Financing Prosperity

Ross Levine
Willis H. Booth Chair in Banking and Finance

University of California, Berkeley
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Index

1. Introduction

People don't like banks. There is a powerful sense that banks collect money from the many, lend most to the privileged, and get an exorbitant return in the process. If one were to poll random people on a street corner about what they think of the earnings of bankers, one would likely hear the words "undeserved," "unmerited," "unreasonable," "unwarranted," and "excessive." Such sentiments are not new. Many centuries ago, Buddhist, Christian, Islamic and Jewish leaders condemned moneylenders. More recently, the second President of the United States, John Adams, argued at the close of the 18th century that "... banks have done more harm to the morality, tranquillity, and even wealth of this nation than they have done or ever will do good." And, still more recently in the aftermath of the first global financial crisis of the 21st century, many writers argued that bankers do little to identify and fund the most promising entrepreneurs but rather do much to

extract larger bonuses for themselves. People are clearly distrustful of banks and often angry about the role they play in society.

In this book, I take a step back from these emotional sentiments and assess the evidence on the social productivity of banks. I ask: Does the functioning of the banking system influence economic prosperity? By economic prosperity, I do not only mean the overall amount of good and services produced by an economy. That is, I define the economic prosperity of a country much more broadly than Gross Domestic Product (GDP). In defining prosperity, I give special consideration to the incomes of those at the lower end of the income distribution, to poverty, and to the economic opportunities available to people throughout society. The goal of this book is to take stock of a large body of research examining the role of banking systems in shaping economic growth, income inequality, poverty, and the degree to which an individual's economic horizons are shaped by the wealth of the person's family or by the person's talent, energy, and initiative.

The evidence provides a clear message: Well-functioning banking systems are necessary for economic prosperity. By well functioning, I refer to banks that effectively mobilize savings, screen borrowers and allocate those savings, monitor and govern the use of those savings by firms and individuals, and provide mechanisms for individuals and firms to manage risk. How well banks perform these functions exerts a powerful influence on the economy.

When banking systems perform these functions well, banks promote growth and expand economic opportunities. For example, when banks screen borrowers effectively and identify firms with the most promising prospects, this is a first step in boosting productivity growth. When they mobilize savings from disparate households to invest in these promising projects, this represents a second crucial step in fostering

growth. Furthermore, when banks monitor the use of investments and scrutinize managerial performance, this is an additional ingredient in boosting the operational efficiency of corporations and reducing waste, fraud, and the extraction of private rents by corporate insiders. But, that is not all. When banking systems ease the diversification of risk, this encourages investment in higher-return projects that might be shunned without effective risk management vehicles. And, when banks lower transactions costs, this facilitates trade and specialization, which are fundamental inputs into technological innovation and economic growth.

However, when banking systems are underdeveloped and perform these functions poorly, they hinder economic growth and curtail economic opportunities. For example, if banks simply collect funds with one hand and pass them along to cronies with the other hand, this produces a less efficient allocation of resources that slows economic growth and limits the economic horizons of many people. If banks fail to exert sound corporate governance, this makes it easier for managers to pursue projects that benefit themselves rather than the firm and the overall economy. Thus, poorly functioning banking systems can become an effective tool for restricting credit—and hence opportunity—to the already rich and powerful rather than a mechanism for financing the best projects and entrepreneurial ideas. And, when banks create new, complex financial instruments and trick unsophisticated savers into buying them, this can boost the bonuses of financial engineers and executives while distorting credit allocation and attracting talented individuals into these socially unproductive activities.

Evidence from around the world shows that better functioning banking systems accelerate long-run economic growth, where "long-run economic growth," means growth over many decades Using many

different research methodologies, investigators consistently find that countries with better-developed banking system enjoy much faster rates of long-run economic growth than economies with malfunctioning banking systems. A virtual avalanche of research shows that this result does not reflect a "chicken-and-egg" problem. It is not just that rich countries develop better banking systems. The evidence indicates that better banking system accelerate economic growth.

The evidence also explains that banks spur growth by improving the allocation of resources, not by increasing the savings rate. Better banking systems exert a first-order impact on the economy by getting resources to the most productive entrepreneurs and ensuring that those entrepreneurs use those resources efficiently. While better banking systems more ably mobilize savings from individuals, the evidence indicates banks do not primarily boost economic growth by raising the savings rate. Rather, by mobilizing savings into the hands of an entity that is especially good at screening borrowers and exerting governance over borrowers, better banking systems allocate scarce resources more efficiently, with positive ramifications on economic growth.

Economic prosperity, however, involves more than increasing the size of the economy pie. Part of evaluating the impact of banks on economic prosperity involves understanding how banks shape the sizes of the slices of the economic pie. Do better-developed banks increase GDP only by boosting the incomes of the rich? Do better-developed banks materially boost the living standards of lower-income households? Moreover, part of evaluating the impact of banks on economic prosperity involves focusing on economic opportunities. Do better-developed banking systems influence the degree to which the contours of an individual's economic possibilities are shaped by the

individual's abilities versus the degree to which those opportunities are predetermined by the wealth and connections of the individual's family?

The evidence will surprise many: Better-developed banks disproportionately help lower income families and expand the economic opportunities available to economically disadvantaged individuals and groups. To see how this works, again consider how banks shape long-run growth. Better-developed banks boost growth by funneling capital to the most promising entrepreneurs. This does not mean that better-developed banks funnel credit to those endeavors run by the wealthiest families. Rather, it means that better-developed banks boost growth by funneling credit to those entrepreneurs with projects that have greater risk-adjusted expected returns. By reducing the connection between wealth and access to credit, better banking systems can expand the economic opportunities for low-wealth people, improve the efficiency of resource allocation, and spur growth. It is not growth versus expanding economic opportunities; it is growth by expanding economic opportunities.

Crucially, research also uncovers the channels through which better-developed banking systems reduce income inequality. First, banks do not reduce inequality by lowering the incomes of high-earners. Rather, better banking systems reduce income inequality by boosting the incomes of lower-income families by more than they boost the incomes of higher-income families.

Second, research also shows that better-functioning banks exert a powerful influence on the poorest in society by spurring entrepreneurship and improving labor market conditions. This occurs as follows. Better banking systems lower the barriers to becoming an entrepreneur. This facilitates the entry of promising new firms, forcing the exit of unsuccessful incumbents and making the product market

more competitive. The resultant intensification of product market competition means that workers—who account for the vast majority of people—look for work in a more dynamic competitive environment. A few large firms can no longer dictate terms to labor, and labor unions can no longer protect inefficient workers at the expense of more efficient ones. Better banks create more competitive product markets, which in turn enhances competition for workers, boosting wages and lowering unemployment. It is through this labor market channel that better-functioning banking systems boost the incomes of lower income families and narrow income inequality. Thus, banking systems shape the economic lives of everyone—*even those who never receive a loan or start a business*—because almost everyone needs a job and that job search is materially shaped by the banking system.

Banking systems are special. While many other policy areas deserve attention, such as inflation, fiscal expenditures, taxes, international trade, cross-border capital flows, and the regulation of nonfinancial industries, banks are special. While the level of banking system development in 1960 predicts economic performance over the next half-century, none of these other features of economies has such predictive power. Similarly, while other components of the financial system are important, such equity and bond markets, the powerful connection between banks and economic prosperity holds even when controlling for these other features of financial systems. The breadth and strength of evidence concerning the impact of banking systems on economic growth, entrepreneurship, and income inequality is exceptional. From cross-country comparisons, individual country studies, time-series studies, and microeconomic studies, research confirms and reconfirms the decisive impact of banking systems on economic prosperity. People do not enjoy substantial and enduring improvements in living standards over decades in the absence of well-functioning banking systems.

Another special feature of banks is that they must innovate and evolve to remain effective. Financial innovation is essential for improving the wealth of nations. As described by Adam Smith, enhancing the wealth of nations requires increased specialization and the development of novel technologies. The resulting increase in complexity will typically make it more difficult to screen borrowers, identify the most promising entrepreneurs, and funnel credit effectively. Put differently, as technologies advance, it becomes harder to be an effective bank. If in turn banks allocate credit less efficiently, economic growth will slow. Thus, to maintain the same rate of economic progress, banks must adapt to changing conditions and enhance the quality of their services to avoid becoming ineffective and obsolete. Again, historical examples and new econometric evidence shows that (1) better-functioning banking systems spur technological improvements and (2) continual innovations within banks are necessary for sustaining technological innovation. There is a symbiotic connection between technological innovation, finance, and financial innovation.

Indeed, the evidence suggests that Paul Volcker, the former chairman of the Board of Governors of the Federal Reserve System, was wrong. He skeptically stated in 2009, "I wish someone would give me one shred of neutral evidence that financial innovation has led to economic growth — one shred of evidence." In fact, an enormous body of research using examples from the last few thousand years discovers that financial innovations are essential for fostering the technological innovations that spur sustained improvements in living standards. Just to mention a few examples, the creation of tradable debt contracts 6,000 years ago in Samaria made it easier to lend and less costly to borrow, which boosted specialization and productivity. Ancient Rome developed a stock market to ease the mobilization of savings for enormous mining projects. To finance oceanic explorations in the 16th – 18th centuries,

banks and other financial market participants invented the joint stock company to facilitate risk diversification. And, financial innovations were necessary ingredients for the Industrial Revolution and for the more recent economic revolutions in information technologies and biotechnologies.

Given all of the evidence, it is perhaps more appropriate to turn Volcker's skeptical query around and ask, "I wish somebody would give me a shred of evidence that the long-run link between financial innovation and growth recently stopped."

In this book, I extensively review the evidence concerning the impact of banks on economic prosperity and briefly mention a few key elements of the types of financial regulatory and supervisory policies that foster the development of well-functioning banking systems. A comprehensive discussion of bank regulatory and supervisory policies would require a separate book, and I have written two books on this topic with James Barth and Gerard Caprio: *Rethinking Bank Regulation: Till Angels Govern* (Cambridge University Press) and *Guardians of Finance: Making Regulators Work for Us* (MIT Press). Nevertheless, it is worth noting some of the findings from that work here. An overarching theme concerning the types of policies associated with well-functioning banking systems is as follows: Bank regulation is not just about preventing crises; it is also about cultivating banking systems that effectively mobilize savings, screen borrowers and allocate savings to the best ones, monitor borrowers and induce them to use those savings efficiently, and provide first-rate risk management services—and it is about creating a banking system that continually innovates to improve the quality of these financial services.

Three key policy lessons emerge from the vast literature on public policies toward banks. First, competition among banks tends to improve

the quality of the services provided by banks to the rest of the economy with positive effects on economic growth, the incomes of the poor, and the availability of economic opportunities to people throughout society. Greater competition among banks spurs competition among nonfinancial firms, enhancing efficiency throughout the economy. That is, greater competition among banks thwarts the adverse effects of cronyism, as the drive for survival and profits forces banks to search out the most promising entrepreneurs and not simply fund incumbent firms. Considerable evidence shows that when bank regulators remove impediments to competition, bank lending rates fall, deposit rates rise, bank profits fall, the proportion of past due loans falls, bank transparency increases, the efficiency of credit allocation soars, economic growth accelerates, new firms enter at a faster rate, old firms exit at a faster rate, inequality falls, poverty drops, and income inequality shrinks. Greater bank competition improves the functioning of banks, the efficiency of firms, and the prosperity of economies.

Second, granting greater power to official supervisory and regulatory agencies too often *damages* the operation of financial systems unless there are effective institutional mechanisms for compelling these agencies to use their powers in the best interests of the public. As shown by Barth, Caprio, and Levine (2006, 2012), bank regulatory and supervisory systems often use their powers to promote the interests of narrow political groups or wealthy individuals and too infrequently promote the interests of the public at large. Too often, there is ineffectiveness governance of bank regulatory and supervisory agencies and these agencies are captured by narrow interests and fail to advance the public interest. From the most developed economies to the least developed ones and across centuries of experience, research shows us that it is often the regulatory agencies that impose and implement policies that discourage banks from effectively screening borrowers

and allocating capital efficiently. It is often the regulatory agencies that compel banks to make loans to politically appealing ends that too often turn out to be economically unproductive loans that harm economic prosperity. It is often public institutions—and indeed public banks—that distort the flow of credit to cronies and constituents in ways that restrict economic opportunities to the connected. Thus, too often it is the regulatory and supervisory agencies themselves that limit the ability of the most promising entrepreneurs to flourish. While every government and every regulatory agency believes that it can manipulate the levers of banking policies to achieve socially productive outcomes, the evidence provides a skeptical conclusion. The evidence raises a cautionary flag about approaches that rely on the guiding hand of government.

Third, the evidence does favor a regulatory approach that forces banks to disclose more information, that makes it easier for bank owners and creditors to monitor banks, govern the activities of banks, and compel banks to act in the best interests of all of those funding the bank, and that provides the necessary legal and infrastructure, such as effective credit bureaus and contract enforcement mechanisms, so that banks can provide sound services to the economy. Such a regulatory approach will not just involve forcing banks to disclose information in a timely, comparable, and transparent manner. Such a regulatory approach will focus on enhancing private sector governance of banks, so that small shareholders and debtors have the incentives, information, legal backing, and legal means to exert corporate control over banks. While more transparency never seems to do harm, Barth, Caprio, and Levine (2006) show that effective market discipline requires all three of these interrelated building blocks: information, sound incentives, and effective corporate governance.

In stressing these three components of a sound bank regulatory and supervisory system, I do not argue that these three components are sufficient or that it is always better for an economy to have fewer bank regulations and weaker supervisory systems. For example, the recent global financial crisis, the Chilean banking crisis of the 1980s, and many other systemic banking crises around the world advertise the devastating ramifications of misguided bank regulatory policies. I simply observe that the bulk of experience suggests that competition, the ability of private investors to exert sound governance over banks, and an official sector that does not play an overly pernicious role in shaping the allocation of credit are crucial ingredients for creating a prosperity-promoting banking system.

Although this book examines the relationship between banking system development and economic prosperity in general, its lessons apply directly to Chile. Chile has the most developed banking system in Latin America, outside of a handful of small banking centers, such as Barbados, St. Lucia, St. Kitts and Nevis, and Panama, as measured by bank credit to the private sector as a share of Gross Domestic Product (GDP). Furthermore, Chile scores well in terms of banking sector efficiency, as measured by net interest margins and the ratio of overhead expenditures to total assets, relative to other economies in Latin America. Furthermore, Chile is not an outlier in terms statistical estimates of the impact of banking development on economic prosperity. This suggests that the estimated effects of banking sector development on economic performance apply well to the particular case of Chile.

Furthermore, during the last two decades, Chile's banking system has steadily expanded its services to more and more clients in Chile, as shown by official figures. Not only have loans increased, but many more individuals and firms are borrowing from banks. The number of clients

receiving housing loans and consumer loans has more than doubled since 1996, and the number receiving commercial loans has increased by about 50%. Chile's banking system has also modernized, so that almost seven million clients use online banking services.

