blaming the poor quality of interest rate data. Sussman (1993) finds a weak negative correlation between rate spreads and real per capita GDP for 1985 for eighty-one countries (omitting repressed countries with negative rate spreads). He shows that the markup increases as incomes rise from poor countries to middle-income countries and then falls again as incomes rise to those in the group of rich countries.

Relevant Microeconomic Studies on Efficiency and Competitiveness of Financial Intermediaries. This article has argued that factors such as scale economies and financial market structure may affect the efficiency of the financial intermediaries and thus ultimately growth. To date there are no studies that explore the relationships among these factors and growth. However, there are microeconomic studies that look at some of these factors in isolation. One aspect that deserves attention is the role of economies of scale on efficiency and growth. The empirical evidence suggests that there may be returns to scale in at least U.S. banking markets. Clark (1988) argues that economies exist only for small depository institutions. Berger, Hunter, and Timme (1993) conclude in their survey of the literature that medium-scale financial intermediaries might be slightly more scale-efficient than large or small firms. McAllister and McManus (1993) find that managers at large financial intermediaries might be better able to control costs and that large firms have approximately constant returns to scale. Berger and Humphrey (1997) review the few studies that make cross-country comparisons on the efficiency of the financial sector. These studies have methodological differences and do not control for regulatory differences, but one finding is that U.S. banks are among the least efficient when comparing developed countries.

Economies of scale sometimes imply imperfect competition, and how competitive financial intermediaries are may also affect how well they perform in overcoming frictions and ultimately stimulating growth. Unfortunately, only a very few studies make cross-country comparisons. Shaffer (1995) estimates the degree of market power or contestability on the commercial banking industry in each of fifteen industrialized nations over multiyear periods. He finds that there is much variation in the degree of competition across countries and that five countries (Belgium, Denmark, France, Japan, and the United States) had statistically significant evidence of market power. Berger and Humphrey, in their survey of the literature, conclude that "market power does seem to affect the prices of some types of local deposits and loans in the United States" (1997, 47). They caution, though, that U.S. banking markets are an outlier because elsewhere markets tend to be more concentrated, sometimes with explicit collusion, and usually they are national in scope. Petersen and Rajan (1995) show that market power varies geographically in the United States. They find that young or small firms obtain more external financing in concentrated markets than in competitive markets because larger and more monopolistic banks can extract future payments from them in an environment in which firms are less able to turn to other banks.

Conclusion

This article states that in one way or another financial intermediaries give individuals or firms access to economies of scale that they would not have otherwise. Thus, intermediaries allocate capital to its best possible use and economic efficiency is enhanced. How well financial intermediaries carry out their functions may explain differences across countries' rates of growth.

23. See also Wachtel and Rousseau (1995), who provide asset ratios for various types of intermediaries in the United States, the United Kingdom, and Canada over a period of 100 years.

24. One exception is Jayaratne and Strahan (1996), who find that when intrastate branching restrictions were relaxed in the United States bank lending quality and real per capita state growth rose. They argue that lower barriers to entry improved the average quality of surviving banks and that increases in the average size of banks led to economies of scale and scope.

25. See also Arestis and Demetriades (1997), who provide evidence that policy interventions matter if a study uses a time series framework.

A simple model illustrates this relationship and shows how policies such as reserve requirements, interest rate controls, entry limitations, and directed credit flows affect growth and interest rates. While most of these policies are inimical to growth, there are two exceptions: the quality of investments and growth may be increased if entry restrictions cause financial intermediaries to operate at more efficient scales or if directed credit policies are chosen well.

The article also briefly surveys some of the recent empirical literature, which consistently finds a positive relationship between growth and financial intermediation, and shows that because financially repression hurts growth, financial intermediation matters if it is not efficient. More work needs to be accomplished, however, before policy recommendations can be made. This article argues that more attention needs to be paid to the efficiency-enhancing role and imperfectly competitive aspects of financial intermediation. The economies of scale arguments used to motivate financial intermediation imply that markets may be imperfectly competitive at the same time that the race for market power provides incentives for financial innovation and development. Empirical work suggests that financial intermediaries differ across countries in the cost efficiency and the degree of competition they provide, a finding that has implications for economic efficiency and maybe for growth.

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