As discussed throughout the book, the accumulated body of research indicates that further improvements in the Chilean banking system would contribute materially to economic growth, reductions poverty, and the expansion of economic opportunities to a wider array of Chileans. Chile has been the most successful economy in Latin America over the last few decades, but it has even more expansive economic horizons. The estimates discussed below, suggest that a twenty percent improvement in Chile's banking sector development could increase the income of the average Chilean in 2030 by about 7% more than it otherwise would be.[1] And, it is not just about the average Chilean. The research predicts that the same improvement in the banking system would increase the incomes of lower income Chileans by an even faster rate, putting downward pressure on growing income disparities in Chile. These estimates do not suggest that improving the banking system is the only way to improve the economic lives of the citizens of Chile. Investments in education, a sound macroeconomic environment, and efficient regulatory policies all contribute. But, the analyses in this

1 To compute this, first note that the level of bank development in Chile in 2011 was 65.53, as measured by the percentage of bank credit to private firms as a share of Gross Domestic Product (GDP), as reported in Cihak et al. (2013). Thus, a 20% improvement would involve Chile having a level of banking development of 78.64. Second, use the smallest coefficient estimate (2.5) of the impact of bank development on real per capita GDP growth from Table 3 of Levine it al (2000)), note that the regressors are in logs, and compute the estimated increase in economic growth from a 20% boost in banking development as 0.46 = 2.5*(Ln(78.64) – Ln(65.53)). Third, using the long-run annual real per capita growth of Chile from 1960 through 2011, the 20% improvement in bank development increase the growth to an estimated rate of almost 3% per annum. Fourth, accumulating these growth rates from 2015 through 2030, this yields the estimated increase in per capital GDP of 7%, i.e., $0.07= (1.0296^{15}/1.025^{15}) – 1$.

book do suggest that the financial sector exerts a first-order impact on economic prosperity, especially on the living standards of those at the lower end of the income distribution.

And, as noted above, research illuminates the challenges facing Chile as it seeks to improve its banking system to foster economic prosperity in the coming decades. First, as a small economy, Chile will face the challenge of fostering and maintaining bank competition, efficiency, and stability. While the U.S. banking system can support many banks operating at efficient scale, this is less likely in Chile due to the size of its economy. Thus, Chile will need to identify and lower barriers to entry from new banks and nonbanks, while protecting consumers and maintaining a level regulatory playing field across different financial intermediaries. Second, Chile will face the challenge of improving and adapting its regulatory system as the domestic and global financial systems evolve. As emphasized in Barth, Caprio, and Levine (2012), a crucial component is the governance of the regulatory and supervisory agencies themselves. While these agencies must be powerful enough to govern financial institutions and markets, they must be compelled to act in the best interests of the public. For example, governments often impose caps on interest rates with the advertised goal of helping disadvantaged borrowers. But, this often leads banks to lend less to high-risk borrowers and more to politically-connected ones that enjoy implicit or explicit support from the government. Furthermore, the bank regulatory and supervisory system can be used to enhance the monitoring and governance of banks by private investors. In this way, official regulation does not substitute for private governance; it improves the ability of investors to monitor banks and discipline bank executives. Finally, as emphasized above, Chile's regulators and supervisors should seek ways to improve the legal and institutional environment. Given the contractual and information-intensive nature of finance, legal and

institutional improvements that reduce the transactions costs associated with screening and monitoring borrowers, making transactions, and enforcing contracts will materially enhance the services provided by banks to the rest of the economy with positive effects on economic growth, the incomes of the poor, and the availability of economic opportunities to people throughout society.

In sum, a large and growing body of evidence demonstrates that banks exert a powerful influence on the economy and well-functioning banks are crucial for economic prosperity. They influence who can start a business and who cannot, who can expand a business and who cannot. They shape who can borrow to buy a house in a neighborhood that is conducive to the cognitive and noncognitive development of their children and who cannot and who can borrow to send their children to better schools. Banks influence whether people look for work in a dynamic, competitive, and growing economy or whether people search for jobs in more stagnant economies in which a few, protected firms dominate labor markets. Although, banks will never eliminate the advantages of being rich, better-developed banks reduce the advantages of wealth by expanding economic opportunities and boosting the dynamism of economies.

The remainder of the book is organized as follows. Chapter 2 discusses what banks do. This is the basis on which the remainder of the book builds. Once we know the functions performed by banks, we can assess how these influence growth, the distribution of income, poverty, entrepreneurship, and the rate of technological innovation. Once we know the functions performed by banks, it is also clear why banks must continually adapt to changing economic and technological circumstances to maintain steady improvements in economic prosperity.

In turn, Chapter 3 shows that better functioning banking system boost economic growth by improving the allocation of capital. Banks do not boost growth primarily by boosting the proportion of income that individuals save. They boost growth by improving the efficiency with which those savings are allocated.

Chapters 4 and 5 turn to income inequality and the degree to which a person's economic opportunities are shaped by skill and initiative or by family income. The evidence shows that banks weaken the link between economic success and family wealth. Better functioning banks disproportionately help lower income families. Better banking systems facilitate the entry of promising new firms and encourage the exit of inefficient old firms by reducing the role of family wealth in determining business opportunities and creating a more competitive product market. Chapter 5 also stresses that as technologies advance, banking must innovate and improve so that they can continue to identify promising firms, monitor those firms, provide sound risk management services, and mobilize savings effectively.

Chapter 6 concludes. It pulls together the lessons from the book and provides some views on the policy challenges facing countries around the world.

2. What do banks do?

The answer to the question—"What do banks do?"—might seem trivial. We know what banks do. They take deposits and make loans. Those more familiar with the activities of banks would add that some banks access derivative markets for clients and some help companies issue stock and bonds by satisfying legal, regulatory, and accounting requirements and by interacting with institutional investors to assess the market for those securities. But, these answers are about the mechanics of what banks do.

The question can be more appropriately posed as, "What do banks do that shapes economic prosperity? What do banks do that influences the allocation of credit and hence the allocation of economic opportunities? What do they do that impacts the efficiency with which society uses its savings and hence the availability of jobs and the growth rate of wages? The question becomes: What functions and services do

banks provide to the economy that affect the everyday lives and welfare of people?

The answer is that banks perform four essential functions that shape the quality of life in an economy. They:

1. Screen firms and individuals and allocate capital,
2. Monitor investments and exert corporate governance after providing funding,
3. Facilitate the diversification and management of risk, and
4. Mobilize and pool savings.

While all banking systems provide these functions, there are large differences in how well banking systems provide them. Banking systems that perform these functions well contribute to economic prosperity, while banking systems that perform these functions poorly impede employment, wage growth, and economic success. Studying these functions gives shape and substance as to how banking systems influence economic prosperity. Furthermore, studying these functions emphasizes the unique and special role of banks in the financial system, relative to stock and bond markets and other financial institutions. By examining each of these four functions, this chapter explains why banks emerge and how the quality of the banking system influences growth, the inclusiveness of growth, and equality of opportunities available to people in an economy.

By defining what banks do, this chapter explains what it means to have a "better" or "worse" banking system. Put simply, better banking systems are better at (i) acquiring information about firms and individuals, (ii) monitoring whether their loans and investment are being used wisely by firms and individuals, (iii) providing mechanisms for firms and people to diversify and manage risks, (iv) mobilizing and

pooling savings from disparate individuals and firms, and (v) facilitating the exchange of goods and services. And, put just as simply, poorly functioning banking systems are not very effective at providing these four services to the economy.

The chapter also explains how each of these four banking functions influences economic prosperity, focusing on economic growth. It is worth stressing the comparative importance of the quantity of investment and the quality of investment in accounting for economic prosperity. An extensive body of economic research shows that physical capital investment per se does not account for much of long-run economic growth. Quantity just does not matter much. Rather, it is the efficiency with which an economy allocates and uses capital that has the biggest impact on economic performance. Thus, in explaining how banks influence economic prosperity, it is crucial to explain how each of the four functions performed by banks influence the quality of investment in an economy. While this chapter focuses on economic growth, future chapters stress how these banking functions shape other elements of economic prosperity, such as poverty, income inequality, entrepreneurship, and economic stability. Finally, this chapter ends with a discussion about what makes banks special. It explains that securities markets, investment banks, and other financial institutions all provide valuable services to the economy. But, banks play a unique and prominent role in shaping economic prosperity.

2.1 Screening firms and individuals and allocating credit

Who gets the money? Many people and firms want credit to start or expand businesses. Figuring out who gets the money and at what price is perhaps the most consequential challenge facing all economies. If economies allocate society's savings to endeavors that foster sustainable economic growth, this will foster prosperity. But, if economies misallocate

resources and finance low quality investments, this will impede economic growth and hurt economic welfare. Indeed, if we simply substitute the word "opportunities" for "money," this emphasize the pivotal role that screening potential investments and allocating credit plays in each and every economy: who gets the opportunities?

There are large costs and complexities associated with evaluating firms, managers, and market conditions. Imagine how hard it would be for individual savers to figure out whether this firm or that firm is credit worthy? Imagine how hard it would be for individual savers to assess and compare the prospects of particular products or compare the quality of managers across different firms. Individual savers have jobs, families, and a full range of responsibilities. Even if they had the expertise, they probably would not have the time to screen investments before allocating their savings. And, most don't have the expertise.

The barriers to evaluating different investment opportunities may keep money from flowing to sound investments. Each saver faces the daunting costs associated with evaluating firms, managers, and economic conditions. Without sound evaluations, individuals will not be able to figure out which are the products, firms, and managers with the greatest prospects and they will do a corresponding poor job of funneling their hard earned savings to promising endeavors. Not only will they in turn earn less on their savings, but also the best firms might not get the money. This misallocation of resources will slow economic growth, impede the growth rate of wages, and have deleterious effects on economic prosperity.

Banks can ameliorate these problems and get credit to where credit is due. Banks can do the screening and credit allocation for others. Rather than having each saver investigate all possible investments, banks can do this for savers. By economizing on the costs of screening

investments, banks will improve information about possible investments. Since many entrepreneurs solicit capital and that capital is scarce, banks that produce better information on firms will thereby fund more promising firms and induce a more efficient allocation of capital.

Put differently, savers hire banks to evaluate firms, market conditions, and entrepreneurs and make investment decisions. Just as people hire doctors to assess their health rather than become doctors themselves and people hire gardeners to look out for their trees and flowers, so they can do other things, people hire banks to allocate their savings rather than screen investment opportunities themselves. If banks do a satisfactory job of acquiring and processing information on firms, managers, and economic conditions, more people will hire them with positive ramifications on the capital allocation and the rate of economic growth.

By screening firms and individuals and allocating credit, banks have a substantial impact on entrepreneurship and technological change. Banks influence who gets to use society's savings. As such, banks influence who can start a business and who expand an existing one. And, they influence who cannot. Thus, by saying yes and no to requests for credit, banks shape entrepreneurial opportunities throughout the economy. And, by giving the thumbs up or thumbs down to requests for funding, banks influence innovation. That is, they influence the rate of technological innovation by determining those entrepreneurs with the best chances of successfully initiating new goods, services, and production processes. As Joseph Schumpeter argued (1912, p.74), "The banker, therefore, is not so much primarily a middleman … He authorizes people in the name of society … (to innovate)."

2.2 Monitoring Investments and Exerting Corporate Governance

2.2.1 The governance challenge

Having decided who gets the money, the problem now becomes stopping them from stealing it and forcing them to use it well. The challenge becomes can savers effectively monitor how borrowers use their investments. Can savers ensure that the managers implement their business plans effectively, and can they ensure that the firm's insiders do not misappropriate the funds provided by the savers. That is, the problems only just begin when savers identify a promising firm. This is the challenge of corporate governance—inducing managers to behave in the best of interests of investors.

Corporate governance is central to understanding economic growth in general and the role of banks in particular. The degree to which the providers of capital to a firm can effectively monitor and influence how firms use that capital has ramifications on both savings and allocation decisions. To the extent that savers effectively monitor firms and induce managers to maximize firm value, this will improve the efficiency with which firms allocate resources and make savers more willing to finance production and innovation. In turn, the absence of financial arrangements that enhance corporate governance may impede the mobilization of savings from disparate agents and also keep capital from flowing to profitable investments. Thus, the effectiveness of corporate governance mechanisms directly impacts firm performance with potentially large ramifications on national growth rates.

Individual shareholders try to exert effective corporate governance directly by voting on crucial issues, such as mergers, liquidations, and fundamental changes in business strategies, and indirectly by electing boards of directors to represent the interest of the owners and oversee the myriad of managerial decisions. If they can figure out what is going

on inside the firm and if they have the legal authority, shareholders can make informed decisions, vote accordingly, and induce executives to behave in their interests.

But, small, diffuse equity typically encounter a range of barriers to exerting sound control over corporations. This can allow managers to pursue projects that benefit themselves rather than the firm and society at large. In particular, small shareholders often are unable to figure out what is going on in corporations and corporate executives have enormous discretion over the flow of information to small investors. Furthermore, small shareholders frequently lack the expertise and incentives to monitor managers because of the large costs and complexity associated with overseeing mangers and exerting corporate control. This may induce a "free-rider" problem: Each investor relies on others to undertake the costly process of monitoring managers, so there is too little monitoring. The resultant gap in information between corporate insiders and diffuse shareholders implies that the voting rights mechanism will not work effectively.

Also, the board of directors may not represent the interests of minority shareholders. Although shareholders elect directors and although those directors are supposed to act in the interests of shareholders, management frequently "captures" the board and manipulates directors into acting in the best interests of the managers, not the shareholders. Finally, in many countries legal codes do not adequately protect the rights of small shareholders and legal systems frequently do not enforce the legal codes that actually are on the books concerning diffuse shareholder rights. Thus, small shareholders often cannot exert effective corporate governance, with adverse effects on resource allocation and economic growth.

One response to the inability of small shareholders to govern firms effectively is for firms to have a large, concentrated owner, but this ownership structure has its own problems. Large owners have greater incentives to acquire information and monitor managers and greater power to thwart managerial discretion. The existence of large shareholders, however, creates a different problem: Conflicts arise between the large shareholder and other shareholders. The large owner may expropriate resources from the firm, or provide jobs, perquisites, and generous business deals to related parties in a manner that hurts the firm and society, but benefits the controlling owner. Around the world, controlling owners are frequently powerful families that use pyramidal structures, cross-holdings, and super voting rights to magnify their control over many corporations and banks. And, these controlling families frequently translate their corporate power into political influence and use their influence to shape public policies in ways that protect them from competition and subsidize their ventures. Thus, highly concentrated ownership can distort corporate decisions and national policies in ways that curtail innovation, encourage rent-seeking, and stymie economic growth. While small, diffuse shareholders might be ineffective in exerting corporate governance, large shareholders might be too effective at extracting rents from the firm.

2.2.2 Banks and the governance of firms

Banks can address the corporate governance challenge. Individuals have a difficult time monitoring how firms use their investments, forcing managers to use their funds well, and stopping insiders from misappropriating their investments. They have a difficult time exerting corporate governance because they often do not have the time, expertise, or legal power. Individually, savers often cannot induce firms to behave in their interests.

Just as with screening, banks can do the corporate governance for many other savers. Banks become the "delegated monitor" that oversees the firm and makes sure they use the funds provided by savers in the best interest of those savers. Rather than expecting that each small saver will govern the firm or relying only on boards of directors, banks can perform this task for a large collection of savers. Furthermore, as banks and firms form long-run relationships, this can facilitate the flow of information, make it easier for banks to monitor firms and managers, and thereby enhance corporate governance.

The fact that banks typically make loans to firms, rather than purchase equity in them, can also improve the governance of firms with material ramifications on corporate performance. With loans, banks do not have to evaluate whether each dividend payment is appropriate. They simply need to make sure that the firm can make all loan payments, economizing on monitoring costs. Thus, banks can focus on the big, strategic decisions of the firm. Furthermore, by receiving a steady stream of loan payments, banks reduce the amount of cash available to executives. By shrinking the amount of cash available to executives for discretionary spending and investing, this forces those executives to make an explicit case to banks or other investors about how they plan to use additional funds. This can reduce managerial slack and impose greater discipline on firm investment decisions.

2.2.3 Banks, governance, and economic prosperity

How well banks exert corporate governance over firms is crucial for economic prosperity. To see this, consider the repercussions of banks performing this function poorly. If banks do a poor job of monitoring how firms use the savings of individuals, this means those banks will limit their investments to firms and individuals with lots of collateral:

If I can't figure out what you are doing with my money, I am going to make sure that you have something that I can take if you use my money poorly. This means that money will flow to people with the most wealth and not necessarily to those with the best ideas. And, this in turn means that (1) capital will be allocated inefficiently, slowing economic growth and (2) entrepreneurial opportunities will be limited to people from sufficiently wealthy families to come up with the requisite collateral. Thus, to the extent that banks perform corporate governance comparatively poorly, this will hurt the efficiency with which credit is allocated, limit entrepreneurial opportunities, and slow improvements in economic welfare.

The reverse is also true. Banks can materially enhance economic prosperity by contributing the effective governance of firms. When banks can both identify promising firms and monitor how those businesses use bank loans, this increases the flow of society's savings to those endeavors with the highest expected returns and reduces the degree to which accumulated family wealth shapes the allocation of credit. When banks effectively monitor businesses, this (a) reduces the likelihood that executives misappropriate funds, potentially leading to socially inefficient bankruptcies and layoffs, and (b) increases the likelihood that firms make decisions that improve productivity, with positive effects on wages. Thus, governing firms is a central and consequential role of banks. To the extent that they perform this function well, banks both expand economic opportunities and spur economic growth. Well-functioning banks foster growth and inclusive growth.

2.3 Facilitating the diversification and management of risk

2.3.1. Diversification and growth

People don't like risk. They might occasionally enjoy betting on a soccer game or playing the lottery, but on big decisions most

people try to minimize risk. Consequently, people will choose a more risky investment over a less risky one only if the riskier investment has sufficiently greater expected returns.

If people could find a way to diversify away some of the risk of more risky investments, they would allocate more of their savings to projects that are likely to have a more positive impact on economic growth. To see this, consider a simple example where there are three firms: Safe, Risky-1, and Risky-2. While riskier, Risky-1 and Risky-2 are expected to enjoy faster growth, greater profits, and demand more workers than Safe. Let's further assume that when Risky-1 does well, Risky-2 does poorly, and when Risky-1 performs poorly, Risky-2 succeeds. Thus, by investing in both Risky-1 and Risky-2, savers can diversify away the idiosyncratic risks associated with investing in either Risky-1 or Risky-2. Diversification encourages more investment in the more promising firms, which means that diversification encourages more investment in firms that are more likely to foster economic prosperity.

But, it is not easy to diversify away risk. There are minimum investments and costs associated with each investment. And, it takes time and expertise to evaluate the risks of different investments and which particular combinations of risky investments will diversify away risk. Many people do not have the time, skills, or resources to make all of these calculations and invest in a diversified portfolio of firms that lowers risk and facilitates more investment in the most promising firms. Unless, institutions arise to help people diversify risk, people in particular—and the economy in general—will invest little in the high-expected return firms with adverse consequence for economic growth.

2.3.2 Banks, diversification, and growth

Banks can help people diversify risk and thereby improve the allocation of capital. By reducing the risk associated with investing in

firms with a higher probability of accelerating growth and increasing wages, diversification can improve the allocation of capital, expand economic opportunities, and thereby improve living standards without increasing financial or economic fragility much. Thus, the degree to which banks facilitate the diversification and management of risk can materially influence economic prosperity.

For example, banks can mitigate the risks associated with individual projects, firms, industries, regions, countries, etc. Banks collect savings from many people and invest these savings in a diversified collection of firms, engaging in different projects, of often in different industries and regions, and sometimes even in different countries. This type of diversification might be especially important for innovation. The risks associated with technological innovation may discourage investors. However, the ability to hold a diversified portfolio of innovative projects reduces risk and promotes investment in such growth-enhancing activities. Thus, financial systems that ease risk diversification can accelerate technological change and economic growth.

Thus, people hire banks to evaluate the expected returns and risks of different investments and choose a mixture of investments that maximizes returns at the lowest possible risk. To the extent that banks provide this essential function—diversifying and managing risk—effectively, they improve the allocation of society's savings with positive effects on economic growth.

As another example, banks can reduce a different type of risk: the risk associated with macroeconomic fluctuations. Risks that cannot be diversified at a particular point in time, such as business cycles, need to be diversified over time. Long-lived banks can facilitate this intertemporal risk sharing by investing with a long-run perspective and offering returns that are relatively low in boom times and relatively high

in slack times. This type of risk management is extremely difficult for individuals to implement. But, banks can reduce the risks associated with the vagaries of the macroeconomic economy. This is another channel through which banks can improve the allocation of capital for the economy at large by managing risk for individuals.

As a final example of how banks can foster growth by diversifying and managing risk, consider liquidity. Liquidity reflects the cost and speed with which agents can convert financial instruments into purchasing power at agreed prices. Liquidity risk arises due to the uncertainties associated with converting assets into a medium of exchange. Liquidity can influence economic growth because some high-return projects require a long-run commitment of capital, but savers do not like to relinquish control of their savings for long-periods. Thus, if the financial system does not augment the liquidity of long-term investments, less investment is likely to occur in the high-return projects. Indeed, many products manufactured during the first decades of the Industrial Revolution had been invented much earlier. Rather, the critical innovations that ignited growth in 18th century England were the emergence of financial institutions and markets that reduced liquidity risk.

Banks can rescue the economy from the adverse repercussions of liquidity risk. Banks offer liquid deposits to savers and undertake a mixture of liquid, low-return investments to satisfy the day-to-day demands for deposits and illiquid, high-return investments to generate as large a return as possible to savers in the banks. By providing demand deposits and choosing an appropriate mixture of liquid and illiquid investments, banks can give savers what they want—quick access to their money with greater returns than they could get on their own—and banks give the economy a more efficient allocation of capital and faster

growth than it could achieve in their absence. To the extent that banks provide financial instruments to savers, invest in a diversified portfolio of assets, and engage in intertemporal risk sharing, they can materially enhance resource allocation and boost economic growth.

2.4. Mobilizing and pooling savings

It's not easy to get the money from disparate savers. Many economically profitable and socially productive activities require a large injection of capital that is beyond the means or inclination of any single investor. Unless economies can overcome the problems associated with mobilizing savings from disparate savers, they will not undertake many of these valuable endeavors. Indeed, Walter Bagehot, who was editor-in-chief of The Economist between 1860 and 1877, argued that a major difference between England and poorer countries was that the British financial system could mobilize resources from many individual savers, pool those savings, and invest them in "immense works" that sustained rapid rates of economic growth in England. In England, fewer good projects failed for lack of capital.

By mobilizing and pooling the savings of households and firms throughout an economy, banks can invest in large, productive projects that could not be easily financed with the funds of individual savers. The major benefit of effectively mobilizing savings is not that it increases the aggregate savings rate; rather, the major benefit is that it improves the allocation of savings. To see this, consider an economy in which everyone saves 20 percent of his or her income and invests it in his own business or in the business of a close relative. The aggregate savings rate is 20 percent, but individuals do not pool their savings to undertake large, productive investments because the economy has not overcome the problems associated with mobilizing and pooling the resources of disparate savers. If a mechanism emerges to mobilize savings and pool

them for investing in the best projects, then growth will accelerate even if people continue to save 20 percent of their incomes. In this way, banks can enhance the efficiency with which an economy allocates capital.

2.5. What is so special about banks?

Other components of the financial system also influence the allocation of savings, the efficiency with which those savings are used by firms and individuals, the ability individuals and firms to diversify and manage risk, and mobilization of savings for large, productive investments. For example, equity and bond markets provide mechanisms for firms, especially very large firms, to raise capital and a vehicle through which individual savers, especially wealthy savers, to diversify their savings. Mutual and pension funds can facilitate the use of such securities markets by mobilizing savings from disparate savers for investment in firms, and investment banks can help those firms issue securities to institutional investors.

But, these other components of the financial system do not substitute for banks, as shown by the work of Levine and Zervos, 1998a. Banks have several comparative advantages. For example, individuals and firms often seek to borrow money from the same banks in which they keep their deposits. This allows banks to obtain information about potential borrowers well before they ask for a loan that is less readily available to nonbanks and securities markets. And, this multifaceted relationship between banks and borrowers also helps banks monitor actual borrowers.

Furthermore, because many bank loans cannot be traded, banks typically have long-run relationships with their borrowers, which forces banks to focus on the long-run prospects of the firm. Since banks cannot as easily cut ties with their clients, banks invest in acquiring

information about firms and working with management. In contrast, holders of such securities may find it easier to sell their securities if they suspect that something is amiss with the firm rather than expend time, effort, and resources monitoring firms, pressuring managers to improve the firm, and renegotiating terms when appropriate. Thus, banks are typically comparatively effective screening borrowers and improving the governance of their clients.

Liquidity provision is another area in which banks typically provide unique services for large segments of the population. By making longer-term loans and issuing short-term deposits, banks create liquid assets for many individuals and firms. The point is not to argue that nonbanks and securities are unimportant. Rather, the point is that in many countries, banks are the dominant providers of key financial services: identifying good investments, mobilizing resource to fund those investments, monitoring how firms and individuals use those funds, and providing liquidity and risk services to individuals.

3. Do Banks Shape Economic Growth?

Yes. Though researchers will always call for more research, a large and growing body of evidence answers the question posed in the title of the chapter, *do banks shape economic growth*, with a confident yes. The evidence emerges from different researchers, using different methodologies, from different datasets, and different countries. While not every study finds strong evidence that banks shape growth, the preponderance of evidence indicates that better functioning banking system boost economic growth.

This chapter discusses some of this evidence. The first part of the chapter focuses on cross-country comparisons that examine whether countries with better functioning banking systems grow faster than

countries with more poorly functioning banks after controlling for many other determinants of economic growth. There are some unavoidable weaknesses with this approach, just as there are unavoidable weaknesses with every approach. The second part of the chapter focuses on a different approach—an approach that addresses weaknesses associated with cross-country comparisons—but that has its own distinct limitations. This second approach examines the individual states of the United States. This provides insights on the growth effects of improving banking systems in different years, but in similar economies at similar levels of economic development, and then tracing out the effects afterwards. The chapter concludes with still other methodologies that address concerns with first two approaches, but that also have their own shortcomings.

Critically for policymakers, all of the evidence points toward the same conclusion: The functioning of the banking system is vitally important for fostering improvements in living standards. While each approach has different weaknesses, they do not all have the same weaknesses. Yet, they all yield the same finding.

3.1. Evidence from Cross-Country Comparisons

3.1.1 Basics

One way to get a sense of just how important banks are for economic growth is to compare many countries over many years. One can evaluate the question: Do differences in functioning of national banking systems explain differences in long-run rates of economic growth? This is not an easy question. There are challenges to measuring differences in the quality of banking systems. There are challenges to isolating the relationship between banks and growth, since many other factors might be influencing economic growth and the functioning of banks. There are challenges to addressing issues of causality: Do banks influence growth, or does growth influence banks? Researchers have

worked hard to sort this out over the last half-century and have come to some qualified conclusions.

Methodologically, broad cross-country evaluations of the impact of financial development on growth use one observation per country, where the data are typically averaged over 30 or 40 years. So, the focus is on explaining why some countries grow faster than other countries over long period. In assessing the independent link between growth and the level of banking system development, researchers control for many other possible determinants of economic growth such as initial income, educational attainment, inflation, government spending, openness to trade, and political instability. These studies also examine whether banking system development is associated with productivity growth and capital accumulation, which are two channels through which the operation of the banking systems can influence growth.

To measure financial development, cross-country studies typically use *Private Credit*, which equals bank credit to the private sector as a share of gross domestic product. This measures the degree to which the banking system intermediates the flow of credit from savers to private firms households. It excludes bank loans to state-owned firms and the government based on the view that loans to the government and state-owned enterprises are not associated with the essentials of banking: mobilizing savings, screening potential borrowers, exerting governance over borrowers, and providing risk arrangements. This measure is not without its limitations since it does not directly measure the quality of all of the services provided by banks. While acknowledging these limitations, researchers have found similar results when using alternative measures of banking development. Since *Private Credit* is available for a wide group of countries over a long period of time, we use it here.

To start, consider the relationship between the level of banking system development in 1960 and the rate of economic growth from 1960 through 2005. Does the level of banking system development predict growth over the next 45 years, where growth is measured as the average annual rate of real per capita Gross Domestic Product (GDP) growth? There are data on *Private Credit* in 1960 and subsequent rates of economic growth for 100 countries. After ranking all countries from the lowest level of banking system development in 1960 to the highest level, take the first twenty five countries and compute the average annual rate of real per capital GDP growth among these twenty five countries and map the relationship between countries with low banking development in 1960 and subsequent growth. This can be done for each quartile.

Figure 1 shows that countries that started out in 1960 with greater levels of *Private Credit* grew faster over the next 45 years. The level of banking system development predicted growth over subsequent decades. For example, the 25 countries with the lowest level of banking development in 1960 had average levels of *Private Credit* of 11% and grew at an annual average rate of just over 1% during the next 45 years. However, the next quartile of countries as measured by banking development in 1960—the next 25 countries—had average levels of *Private Credit* of 22% and grew at more than double the rate of the first quartile of countries. There is a strong, positive relationship between banking development and economic growth.

Banks are special. When recreating this figure using inflation in 1960 instead of banking development, there is not a strong, negative relationship between inflation and growth. Inflation does not predict long-run growth. Similarly, when recreating this figure with measures of openness to trade, government deficits, government expenditures, or capital account openness in 1960, there is not a strong association with

growth. Among these key macroeconomic factors only banking system development is powerfully associated with future long-run growth. Banks matter.

While illustrative, there are limitations to drawing definitive inferences from this figure. In particular, this just graphs the relationship banking development in 1960 and subsequent growth. It does not control for other factors. Perhaps, political stability, good macroeconomic policies, and the education of the population are related to both banking development and growth. If so, Figure 1 might be measuring the combined influences of all of these factors on growth and not the independent impact of banking development growth.

3.1.2 Banking and growth: Controlling for other growth determinants

It is possible to address these limitations. Researchers assess the relationship between banking system development and economic growth while controlling for many other characteristics of the countries. In this way, it is possible to evaluate the connection between banks and growth while holding many other factors constant. In particular, to isolate the relationship between banks and growth, researchers control for initial income, educational attainment, macroeconomic policies, exchange rate policies, openness to trade, and political instability.

Figure 2 illustrates that countries with better-developed financial systems grow faster. The figure details the relationship between a country's average rate of economic growth over the 35 years between 1960 and 1995 and the average level of *Private Credit* over this period. Even after controlling for many other possible determinants of economic growth, such as initial income, educational attainment, inflation, government spending, openness to trade, and political instability, the figure indicates that greater banking system development is positively associated with additional growth. The figure is based on the study

by Levine, Loayza, and Beck (2000), who also show that financial development boosts growth primarily by enhancing the efficiency of capital allocation. The connection between financial development and the savings rate is weaker. Thus, it is the choices that the banking system makes in allocating society's resources that shape national growth rates. It matters who get the money.

3.1.3 The impact of banks on growth is large

To illustrate the economic magnitude of the estimated impact of banks on growth, first consider Argentina and Chile. Chile's value of Private Credit over the period 1960-95 was 27.8 percent of GDP, while the mean value was 15.7 for Argentina. Holding other features of the economies constant, the research by Levine, Loayza, and Beck (2000) suggests that if Argentina had the same level of banking development as Chile over these 35 years, then its average annual real per capita GDP growth rate would have been 2 per cent per annum rather than Argentina's actual real per capita GDP growth rate of 0.6 per cent per annum. This is large because of the power of growth, just as the power of compounded interest can yield enormous differences in savings from small differences in returns. The estimates suggest that holding other things about Argentina constant, its level of GDP per capita in 2015 would be double its actual level if it had adopted policies that allowed it to have the same level of banking development as Chile since 1960.[2]

The estimates indicate that even relatively small improvements in bank development can have consequential effects. For example, if the

2 To compute this, consider the smallest coefficient estimate (2.5) from Table 3 of Levine it al (2000) and note that the regressors are in logs. Thus, the projected increase in real per capita annual GDP growth in Argentina is 1.428 = 2.5*(Ln(27.8) – Ln(15.7)), so that projected real per capita GDP growth would be 2% per annum since actual growth was 0.6%. Accumulating over the 55 years between 1960 and 2015, this suggests that Argentine real per capital GDP would be more than double its actual level, i.e., $1.14 = (1.02^{55}/1.006^{55}) - 1$

level of banking sector development in Chile had been just 20% greater than it was over this period; 33.4 instead of 27.8, the statistical estimates indicate that the annual per capital growth rate in Chile over these 35 years would have been 0.46% faster, i.e., 1.91% per annum instead of 1.45.[3] This adds up. For example, accumulating this extra growth from 1960 to 2015, it means that the average Chilean would be 28% richer today, such that per capita income would be 11,260,389 Chilean Pesos instead of the projected 2015 value of 8,797,179. These types projections must be treated cautiously because they do not consider how the country improves its banking system. Nonetheless, the results do indicate that there are potentially enormous economic benefits associated with improving the quality of an economy's banking system.

3.1.4 Banks vs. Markets?

Two related questions that often arise in evaluating the relationship between finance and growth are the following: Can securities markets and nonbanks substitute for banks in providing growth-enhancing financial services and is it better for an economy to have a bank-based or a market-based financial system? These questions have existed since at least the late 19th century when people started comparing the comparative economic performances and financial systems of England and Germany. England was viewed as a market-based financial system and Germany was typically categorized as having more bank-centric financial system. While it was difficult to answer these questions in a statistically rigorous manner when comparing only

3 To compute this, again consider the smallest coefficient estimate (2.5) from Table 3 of Levine it al (2000) and note that the regressors are in logs. Thus, $0.46 = 2.5*(\text{Ln}(33.4) - \text{Ln}(27.8))$. Accumulating from 1960 through 2015, yields the estimated increase in per capital GDP of 28% i.e., $0.28= (1.0191^{55}/1.0145^{55}) - 1$.

two economies, researchers over the last couple of decades have been able to answer these questions by comparing many countries.

Research provides the following answers. Securities markets are not just casinos where the rich come to place their bets. Securities markets—and nonbank financial intermediaries more generally—often boost the quality and availability of growth-enhancing financial services. These are critical components of a vibrant, competitive financial system. But the strong, positive connection between banking system development and economic growth holds even when controlling for the level of stock market development and the development of nonbanks. This was first shown by Levine and Zervos (1998a), and has been confirmed by subsequent studies, including Beck and Levine (2004) and Demirgüç-Kunt, Feijen, and Levine (2012). Thus, securities markets and nonbank financial institutions do not substitute for banks. Even as these other components of the financial system grow, they do not reduce the growth-enhancing role of well-functioning banks.

With respect to the second question of whether bank-based or market-based financial systems are better for growth, the literature also provides a clear answer: Neither. Neither a bank-based or market-based financial system is better. As shown in the book by Demirgüç-Kunt, and Levine (2001c) and research papers by Beck and Levine (2002) and Levine (2002), the degree to which an economy has a bank-based or market-based financial system does explain economic growth. This finding does not vary by the level of economic development or the structure of the economy. After controlling for the overall level of financial development, the degree to which the financial system is bank-based or market-based does not account for differences in economic growth. Rather, this research shows that the overarching issue is the degree to which the overall financial system is effective at screening firms,

monitoring firms, mobilizing savings, and reducing risk. Across many economies and using many different methods, researchers find that banks provide services that are essential for economic prosperity and this powerful relationship between bank development and economic growth holds even when controlling for the effects of markets and nonbanks on economic performance.

3.1.5 A few considerations

Although Figures 1 and 2 illustrate a strong, positive relationship between banking system development and economic growth across countries, skeptics might have lingering doubts. Countries have so many differences that it might be impossible to control for all of them in assessing the impact of banks on growth. Perhaps, something else shapes both the level of banking development and the rate of economic growth, such that banks do not exert an impact on growth that is independent of this "something else." Although researchers control for everything possible, skeptics can always raise the possibility that something else drives the results, arguing that it is just too difficult to satisfactorily control for all of the differences between Haiti and Germany.

Skeptics might raise another concern about cross-country studies. The measure of banking development, *Private Credit*, might not be an accurate proxy of how well banking systems mobilize savings, screen potential borrowers and allocate credit to the best ones, make sure that borrowers use the credit wisely, and provide mechanisms for firms and people to manage risk. Although *Private Credit* might be the best measure possible when examining the relationship between banking system development and growth across 100 countries and over several decades, it would be valuable to get other types of information on the role of banks in stimulating economic growth.

3.2. Evidence from Cross-State Comparisons

3.2.1 The history of U.S. banking is unique and useful

It would be ideal to conduct a laboratory experiment on the relationship between banking systems and growth. In such an experiment, researchers could take many similar economies and randomly give some a different banking system. Then researchers could compare what happens to economies that did not receive the different with those that did. This is what happens in medicine. Doctors take similar patients and randomly give some a different medicine. The researchers then compare the health outcomes of those that receive the medicine with those who do not. If people taking the medicine enjoy a distinct improvement in health relative to the control group, this provides evidence that the medicine works. Unfortunately for the study of banking and growth, countries will not allow researchers to randomly assign them different banking systems and evaluate what happens after a decade or two.

Fortunately, the history of banking systems in the individual states of the United States provides a quasi-experiment of the impact of banks on economic growth. For most of the history of the United States, each individual state imposed regulatory restrictions on the geographic expansion of banks. Most banks were licensed by a state and supervised and regulated by authorities in that state. The first type of geographic restriction—interstate bank regulations—involved limitations on the entry of banks from other states. In particular, states prohibited the entry of banks from "foreign" states to protect their "domestically" licensed banks. The second type of geographic restriction—intrastate branch regulation—involved limitations on the ability of banks to establish branches throughout the state. In some cases, banks were limited to have one building. In other cases, banks could only establish a limited number of branches within a city's limited geographical area. Each type

of regulation limited the ability of banks to expand geographically and compete for customers. These regulations boosted the number of banks by creating many localized monopolies where local banking markets were protected from banks from different states and cities.

These regulatory restrictions on the geographic operations of banks hurt the functioning of banks, but boosted the profits of bankers. By restricting competition among banks and the contestability of banking markets, the regulations boosted the price of banking services, increased the cost of borrowing, decreased interest rates offered to depositors, diminished incentives to improve banking services, and bloated the profits of banks. Once these regulations were in place, politicians found it impossible to get rid of them. Although high-level officials and influential politicians noted the growth-reducing effects of these geographic restrictions, they had powerful constituencies. Inefficient banks that would be unable to compete in a less protected system certainly spent considerable funds contributing to political campaigns to maintain these restrictions. And, some populist politicians successfully argued that small, local banks would more successfully promote local economic development than larger banks. Thus, for much of the 20th century, these state-level regulatory restrictions endured, hindering the operation of the U.S. banking system.

It would be a mistake to view the unique history of U.S. bank deregulation as entertaining to scholars but useless to policy makers today. The history of U.S. banking deregulation addresses the following concerns with using cross-country comparisons to assess the impact of banks on economic growth: the difficulties in controlling for all of the differences between countries, the difficulties in measuring the quality of banking systems in different countries, and the challenge of isolating the impact of a change in the quality of the banking system on economic

growth. By examining the states of the United States, researchers address these concerns and provide more confident information to current policy makers about the role of banks in shaping economic prosperity.

3.2.2 A quasi-experiment

The experiment stated in the mid-1970s. Individual U.S. states started removing regulatory restrictions on opening banks branches within the state's borders. States changed their regulatory restrictions on intrastate branching in different years over the period from 1973 through 1995. Similarly, in different years, states also started lifting restrictions on interstate banking, allowing banks from "foreign" states to enter their borders. The driving forces behind these deregulations were largely independent of state-specific economic performance. Technological, legal, and financial innovations diminished the economic and political power of banks benefiting from geographic restrictions on banking. The invention of automatic teller machines (ATMs), in conjunction with court rulings that ATMs are not bank branches, weakened the geographical bond between customers and banks. Furthermore, checkable money market mutual funds facilitated banking by mail and telephone, which weakened local bank monopolies. And, improvements in credit scoring techniques, information processing, and telecommunications reduced the informational advantages of local banks. These innovations reduced the monopoly power of local banks and therefore weakened their ability and desire to fight for the maintenance of these restrictions on competition. State by state, the authorities removed these restrictions over the last quarter of the 20th century.

This is a quasi-experiment because it involved states in the same country removing geographic restrictions on banking in fairly random years. It provides a natural setting for assessing the question: When 50

similar economies experience the same regulatory change in different years, what happens to the banking system and to the economy in general.

The first result from this experiment is that banking system got better, much better. The reforms intensified competition among banks and triggered improvements in banking services, reducing interest rates on loans, raising them on deposits, lowering overhead costs, spurring the development of better techniques for screening and monitoring firms, and reducing the proportion of bad loans on the books of banks. The lifting of geographic restrictions on banking intensified competition, improved the functioning of the banking system, and did not increase fragility.

This first result allows researchers to pose a more important question: When 50 similar economies get a better banking system in different years, what happened to economic growth? To examine growth, Figure 3 traces out the year-by-year effects of the removal of geographic restrictions on intrastate bank branching on the logarithm of Gross State Product per capita (*GSP*). That is, Figure 3 plots output per person in states during the decade before a state removed impediments to the geographic operation of banks and then plots what happens after states deregulated impediments to intrastate branching. The Figure uses the year of deregulation as the benchmark year, so that output per person in each year is measured relative to *GSP* in the year of deregulation. The year of deregulation is set equal to zero for all states, so that -1 is one year before deregulation and +2 is two years after deregulation. The calendar year corresponding to the year of deregulation is different for different states. Figure 6 plots the results and the 95% confidence intervals, to get a sense of how much confidence we should have in these plots.

Figure 3 illustrates a very important finding: the removal of geographic restrictions on intrastate banking—which improved the quality of banking services—boosted economic growth. There is a material increase in output per person immediately after deregulation and the impact of the better banking system on economic growth in the state increases over time. The acceleration of economic growth does not occur because of an increase in the savings rate; rather, it occurs because when banks were faced with greater competition, they improved their systems for screening borrowers, getting funding to the best ones, and exerting governance over firms to which they lent money. Thus, even when limiting the analyses to 50 economies within one country, a shock to the quality of each economy's banking system in different years triggered a boost in living standards for the average person.

3.3. Case-studies and More Microeconomic Evidence

3.3.1 Studies of particular countries

Several studies dig into the details of countries other than the United States to assess the relationship between banks and growth. First, consider the case of Italy, which is insightfully addressed in Guiso, Sapienza, and Zingales (2004). They examine the individual regions of Italy. Using data on households and financial services across Italy, they examine the effects of differences in local financial development on economic activity across the regions of Italy. The key finding is that local financial development (i) enhances the probability that an individual starts a business, (ii) increases industrial competition, and (iii) promotes the growth of firms. These results are weaker for large firms, which can more easily raise funds outside of the local area. This study ameliorates many of the weaknesses associated with examining growth across countries.

Next, consider Haber's (1991, 1997) comparison of industrial and capital market development in Brazil, Mexico, and the United States between 1830 and 1930. Using firm-level data, he finds that capital market development affected industrial composition and national economic performance. Specifically, Haber shows that when Brazil overthrew the monarchy in 1889 and formed the First Republic, it also dramatically liberalized restrictions on Brazilian financial markets. The liberalization gave more firms easier access to external finance. Industrial concentration fell and industrial production boomed. While Mexico also liberalized financial sector policies, the liberalization was much more mild under the Diaz dictatorship (1877-1911), which " . . . relied on the financial and political support of a small in-group of powerful financial capitalists." (p. 561) As a result, the decline in concentration and the increase in economic growth were much weaker in Mexico than in Brazil. Haber (1997) concludes that (1) international differences in financial development significantly impacted the rate of industrial expansion and (2) under-developed financial systems that restrict access to institutional sources of capital also impeded industrial expansion.

Banks have also been essential for the economic development of France. Bertrand, Schoar, and Thesmar (2007) examine the impact of deregulation in 1985 that eliminated government intervention in bank lending decisions and fostered greater competition in the credit market. They find that after deregulation, banks bailed out poorly performing firms less frequently, increased the cost of capital to poorly performing firms, and reallocated credit to more efficient firms. The improvement in banking lowered industry concentration ratios and boosted both entry and exit rates for firms. While not directly tied to growth, this research suggests that better functioning banks exert a first-order impact on the structure and dynamics of product markets.

Finally, a rich economic history literatures examines (1) the historical relationships between banking development and the early stages of industrialization for England (1750-1844), Scotland (1750-1845), France (1800-1870), Belgium (1800-1875), Germany (1815-1870), Russia (1860-1914), and Japan (1868-1914) The body of work finds that in Scotland and Japan, but also in Belgium, Germany, England, and Russia, the banking system played a positive, growth-inducing role. Although disagreement exists over many of these individual cases, a rich body of country-studies suggests that well-functioning financial systems spur economic growth.

3.3.2. Industry-level and firm-level studies

To better understand the relationship between banks and growth, it is possible to examine what is going on at the industry and firm level. The question becomes, if banks are really driving growth, then they exert an especially big impact on firms and industries that are heavily dependent banks for growth. Answering this question involves digging more into the details of how banks shape the economic growth of entire economies. It involves examining particular industries and firms.

Consider first the influential study by Rajan and Zingales (1998). They argue that industries that are naturally heavy users of bank credit should benefit disproportionately more from greater banking development than industries that are not naturally heavy users of external finance. To measure which industries are "naturally heavy users" of bank credit, they assume that the banking system in the U.S. is one of the most developed in the world, so that the degree to which industries depend heavily on bank credit in the United States provides information on their natural dependence on bank finance. They then examine whether industries that are naturally more dependent on bank

credit—as defined by the U.S. benchmark, grow comparatively faster in countries that have more developed banking systems. If they do, then such evidence would suggest that banks promote growth by easing the flow of credit to exactly those firm and industries that we think would benefit most.

The results indicate the better-developed banking systems boost economic growth by accelerating the rate of growth of firms that are naturally dependent on banks. Banking system development disproportionately boosts the growth of industries that are naturally heavy users of bank credit. The effects are big. Compare Machinery, which is an industry at the 75th percentile of bank dependence, with Beverages, which is at the 25th percentile of dependence. Now, consider Italy, which has fairly well developed banking system, at the 75th percentile of the global sample of countries, and the Philippines, which is at the 25th percentile. Due to differences in bank development, the study indicates that Machinery should grow 1.3 percent faster than Beverages in Italy in comparison to the Philippines. The actual difference is 3.4, so the estimated value of 1.3 is quite substantial and suggests that bank development helps account for a large proportion of the differences in industrial growth rates between these two economies.

Researchers have built on this work to examine small firms. Beck, Demirguc-Kunt, Laeven, and Levine (2005b) examine whether industries that are naturally composed of small firms grow faster in economies with better-developed banking systems. They too use the United States as benchmark, so that the sizes of firms within industries in the U.S. reflect natural dependence of an industry on small firms. They discover that industries that are naturally composed of smaller firms grow faster in countries with better-developed banks. These results are consistent with the view that small firms face greater barriers to raising

funds than large firms, so that improvements in the banking system disproportionately help these smaller firms, as the better banking system allows them to access the banking system and grow.

4. It's Not Just About Growth

4.1 Banks and Economic Opportunity

The press and politicians often accuse banks of increasing inequality. Some argue that banks take from the many and give to the few. Others argue that even if banks increase average growth, they increase the average by helping the rich, not by helping the middle class or the poor. From this perspective, it might be better for society as a whole to experience somewhat average growth to have more inclusive growth that pulls up those in the middle and at the lower end of the income distribution. Such arguments can motivate the imposition of taxes and regulations to limit the functioning and growth of banks in an effort to foster greater prosperity for more.

But, is it true that banks increase inequality? Do banks disproportionately help the rich, perhaps even at the expense of others? The arguments and evidence presented earlier on how banks shape

economic growth should make us skeptical about the view that banks increase inequality. As discussed, banks promote growth by funneling capital to more economically productive endeavors. The term "more economically productive endeavors" refers to endeavors with larger risk-adjusted returns. The term does not refer to productive endeavors backed by more wealthy families.

To the extent that some promising entrepreneurs without much accumulated wealth have more economically productive endeavors than entrepreneurs from rich families, banks that shift the flow of credit to the more economically productive firms will spur growth and expand opportunities. Better banking systems—banking systems that provide higher quality financial systems—funnel capital to more economically productive endeavors; they put more weight in their allocation decisions on expected risk-adjusted returns and less weight on the ability of the borrower to post collateral because one of the definitions of a better banking systems is a system that can better screen borrowers.

Thus, by reducing the connection between wealth and access to credit, better banking systems can both expand economic opportunities and spur growth. It is not growth or opportunity; it is growth and opportunity. Weakening the link between wealth and credit can both expand the economic opportunities of those with less wealth and permit a growth-enhancing improvement in the allocation of capital.

Banks can also address another potential source of inequality. Do the wealthy get a higher return on their savings than others? If so, this can produce persistent and growing inequality, as the wealth of the wealthy grows at a faster rate than wealth of others. There are many reasons why lower income individuals might be unable to invest in the higher-return investments available to the wealthy. There might be high fixed fees associated with purchasing some assets. Such fees would be

a negligible proportion of a large investment, but a prohibitively hefty component of a smaller investment. Similarly, there might be minimum investment requirements. For example, a firm may not want to manage the mobilization of savings from and the servicing of payments to many small investors. Thus, they might impose a minimum investment size that limits the investment opportunity to people with the means to make such large investments. The concern is that the wealthy would not only have more savings, but they would also enjoy faster rates of growth in the value of those savings.

One of the definitions of a well-functioning banking system is one that reduces the costs of mobilizing and pooling savings. That is, they reduce the fees and minimum investment requirements facing individuals by allowing them to invest in the more productive investments than they could manage without banks. In this way, better banks boost the returns to savers and reduce the degree to which the wealthy have exclusive access to higher returns investment opportunities.

The point is not that all banks around the world provide financial services that eliminate the advantages of being rich. The point is that as banks become better at providing key services to the economy, this can expand economic opportunities for lower income individuals.

Banks can help make the competitive playing field among entrepreneurs more equal. It's hard to get the money—and it's even harder to get it from strangers. Thus, family wealth directly facilitates entrepreneurship as the family can finance business endeavors. Furthermore, that wealth can act as collateral, making it easier to get money from other savers. Hence, these features can affect the ability of individuals to become entrepreneurs and to grow their businesses with material implications for inequality and the intergenerational persistence of inequality.

Banks can rescue economies from self-perpetuating inequality. The degree to which the banking system provides high-quality banking functions—mobilizing and pooling savings, screening and allocating capital to those with the best projects, exerting governance over the use of that capital, and facilitating risk diversification and management—defines the contours of the economic horizons facing potential entrepreneurs throughout society. Well-functioning banks can expand economic opportunities in their quest to invest in the most economically profitable endeavors. They will never eliminate the advantages of being rich, but they can make it less of an advantage.

4.2 Do Banks Disproportionately Help the Poor? Evidence from around the world

The operation of the financial system can also influence the distribution of income in a variety of ways, some of which disproportionately help the poor and others of which primarily boost the incomes of the rich. First, better-functioning banks focus more on a person's ideas and abilities than on family wealth and political connections when allocating credit. Second, by enhancing the quality of financial services, financial development will naturally benefit heavy users of financial services, which are primarily wealthy families and large firms. Finally, finance can also affect the distribution of income through its effects on labor markets. For example, improvements in finance that boost the demand for low-skilled workers will tend to tighten the distribution of income. And, the financial system helps determine whether people live in a dynamic, growing economy or whether they must find work in a more stagnant environment.

4.2.1 Inequality

Consider the same types of cross-country analyses used to examine economic growth, but now consider growth in inequality, not growth in GDP. To measure inequality, researchers use the *Gini coefficient*, which measures the difference between the actual distribution of income and the distribution that would exist if everyone received the same income. This measure of inequality is a statistical measure; it is not a normative description of how things should be. Researchers can use the growth rate in this statistic to assess the relationship between the functioning of the banking system and the evolution of income inequality in society.

Figure 4 illustrates that countries with better-developed banking systems tend to experience reductions in income inequality, as measured by the growth rate of the *Gini coefficient* of income inequality. These estimates are conducted over the period from 1980 through 2005 due to limitations on data on income inequality. As shown, well-developed banks are disproportionately beneficial to those in the lower part of the income distribution. Critically, this result holds when controlling for the economy's aggregate growth rate and the level of overall economic development, as well as a wide array of other country-specific characteristics (Beck, Demirguc-Kunt, and Levine 2007). Thus, it is not just that better banks reduce income inequality by spurring growth. Rather, above and beyond any effect running through economic growth, better-developed banking systems are associated with reductions in income inequality.

To illustrate the economic magnitude of the impact of banking system development on income inequality, consider the case of Chile. Over this period, income inequality in Chile, as measured by the *Gini coefficient*, grew at 0.5% per annum. This is fast, as only a

few countries—including the United States—had more rapid rates of inequality growth between 1980 and 2005. The estimates in Table 4 of Beck, Demirguc-Kunt, and Levine (2007) indicate that if Chile had 20% greater banking system development, i.e., average *Private credit* of 0.646 over these 25 years rather than 0.538, then the growth rate of income inequality would have been 40% less than it was.[4] The estimates indicate well-functioning banking systems can exert a powerful helping hand in reducing income inequality.

There are several concerns with simply examining income inequality. First, if income inequality falls, this can happen because the rich get poorer, or because the poor get richer, or because of some combination of the two effects. The *Gini coefficient* of income inequality does not provide information on what exactly is shaping the change in inequality. Second, inequality per se is not necessarily an accurate indicator of prosperity. If everyone is much better off than they were but the rich are much, much better off, then simply showing that inequality rose misses the point that everyone is better off.

Fortunately, there are other measures that address these concerns. It is possible to assess the linkages between banking development and the incomes of the poor. Thus, rather than examining income inequality in general, it is possible to examine (1) what is happening to the incomes of the poor in particular and (2) what is happening to the incomes of the poor relative to the incomes of the average person in the economy. In this way, researchers can address the questions: How do better banking

4 To compute this, consider regression (7) of Table 2 in Beck et al (2007), which provides estimates of the exogenous impact of *Private credit* on the *Growth of Gini*, which is the growth rate in the Gini coefficient over the period from 1980 through 2005. Then, the estimated change in the Growth of Gini from a 20% improvement in banking system development in Chile is -0.002 = -0.011*(Ln(0.646) – Ln(0.538)). Since Chile's actual Growth of Gini over this period was 0.005, the boost in banking system development would cut the growth rate in inequality by 40%.

systems influence people in the lower part of the income distribution? Is banking just about the rich?

4.2.3 Finance the poor

Figure 5 shows that bank development disproportionately boosts the incomes of people in the lower end of the distribution of income. Figure 5 focuses on the poorest 20% of the population, those in the poorest quintile of income. For each country, the figure considers the average annual growth rate of the incomes of the poorest 20% of the population over the period from 1960 through 2005 and relates it to the level of banking development, as measured by *Private Credit*. As illustrated in Figure 3, *Private Credit* is associated with an acceleration of income growth of the poorest quintile, even after controlling for many other country characteristics, including the average rate of economic growth and the average level of income per capita in the economy. This is important to emphasize. The evidence is consistent with the conclusion that better functioning banks increase the incomes of the poor more than they increase the incomes of the average person in the economy: Better functioning banks help the poor more than they help the rich!

The estimated effects are big. Again, consider the case of Chile, and again consider a 20% improvement in the average level of banking sector development over the period from 1960-2005, as measured by a value of *Private credit* of 0.646 rather than the actual value over the estimation period of 0.538. The estimates from Beck et al (2007) (Table 3 column 7) indicate that income growth of those in the first quintile of the earnings distribution would be one-third of a percentage point faster per year than it would have been without the improvement in the banking system. Note, this is above and beyond the impact of banking development on the income growth of the average person in Chile, as

these analyses control for the growth rate of average GDP per capita.[5] Thus, while banking sector development boosts the growth rate of the income of the average Chilean, it boosts the incomes of lowest earning workers by still more.

One can push this still further and focus on the extremely poor, i.e., those living on less than two-dollars per day. Since these data only exist since 1980 and only exist for less developed economies, the analyses are conducted over the 1980 to 2005 period for less developed countries. For each country, Figure 6 depicts the result of analyses that consider the average annual growth rate of the proportion of the population living on less than two-dollars per day over the period between 1980 and 2005 and the level of *Private Credit*. Figure 6 shows that bank development is associated with reductions in the fraction of the population living in such extreme poverty. Critically, these results hold when controlling for growth rate of the incomes of the average person in the economy. Thus, it is not just that better banking accelerates economic growth and this growth trickles down to the poor. Rather, the results are consistent with the view that better banking systems exert a *disproportionately* positive influence on the poorest individuals: Better functioning banks help the poorest more than they help the rich.

4.3 Do Banks Disproportionately Help the Poor? U.S. Evidence

As stressed above, cross-country comparisons have limitations. In comparing the banking systems and economic growth rates of Singapore and the Congo, is it possible to control for everything else that might be going on and identify and independent link between banks and growth? Could "something else" be driving both the differences in banking systems and the rates of economic growth, such that banks

5 This is computed as follows: 0.33% =0.018*(Ln(0.646) - Ln(0.538)), where the coefficient estimate of 0.018 is from Beck et al (2007).

do not independently shape growth? And, *Private Credit* might not accurately capture the differences in the banking systems in Switzerland and Burundi. Is there a way to augment the cross-country analyses presented above?

We can again consider the lifting of regulatory restrictions on the geographic expansion of banks by the individual states of the United States and assess whether these regulatory changes—that enhanced the functioning of banking systems within the deregulating state—affected income inequality and the comparative incomes of the poor. Recall, starting in the mid-1970s the individual states of the United States started removing regulatory restrictions on the opening of banks branches within a state's borders. States changed their regulatory restrictions on intrastate branching in different years over the period from 1973 through 1995. We call this an "experiment" because it involved the random removal of the same regulatory restriction in different states in different years. The removal of these restrictions intensified competition among banks the contestability of banking markets with a state. Critically, it improved the state's banking system, reducing interest rates on loans, raising them on deposits, lowering overhead costs, spurring the development of better techniques for screening and monitoring firms, and reducing the proportion of bad loans on the books of banks.

These regulatory reforms that improved the banking systems in individual U.S. states materially reduced income inequality. Figure 7 traces out the year-by-year effects of the removal of geographic restrictions on intrastate bank branching on the *Gini coefficient* of income inequality in the deregulating state. In tracing out the effects, year zero is the year that the state deregulated, where the actual calendar year of deregulation differs across states. Thus, year -2 is two

year before the deregulation and year +2 is two years after the state removed restrictions on intrastate branching. The dashed lines in the figure represent the 95% confidence interval, and these assess the degree of statistical confidence that we can have in the results.

The results indicate that improving the banking sector lower income inequality. After controlling for national factors influencing income inequality (i.e., time fixed effects) and after controlling differences across states (i.e., state fixed effects), Figure 6 shows that inequality in a state fell materially after the state deregulated. In the average state, the *Gini coefficient* falls by almost four percent following deregulation relative to the change in inequality in the overall U.S economy. Note that income inequality is growing in the United States over this period. Thus, the results in Figure 6 indicate that when a state improved its banking system, this materially counteracted this effect. Better banking exerted a dampening effect on the growth in income inequality.

But, did inequality fall because the rich grew poorer or because the poor became richer? The Gini coefficient measures the deviation between an economies actual distribution of income and the "perfectly equal" distribution where everyone receives the same income. Thus, reductions in the Gini coefficient can arise for many reasons, including simply by reducing the incomes of higher income people.

Figure 8 shows that in response to regulatory reforms that improved the banking sector, income inequality fell because the poor grew richer—better banks disproportionately helped those at the lower end of the income distribution. In particular, the figure examines the impact of branch deregulation on the incomes of the lowest 5% of income earners, the next 5% of income earnings, the next%, and all the way up to the highest 5% of income earners. For each of these

groups of income earners, the figure shows how much their incomes grew in response to the regulatory reforms that boosted the banking systems in the U.S. states. The dark bars in the figure show that the result is statistically significant. The lighter colored bars indicate that the results are too imprecisely estimated to have much confidence in the estimated impact on earnings. In this way, Figure 8 illustrates what happened to the incomes of people across the full distribution of incomes. The picture is clear. Bank deregulation increased the incomes of the poorest 35 percent of the population and did not have an appreciable effect on the others.

Unemployment is painful. Besides the contemporaneous loss of income, unemployment hurts future prospects in the labor market. Furthermore, one's feelings of self-worth are often tied to working and producing something useful. Unemployment can trigger an assortment of bad behaviors, such as alcoholism and crime, which have adverse repercussions beyond the drop in income. To the extent the banking sector influence the rate of unemployment, this presents another channel through which banks influence economic prosperity.

Better banking reduces unemployment too. Figure 9 shows that the rate of unemployment falls when a U.S. state improved its banking system by lowering barriers to intrastate branching. As in the figures above, these analyses control for unemployment in the overall U.S. economy. Thus, the figure depicts what happens to unemployment in a state relative to unemployment in the overall economy. It shows that after deregulation, a state's unemployment rate falls relative to the average across all U.S. states. The figure also controls for all of the details of each individual state. Thus, the estimated impact of bank deregulation on unemployment is not capturing something particular about each state. Figure 9 shows that improvements in a

state's banking system were associated with a significant drop in the unemployment rate, with a cumulative effect of more than two percentage points after 15 years. Thus, beyond bank deregulation's positive effect on the incomes of lower-income individuals, it also reduced the unemployment rate.

4.4 It's About More than Growth

The last chapter showed that better developed banks accelerate economic growth. When banks effectively mobilize savings from disparate savers, screen borrowers and allocate capital to the most promising endeavors, monitor and govern the use of that capital, and provide mechanisms for individuals and firms to manage risk this improves the allocation of resources with positive ramifications on the long-run growth rate of average GDP per capita. The last chapter also showed that the channel running from banks to growth runs through efficiency. Better functioning banks boost growth by improving the allocation of savings, not by boosting the savings rate. But, the last chapter focused on the average person, assessing what happens to the income of the average person in an economy. Focusing on the average person has its limitations, as more than what is happening to a hypothetical average person defines a nation's economic prosperity.

In turn, this chapter addressed the following distinct questions: Do more developed banks increase inequality? Do banks simply collect money from the many and give it to a few of the elites, expanding income inequality? Does the financial system in general and banks in particular help the rich get richer without helping those at the bottom of the economic ladder?

The chapter answered these questions with a resounding no: Better functioning banks do not increase inequality and they do not

simply help the rich. In fact, the evidence points in exactly the opposite direction. The very essence of what it means to have a better developed banking system—a system that more effectively mobilizes savings for the most promising endeavors—will boost the efficiency of resource allocation, accelerate growth, and expand economic opportunities. This definition of a better-developed banking system is about getting resources to the most promising endeavors. By doing this, better-developed banks expand economic opportunities, improve resource allocations, and encourage economic growth.

The empirical evidence is unambiguous: Better-developed banks reduce inequality by boosting the incomes of lower-income households. It is not just that better banks *also* help the poor. Better functioning banking systems disproportionately help lower income households. Better finance is especially good for the poor. This conclusion emerges from cross-country studies that examine many countries over several decades. These results also emerge from detailed studies of the U.S. states that reduce many concerns when considering many different countries over long time periods. This research also indicates that regulatory reforms that permit competition among banks tend to improve the functioning of banking systems, triggering the acceleration of growth and the reductions in income inequality.

Research also tells us how this works. A common theme in development economics is that better credit markets increase the number of entrepreneurs, spurring improvements in economic welfare. Think of a woman selling peaches from a rented stand on a street corner. The common narrative goes something like the following. If she can borrow, to buy the fruit stand, rather than renting it out at exorbitant rates, she can accumulate capital and earn more money. From this perspective, better banks boost economic development by increasing the number

of business owners. An alternative view rejects the notion that more entrepreneurs are better for economic development and embraces the notion that better entrepreneurs are better for economic development. In particular, the alternative narrative goes as follows. There are lots of fruit stands because there is a monopolist super market that sells fruit at high prices, but offers the convenience of one-stop shopping. Thus, some people forgo this convenience and buy fruit at lower prices from vendors on street corners. From this perspective, better banks boost economic development by mobilizing capital and allocating it in a manner that allows a new supermarket to arise and compete with the monopolist. From this perspective, the new supermarket will hire at higher wages those formerly selling fruit on street corners to work in the supermarket. From this perspective, better banks boosts the earnings of the poor by creating a more dynamic, competitive labor market.

This is what the data tell us: Better banking systems boost the incomes of the poor by increasing the demand for labor. This emerges from the study of Beck Levine, and Levkov (2010). They show that when regulatory authorities remove poor policies and thereby improve the functioning of banking this causes (1) more business entry and exit but little change in the actual number of businesses, (2) an increase in the demand for labor, so that wage earnings rise, unemployment falls, and the average number of hours worked by salaried workers increases, and (3) the drop in income inequality is accounted for by the increased demand for lower income labor and note from increased changes in the earnings of business owners.

It is not that better banking systems increase the number of entrepreneurs; rather, better banking systems give more people access to capital and make the market more competitive. Better banking systems increase the quality of entrepreneurs, weeding out the bad ones and

providing the resources for the most promising ones to succeed. The more dynamic economy that emerges in response to a better banking system improves the labor market in which workers search for jobs. It is through the improved labor market that better banks primarily help the poor.

5. Financing innovation

In 1911, the famous and influential economist Joseph Schumpeter argued that the banker is not primarily a middleman; rather, the banker authorizes the entrepreneur in the name of society to innovate. Schumpeter's view of banks fits his "creative destructive" view of economic growth in which new goods, services, and production processes replace existing ones. According to Schumpeter, the banker chooses which businesses get the resources to engage in the costly, risky process of creating something new. The banker screens and allocates capital to those with the highest probabilities of innovating and bringing goods, services, and production processes to the market. And, in so doing, banks accelerate the exit of less productive firms. Thus, Schumpeter argued that better banking systems facilitate the entry

of promising business, the exit of less promising ones, and thereby accelerate the rate of technological innovation.

But, is he right? Do better banking systems facilitate entrepreneurship and innovation? This chapter first examines whether more competitive banking systems spur entrepreneurship. It then evaluates whether more developed banking systems spur technological innovation.

5.1 Finance and entrepreneurship

People need money to be entrepreneurs. Banks have the money. Therefore, the functioning of the banking system has first-order implications on the degree and quality of entrepreneurship in an economy. Put differently, when banking systems do not operate effectively, they often collect society's savings with one hand and pass it along to large number of incumbent firms with the other, stymieing entrepreneurship.

A wealth of research indicates that banks affect entrepreneurship through several channels. When there is greater competition among banks, this increases rates on deposits, pushes down rates on loans, enhances the screening of loans, and induces banks to search out those entrepreneurs with the most promising ideas. In this way, more competitive banking systems intensify competition among nonfinancial sector firms by making the market more contestable. Evidence from across different countries suggests that banking competition fosters a more competitive and open industrial sector (Cetorelli and Gambera, 2001). Although banks with market power tend to favor firms with whom they have established relationships, greater competition among banks breaks these bonds and opens the market to new entrants and banks must identify and fund the best firms, not the ones with which they

have long relationships. A better banking system fosters competition, entrepreneurship, while expanding economic opportunities.

Turning from the cross-country evidence to comparisons of U.S. states, research further emphasizes the impact of banks on entrepreneurship. Researchers have constructed the same analyses on the entry of new firms following the deregulation of restrictions on bank competition by individual states in the United States. The results indicate that regulatory reforms that improved the banking system materially accelerated the rate of new firm formation. A better banking system facilitated the entry of new firms. The impact is big. Five years after regulatory reforms enhanced state's banking system, new firm formation is almost 25 percent greater than it would otherwise have been.

The boost in entrepreneurship, however, does not mean that there are more businesses. Better banking systems spur competition among firms by lowering the barriers to new firm entry. This greater competition drives out less productive incumbent firms. Regulatory reforms that improved the banking systems of U.S. states also materially accelerated the rate of exit of old firms. As emphasized above, better banks facilitate the entry of more promising firms and the exit of less promising ones, boosting the productivity of the overall economy.

5.2 Finance and innovation

As has been shown thus far, banks shape the rate of economic growth, the economic opportunities available to lower income households, the dynamism of the economy, as measured by entrepreneurship, and the efficiency with which resources are allocated. The functioning of the banking system influences economic prosperity and the rate at which the economy improves living standards for all.

But, do banks influence the rate of technological innovation? Many stress that other components of financial systems matter for invention and innovation. A long history emphasizes the stock markets are crucial to financing young start-up firms. People point to the big initial public offerings (IPOs) as evidence of the role of stock markets in stimulating innovation. More recently, venture capital firms and private equity firms take a leading role as protagonists in financing innovation and the next generation of technologies that improve living standards. But, what about banks: Does the functioning of the banking sector influence innovation?

The answer is again found in the core functions provided by banks to the economy. To the extent banks seek to maximize profits by identifying the most promising investments and ensuring that borrowing firms use those investments wisely, they will naturally tend to finance innovative firms. It is the innovation that will generate, at least until competitors catch-up, monopoly profits for the firm and these profits will in turn generate solid returns for the banks. In work by Laeven, Levine, and Michalopoulos (2015), research from around the world indicates that better functioning banking systems encourage more rapid economic advancement.

As should be familiar by now, the evidence regarding the linkage between finance and innovation does not just emerge from the cross-country comparisons. The evidence from the U.S. states is also clear, as demonstrated by Amore, Schneider, and Zaldokas (2013) and Chava, Oettl, Subramanian, and Subramanian (2013). When state regulators enacted reforms that made their banking systems more competitive, the banks increased their funding of small, risk-taking firms. This in turn

helped fuel faster rates of innovation, as measured by patenting activity. Better banks spurred invention, which generate improvements in living standards.

6. Conclusions and Financial Innovation

6.1 Banking and Prosperity

Banking systems provide vital services to the economy. They (1) mobilize savings from disparate savers, (2) evaluate, screen, and allocate capital to borrowers, (3) monitor and exert governance over how firms and households use those resources, and (4) provide products for diversifying and managing risk.

How well banking systems provide these functions to the economy have profound ramifications on economic prosperity. When banking systems identify the most promising firms and funnels credit to them, this enhances the efficient allocation of resources and both spurs economic growth and expands the availability of economic opportunities by allocating credit, and hence opportunity, based on the quality of the

entrepreneurial endeavor and not the quantity of accumulated wealth. When banking systems effectively monitor how firms and households use the funds that they receive, this too reduces waste, fraud, and the productive use of society's savings. When banking system make it easier for individuals and firms to save, this not only directly facilitates savings, it also pools savings in the hands of banks and thereby makes it easier for banks to allocate credit to the most efficient projects with less regard to the size of the project. It allows the economy to exploit economies of scale, with potentially big effects on economic growth. And, when banking systems boost risk diversification and provide tools for individuals and firms to manage risk, this too improves the efficiency of resource allocation. If banks help individuals and firms diversify away idiosyncratic risk, they can invest in higher return projects with beneficial repercussions on economic prosperity.

Abundant evidence indicates that the banking system exerts a first-order impact on economic prosperity. This evidence comes from cross-country comparisons, the examination of the individual states of the United States, country-specific studies from around the world, time-series examinations, and microeconomic analyses of industries, firms, and households. While each type of study suffers from a range of methodological problems, the different types of studies suffer from different problems. Yet, they all provide a reasonably consistent message about the finance-prosperity nexus. The operation of banks is critically important.

In particular, banks influence economic growth. More developed banks accelerate the long-run growth rate of economies. Research also shows that banks shape growth primarily by affecting the allocation of savings not the quantity of savings. Thus, the quality of the services provided by banks to the economy does not exert a clear, definitive

impact on the proportion of income that individuals and firms save. Rather, higher-quality banking systems influence aggregate growth by improving which firms get credit and how they use that credit.

The evidence also shows—perhaps surprisingly given the contempt with which some view banks—that well-developed banking systems exert a disproportionately positive influence on lower income families. That is, an increase in bank development tends to help the poor more than it helps the rich. This works through two channels. Better banking systems make access to credit more merit based and less based on family wealth and connections. By better identifying the most promising firms and exerting more effective corporate governance, banks lower the barriers for sound firms to enter and expedite the exit of uncompetitive firms. This disproportionately helps lower-income entrepreneurs, since the rich can get credit in poorly functioning banking systems. In this way, more developed banking systems expand entrepreneurial opportunities.

The second—and larger—channel through which banks disproportionately help lower income families is by enhancing labor markets. Better banking systems enhance the efficient allocation of capital, lower the barriers to new entry, and make product markets more competitive. These developments in turn tend to make labor market more dynamic and competitive. A large employer has less discretion in setting low wages if other firms can pick off the high-quality works to gain a competitive advantage. Hence, well-developed banking systems improve the competiveness of the overall economy and create more dynamic labor markets. The evidence shows that these effects disproportionately boost the earnings of lower income individuals and lower the poverty rate.

It is in these senses that banks shape prosperity. Banking systems shape aggregate growth, income inequality, and the economic opportunities available to lower-income families. Most importantly, with respect to developing well-developed banking systems, the issue is not growth *or* equality. Better banking systems foster both growth *and* equality. The very essence of what banks do implies that if they perform well, they reduce the importance of accumulated family wealth and increase the importance of skills, imagination, and energy. Therefore, policies and regulations that impede competition among banks and improvements in banking services can hurt aggregate economic growth, wide income disparities, and curtail the economic opportunities of the economically disadvantaged.

6.2 Financial innovation and prosperity: History

I close the book by considering financial innovation. Since the global financial crisis that appeared in force during the fall of 2008, many, including Nobel Prize winners Joseph Stiglitz and Paul Krugman, have pointed to financial innovation as contributing to the crisis. Many have therefore called for regulatory and supervisory policies to slow financial innovation. I think that this is a mistake. To make this case, I first discuss the history of financial innovation and then return to more contemporary debates. Throughout, I relate the discussion of financial innovation to the core functions provided by banks: mobilizing savings, allocating savings, monitoring the use of these savings, and providing risk management tools.

Financial innovation has been an integral component of economic activity for several millennia. About six thousand years ago, the Sumerian city of Uruk blossomed as tradable debt contracts emerged to facilitate a diverse assortment of intertemporal transactions underlying increased specialization, innovation, and economic development

(Goetzmann and G. Rouwenhorst, 2005)). In ancient Rome, private investors steadily developed all of the features of limited liability companies, including freely traded shares, an active stock exchange, and corporations that owned property and wrote contracts independently of the individual shareholders. The creation of these corporations eased the mobilization of capital for innovative, large-scale mining technologies (Malmendier, 2009). To finance the construction of vast railroad systems in the 19th and 20th centuries, financial entrepreneurs developed highly specialized investment banks, new financial instruments, and improved accounting systems to foster screening by distant investors (Baskin and Miranti, 1997; and Neal, 1990). Over the last couple of centuries, financiers continuously modified and enhanced securities to mitigate agency concerns and informational asymmetries impeding the financing of frontier technologies (Tufano, 2003). More recently, financial entrepreneurs created venture capital firms to screen high-tech inventions and then modified these arrangements to support biotechnology endeavors (Schweitzer, 2006).

Consider the parallels between technological and financial entrepreneurs. Both maximize profits by seeking to create something novel. Technological entrepreneurs engage in the costly and risky process of inventing and marketing better goods, services, and production methods. If successful, they earn a tidy profit while providing something valuable to the economy. Bankers can also be entrepreneurs. They can engage in the costly and risky process of creating better financial services. Successful financial innovation generates profits to the innovator and leads to better financial services for the economy, such as more efficient savings mobilization, better screening of potential borrowers, more effective governance of firms that receive loans, and enhanced risk management services. Financial innovation boosts the quality of financial services.

But, financial innovation might be necessary for sustaining economic growth. As technologies advance, the old screening methods might become less effective at identifying promising entrepreneurs. As technologies change, the old process for monitoring how business use loans and exerting corporate control over those businesses might work less and less well. As people and firms become more sophisticated and complex, the old method for mobilizing savings and managing risk might become obsolete. For example, the processes for screening the builders of new, cross-Atlantic ships in the 16th century were less effective at screening innovations in railroad technologies in the 19th century. Financial innovation might be necessary to provide the types of financial services necessary to foster continued growth as technologies advance.

History suggests that financial innovation is indeed necessary for sustaining improvements in human welfare. Let's start with trains. Initially, the railway system was funded at the local level through private equity financing because of the informational problems associated with screening and monitoring railroads from afar (Baskin and Miranti, 1997, 134-146). Railroads were new, complex, and spanned a large geographic area. Consequently, prominent local investors who could observe and monitor the activities of railroads were virtually the only source of private capital during the early decades of the 19th century (Chandler, 1965, 1977). This reliance on local finance, however, severely restricted the growth and development of railroads.

Since problems with acquiring and disseminating reliable information about railroads impeded profitable investments, financial entrepreneurs arose to mitigate this problem and thereby spur improvements in railroad technology and expansion throughout England and the United States (Baskin and Miranti, 1997, p. 137-

138). Specialized financiers and investment banks with reputations for integrity and competence emerged to both mobilize capital from individuals to invest in railroads and then oversee those investments by serving on the boards of directors of railroad corporations (Carosso, 1970). In terms of specialized financiers, Baskin and Miranti (1997, p. 137) note that after successfully financing the highly profitable line from Manchester to Liverpool, the same British investors were prominent in funding rail lines in other parts of England. In the United States, the major investment banking houses of J.P. Morgan & Company and Kuhn-Loeb & Company mobilized funds from wealthy investors in the United States and Europe to invest in the construction of railroad lines throughout the United States. This additional capital not only improved transportation through more track mileage, it also financed improvements in the quality of transportation in the form of faster, more comfortable, and safer trains (Chandler, 1977).

Besides the emergence of specialized investment institutions, improvements in managerial accounting methods and financial reporting facilitated the financing, expansion, and improvement of railroads. As documented by Chandler (1965, 1977), the size and complexity of railroads forced them to pioneer new methods for collecting, organizing, and assessing price, usage, breakdown, and repair information. While these new forms of managerial control boosted operational efficiency, they also made it easier for outside investors to assess and monitor railroads. Overtime, financiers were able to assemble and evaluate this information on a monthly, and then on a daily, and by the close of the 19th century on an hourly basis. These improvements in monitoring reduced the barriers to external finance, encouraged investment and innovation, and thereby spurred growth in the railroad industry (Baskin and Miranti, 1997, p. 143-145).

Financial entrepreneurs also developed new financial instruments and greatly expanded the use of existing securities to ease financial constraints on railroads, reduce the risk of bankruptcy from short-term reductions in income, and customize the risks facing potential investors in railroads. Baskin and Miranti (1997, p. 146-157) and Tufano (2003) describe how these financial instruments were combined to facilitate the flow of capital from diverse savers to railroads. For example, preferred stock holders receive income before common stock holders and are senior to common stock in bankruptcy, but preferred shareholders do not have voting rights and unlike debt holders they do not have the right to push a company into bankruptcy. With income bonds, purchasers receive a promised stream of interest payments, but these payments are contingent on the railroad's profitability. This reduces the risk of very costly bankruptcies from short-term reductions in profits. For others, railroads used liens, rather than debentures, to attract risk adverse savers, while deferred coupon debt and super long maturity bonds allowed railroads to further custom design their securities for investors. By providing a menu of securities with different characteristics, railroads greatly expanded the range of outside savers interested in railroad securities. Financial engineering facilitated the expansion of and improvements in railroads in Britain and the United States.

As a second example, consider the commercial revolution of the Middle Ages. Increased trade facilitated specialization, which in turn spurred improvements in productive technologies. Furthermore, Goetzmann and G. Rouwenhorst (2005) stress that the boom in international trade required improvements in the methodologies for valuing transactions occurring at different times, in different currencies, with different rates of payment, and with a complex variety of weights and measures. Standard financial practices were inadequate to address these new needs.

Indeed, Goetzmann and G. Rouwenhorst (2005) show that Leonardo of Pisa, the mathematician best remembered for his "Fibonacci" series and for introducing Italy to the Arabic number system, wrote his magnum opus in 1202 primarily to facilitate commerce by developing more precise, practical valuation techniques. His work was taught throughout Europe, where it was used to train entrepreneurs to overcome common obstacles, and brought Fibonacci considerable recognition and wealth. Over time, Fibonacci's contributions were essential ingredients in the financial revolution that brought liquid securities markets, life insurance, annuities, mutual funds, derivative securities, and deposit banking to Europe. These financial innovations in turn spurred commerce and growth.

As a final example, the 20th century development of venture capital firms to screen and finance high-technology firms and recent modifications to this model to support biotechnology further illustrate the vital role of financial innovation in encouraging technological change. During the second half of the 20th century, new technology firms found it increasingly difficult to obtain financing. Commercial banks were reluctant to lend because there was not yet a secure cash flow to repay the loan. It was difficult to issue securities in public markets because the technologies were complex, difficult to evaluate, and highly risky. Furthermore, scientists with no experience in operating profitable companies often ran these high-technology firms (Gompers and Lerner, 2001).

Venture capital firms arose to screen entrepreneurs and provide technical, managerial, and financial advice to new high-technology firms. Venture capitalists frequently became wealthy through their own successful innovations in high-tech endeavors. Their entrepreneurial experiences then provide a basis of expertise for evaluating new

entrepreneurs. In terms of funding, venture capitalists hold large, private equity stakes that establish a long-term commitment to the enterprise, while offering the possibility of enormous profits after several years. Furthermore, venture capitalists become active investors, taking seats on the board of directors, providing regular advice, making business contacts, and solving managerial and financial problems. Thus, this new financial arrangement arose to facilitate the financing of frontier technological innovations, especially in information technology.

As the frontiers of biotechnology opened, the venture capitalists needed to modify their model for screening, monitoring, and financing technological innovation. In particular, successfully developing a new biotechnology frequently required the inputs of scientists, engineers, and experts from a wide-variety of disciplines, enormous capital injections for sustained periods, and expertise with drug regulations.

Overtime, venture capitalists adapted their funding structures to facilitate innovation in biotechnology. In particular, they coordinated with large pharmaceuticals to finance and assist biotechnology firms. Pharmaceutical companies employ, or are in regular contact with, a large assortment of scientists and engineers, have close connections with those delivering medical products to customers, and employ lawyers well versed in drug regulations. Making these resources available to biotechnology firms increases the probability of successfully creating a valuable product. Furthermore, large pharmaceuticals help in the screening of biotechnology firms, which makes external investors more confident about participating in the financing of these ventures. Thus, financial entrepreneurs facilitate technological innovators in their quests to make new and better products.

6.3 Financing Innovation and Financial Innovation

Is financial innovation good or bad? Many point to financial innovation as the villain that caused the first global financial crisis of the 21st century. The argument goes that greedy bankers created increasingly complex financial products stacked one atop the other until the fragile system collapsed. The ensuing crisis produced enduring unemployment and economic hardship for those who had nothing to do with creating or propagating those financial innovations. Without addressing the particular causes of the financial crisis, there are broader question: Is financial innovation necessary for sustaining technological innovation and fostering improvements in economic prosperity?

As discussed above, the last few centuries demonstrate that financial innovation is crucial, perhaps indispensable, for sustained economic growth and prosperity. Indeed, financial and technological innovations seem to be inextricably bound. As described by Adam Smith, the very essence of economic growth involves increased specialization and the use of more sophisticated technologies. The increased complexity makes it more difficult for the existing financial system to evaluate new enterprises or manage their novel risks. Thus, economic progress itself makes any existing financial system obsolete. Without a commensurate modernization of the financial system, the quality of financial services falls, slowing economic growth. History provides many examples of the symbiotic connection between technological innovation, finance, and financial innovation.

The evidence clearly addresses the challenge dramatically articulated by Paul Volcker, the former chairman of the Board of Governors of the Federal Reserve System: "I wish someone would give me one shred of neutral evidence that financial innovation has led to economic growth — one shred of evidence." First, an enormous body of

evidence indicates that financial development boosts economic growth, with a disproportionately large component focused on the 1980-2000 period. Cross-country, time-series, firm-level, and bank-level research, as well as historical examples all point in the same direction: Legal, regulatory, and tax impediments to financial development slow growth. Indeed, after the late-1970s, economies with profit-maximizing banks that adopted new credit scoring and data processing procedures improved their ability to identify promising new businesses, sparking entrepreneurship and accelerating growth. Second, example after example and evidence from around the world and across the U.S. states indicates that finance and technological innovation are inextricably linked.

There is no reason to believe that the centuries-old synergistic connection between financial and economic development recently ended. The creation of tradable debt contracts 6,000 years ago in Samaria lowered transactions costs, fostered specialization, and boosted productivity. Ancient Rome developed a stock exchange to ease the mobilization of capital for large mining projects. To finance oceanic explorations in the 16th – 18th centuries, financiers modified the corporate form from the *commenda*, to limited partnerships, and to the joint stock company. And, financial innovations facilitated the Industrial Revolution and the transformation of information, communication, and biotechnologies.

This is not to say that financiers are angels. They are motivated by profits. Moreover, financiers sometimes behave reprehensively. For example, while arguing that it performs "God's work," Goldman Sachs used financial wizardry to help the Greek government fool the public about its national debt in the build-up to Greek's recent fiscal crisis. Also, while advertising its expertise in evaluating risk, Goldman ironically

asked in 2008 that U.S. taxpayers pay-off the contracts it wrote with AIG, implying that Goldman should not bear financial responsibility for failing to gauge AIG's risks accurately.

And, this is not to say that all financial products help society. Financial innovation, like all innovation, has risks, which have been unmistakably demonstrated by the current crisis. While government policies and regulators deserve ample blame for permitting, and even triggering, financial abuses, newly engineered financial products are undoubtedly woven into the tapestry of this crisis and past ones as well. The misuse of new products is not limited to finance, however. Information technology eases identity theft. Webcams facilitate child pornography. And, drugs are dangerously abused. But, just as we should not conclude that medical research does not promote human health because of drug abuse, we should not conclude that financial innovation does not promote economic growth because of the devastatingly costly crisis through which we are now suffering.

But, the evidence does suggest that a well functioning and innovating banking system is necessary for sustained economic prosperity. While readers of this book might still dislike banks and they might still view the earnings of bankers as unwarranted, I believe that the evidence overwhelmingly indicates that well-developed banking systems spur economic growth and expand economic opportunities. Policies, regulations, and supervisory systems that stymie the efficient operation of banks and dissuade banks from innovating and providing better and better services will have adverse effects that reverberate throughout the economy.

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Figures

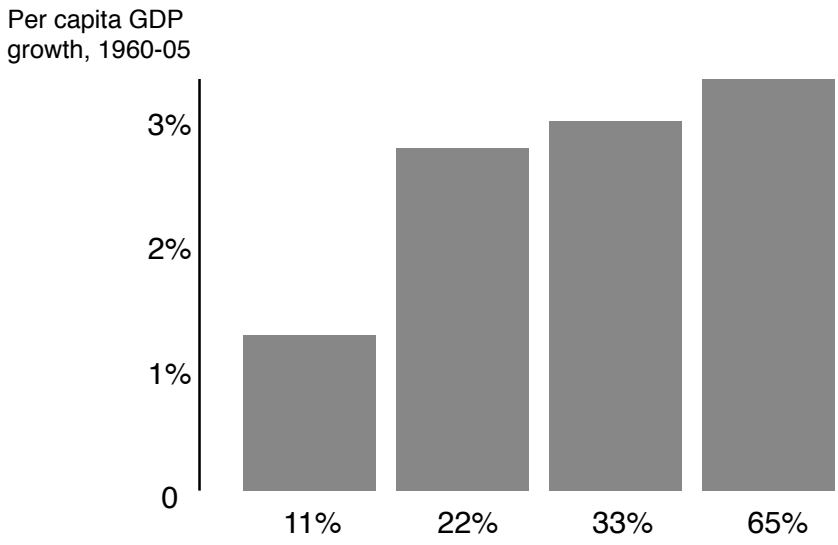

Figure 1: Private Credit in 1960 and Growth from 1960-2005

This figure is based on the following sequence of calculations for eighty countries: (1) Compute the level of *Private Credit* in 1960 for each country, where Private Credit is the claims on the private sector by banks and other financial institutions as a share of GDP. (2) Rank countries from the lowest level of *Private Credit* in 1960 to the highest level. (3) Divide the countries into four groups, with twenty countries in each group. (4) For each group of twenty countries, compute the average of the average annual growth rate of each country over the period from 1960 through 2005. The percentages along the bottom base of the figure represent the average value of *Private Credit* for each group of twenty countries in 1960.

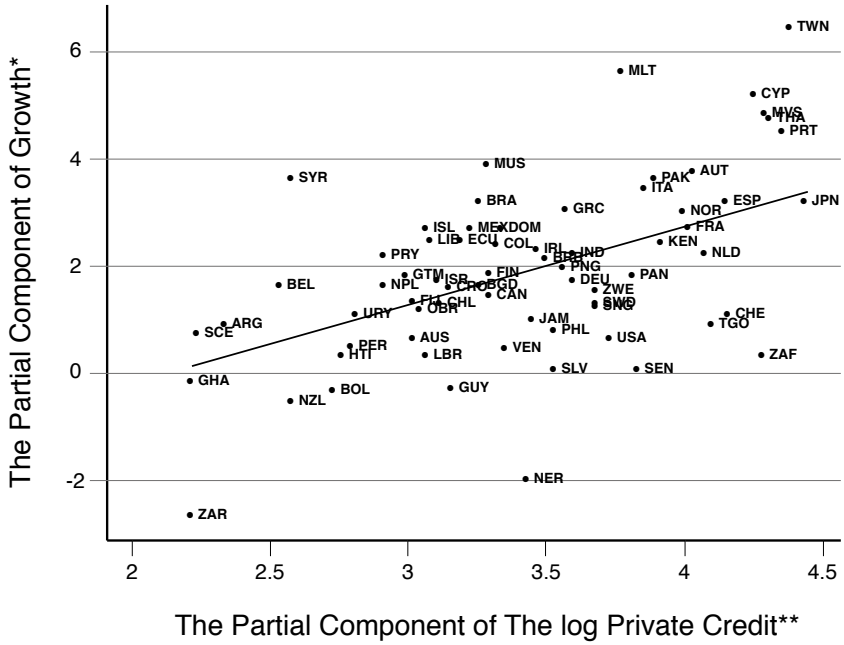

Figure 2: Growth in GDP per capita and the log of Private Credit.

Notes: This is a partial scatter plot of the regression:

$$Growth = \beta_0 + \beta_1 Log(Private\ Credit) + \beta_2 X + \varepsilon,$$

where *Growth* is average real GDP per capita growth over the 1960 to 2005 period, *Private Credit* is the claims on the private sector by banks and other financial institutions as a share of GDP**,** and *X* is a vector of the following control variables: log of initial GDP and secondary schooling attainment in 1960. The regression includes 71 observations and the estimated coefficient, β_1,equals 1.77, with a p-value of 0.00. To construct the figure, first regress *Growth* on *X* and collect the residuals. These residuals are called the *Partial Component of Growth*. Second, regress *Private Credit* on *X* and collect the residuals. These residuals are called the *Partial Component of Private Credit*. Finally, plot the *Partial Component of Growth* against the *Partial Component of Private Credit*. This represents the two-dimensional representation of the regression plane in Growth-Private Credit space while conditioning on X.

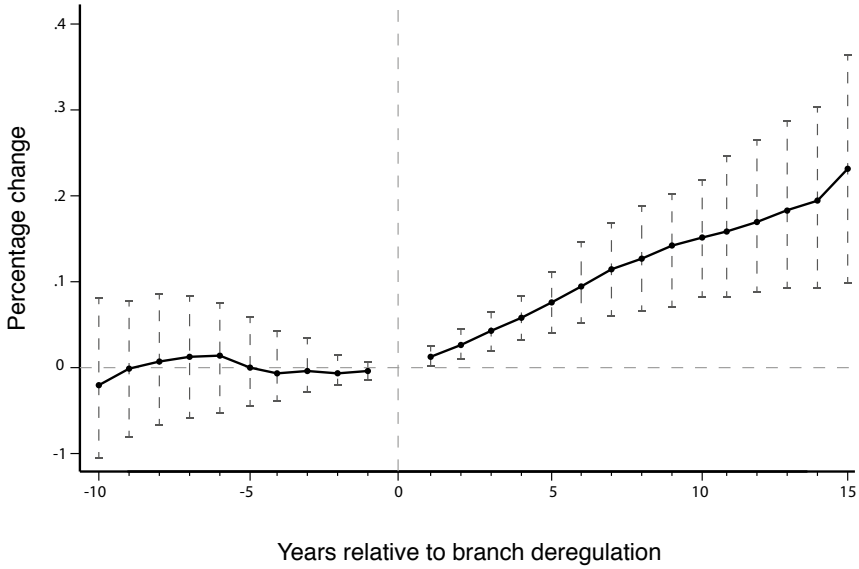

Figure 3. The Dynamic Impact of Deregulation on the Gross State Product.

The figure plots the impact of intrastate bank deregulation on per capita Gross State Product (2000 dollars). First we de-trend the Gross State Product per capita data subtracting out the mean and time trend before deregulation. We then consider a 25-year window, spanning from 10 years before deregulation until 15 years after deregulation. The dashed lines represent 95% confidence intervals, adjusted for state-level clustering. Specifically, we report estimated coefficients from the following regression:

$$\log(GSP)_{st} = \alpha + \beta_1 \mathbf{D}^{-10}{}_{st} + \beta_2 \mathbf{D}^{-9}{}_{st} + \cdots + \beta_{25} \mathbf{D}^{+15}{}_{st} + \mathbf{A}_s + \mathbf{B}_t + \varepsilon_{st}$$

The D's equal zero, except as follows: D^{-j} equals one for states in the j^{th} year before deregulation, while D^{+j} equals one for states in the j^{th} year after deregulation. We exclude the year of deregulation, thus estimating the dynamic effect of deregulation on the Gross State Product relative to the year of deregulation. $\mathbf{A}_s$ and $\mathbf{B}_t$ are vectors of state and year dummy variables that account for state and year fixed effects, respectively.

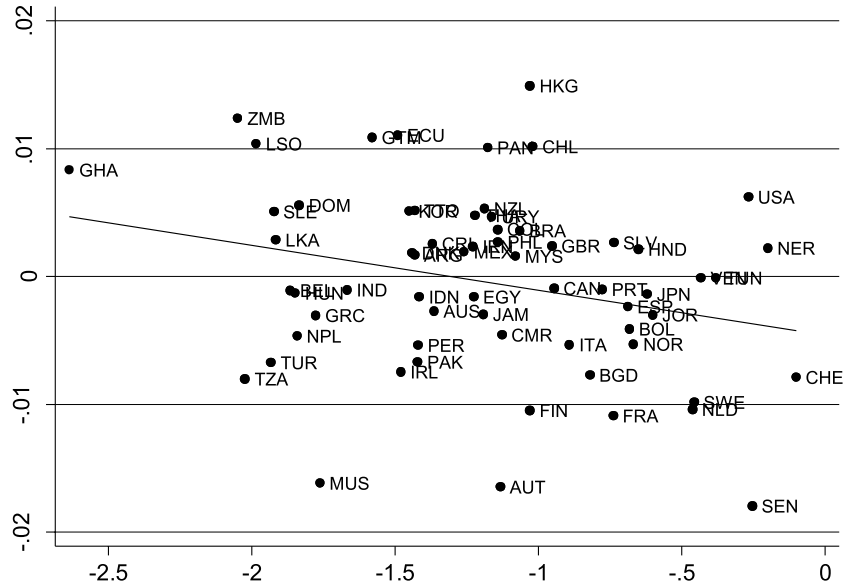

Figure 4: Growth in the log of the Gini Coefficient and the log of Private Credit.

Notes: This is a partial scatter plot of the regression:

$$Growth\ in\ the\ Gini\ Coefficient = \beta_0 + \beta_1 Log(Private\ Credit) + \beta_2 X + \varepsilon,$$

where *Growth in the Gini Coefficient* is the ratio of the area below the Lorenz Curve, which plots share of population against income share received, to the area below the diagonal from 1960 to 2005, *Private Credit* is the claims on the private sector by banks and other financial institutions as a share of GDP**,** and X is a vector of the following control variables: inflation, the log of exports as a fraction of GDP, government consumption as a share of GDP, log of initial Gini Coefficient, GDP per capita growth, and secondary schooling attainment in 1960. The regression includes 65 observations and the estimated coefficient, β_1, equals -0.005, with a p-value of 0.014. To construct the figure, first regress *Growth in the Gini Coefficient* on X and collect the residuals. These residuals are called the *Partial Component of Growth in the Gini Coefficient*. Second, regress *Private Credit* on X and collect the residuals.

These residuals are called the *Partial Component of Private Credit*. Finally, plot the *Partial Component of Growth in the Gini Coefficient* against the *Partial Component of Private Credit*. This represents the two-dimensional representation of the regression plane in Growth in the Gini Coefficient -Private Credit space while conditioning on X.

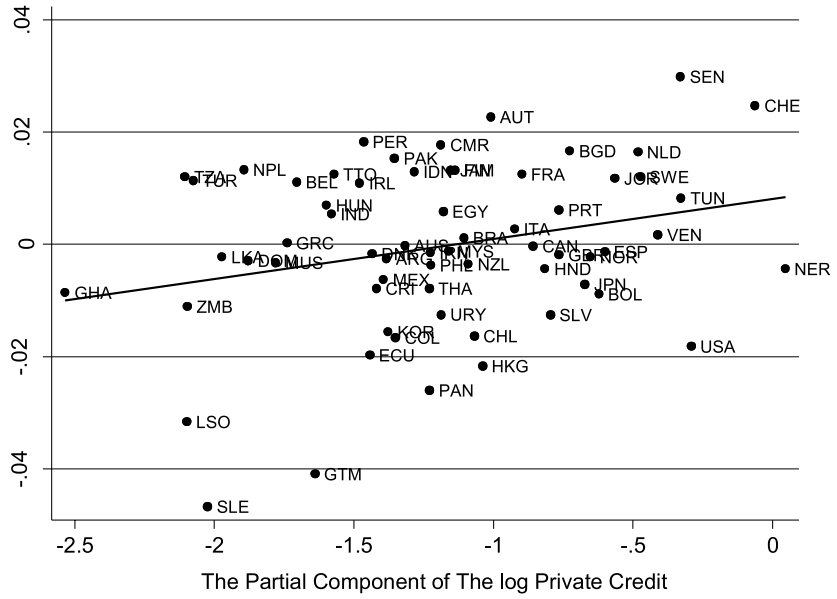

Figure 5: Growth in The log of the Lowest Income and the log of Private Credit.

$$Growth\ in\ the\ Lowest\ Income\ = \beta_0 + \beta_1 Log(Private\ Credit) + \beta_2 X + \varepsilon,$$

Notes: This is a partial scatter plot of the regression:

where *Growth in the Lowest Income* is the log of the average annual growth of the income share of the poorest quintile computed as a log difference between 1960 and 2005, *Private Credit* is the claims on the private sector by banks and other financial institutions as a share of GDP**,** and X is a vector of the following control variables: inflation, the log of exports as a fraction of GDP, log of initial Lowest Income, GDP per capita growth, and secondary schooling attainment in 1960. The regression includes 65 observations and the estimated coefficient, β_1, equals 0.009, with a p-value of 0.014. To construct the figure, first regress *Growth in the Lowest Income* on *X* and collect the residuals. These residuals are called the *Partial Component of Growth in the Lowest Income*. Second, regress *Private Credit* on *X* and collect the residuals. These residuals are called the *Partial Component of Private Credit*. Finally, plot the *Partial Component of Growth in the Lowest Income* against the

Partial Component of Private Credit. This represents the two-dimensional representation of the regression plane in Growth in the Lowest Income -Private Credit space while conditioning on X.

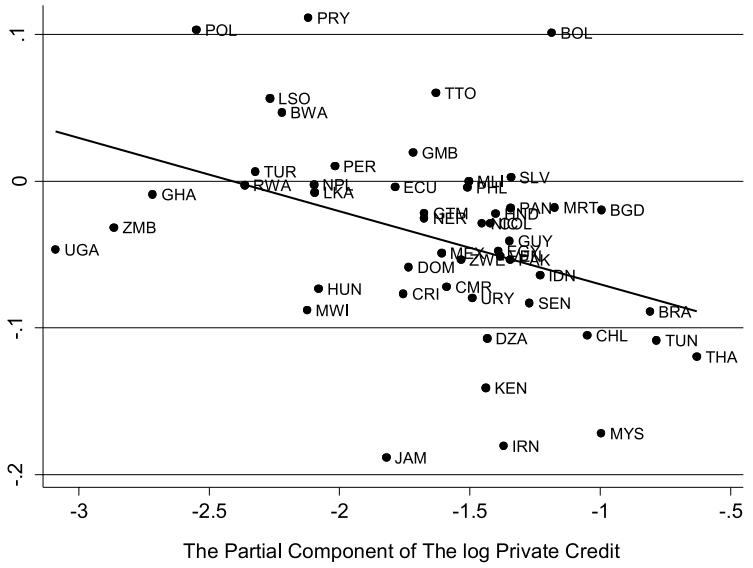

Figure 6: Growth in Headcount and the log of Private Credit.

Notes: This is a partial scatter plot of the regression:

$$Growth\ in\ Headcount = \beta_0 + \beta_1 Log(Private\ Credit) + \beta_2 X + \varepsilon,$$

where *Growth in Headcount* is the growth rate of the percentage of the population living below $2 dollar per day, *Private Credit* is the claims on the private sector by banks and other financial institutions as a share of GDP**,** and X is a vector of the following control variables: inflation, the log of exports as a fraction of GDP, government effectiveness, initial Poverty Gap, Population Growth, Growth in mean income and secondary schooling attainment in 1960. The regression includes 51 observations and the estimated coefficient, β_1, equals -0.050, with a p-value of 0.009. To construct the figure, first regress *Growth in Headcount* on *X* and collect the residuals. These residuals are called the *Partial Component of Growth in Headcount*. Second, regress *Private Credit* on *X* and collect the residuals. These residuals are called the *Partial Component of Private Credit*. Finally, plot the *Partial Component of Growth in Headcount* against the *Partial Component of Private Credit*. This represents the two-dimensional representation of the regression plane in Growth in The Poverty Gap -Private Credit space while conditioning on X.

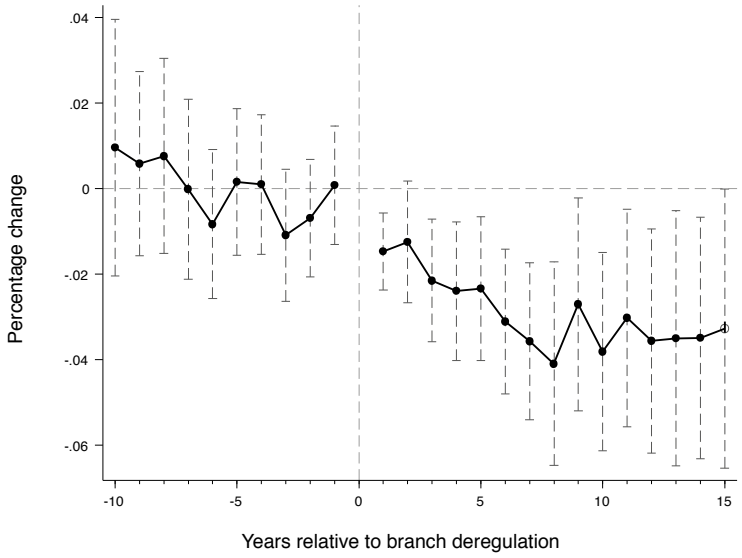

Figure 7. The Dynamic Impact of Deregulation on Gini Coefficient of Income Inequality.

The figure plots the impact of intrastate bank deregulation on the natural logarithm of the Gini coefficient of income inequality. We consider a 25-year window, spanning from 10 years before deregulation until 15 years after deregulation. The dashed lines represent 95% confidence intervals, adjusted for state-level clustering. Specifically, we report estimated coefficients from the following regression:

$$\log(Gini)_{st} = \alpha + \beta_1 \mathbf{D}^{-10}{}_{st} + \beta_2 \mathbf{D}^{-9}{}_{st} + \cdots + \beta_{25} \mathbf{D}^{+15}{}_{st} + \mathbf{A}_s + \mathbf{B}_t + \varepsilon_{st}$$

The D's equal zero, except as follows: D^{-j} equals one for states in the j^{th} year before deregulation, while D^{+j} equals one for states in the j^{th} year after deregulation. We exclude the year of deregulation, thus estimating the dynamic effect of deregulation on the different percentiles of income distribution relative to the year of deregulation. $\mathbf{A}_s$ and $\mathbf{B}_t$ are vectors of state and year dummy variables that account for state and year fixed effects, respectively.

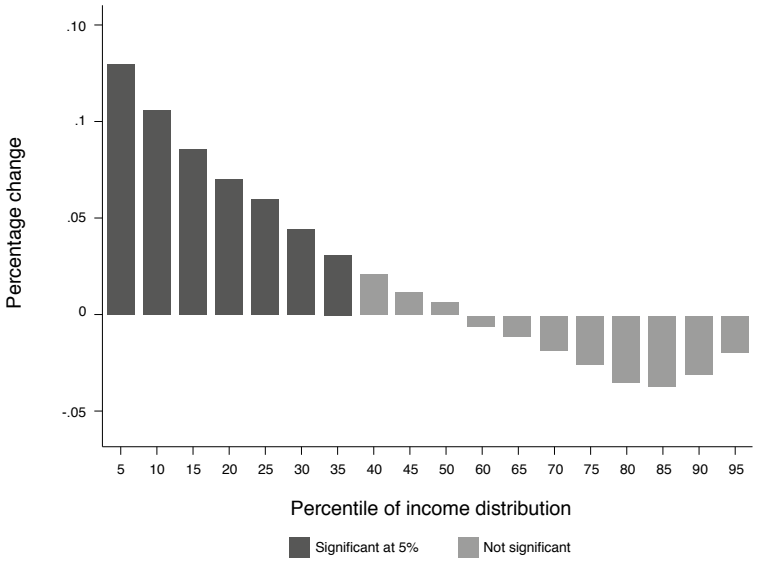

Figure 8: The Impact of Deregulation on Different Percentiles of Income Distribution.

Each bar in the figure represents the estimated impact of bank deregulation on a natural logarithm of a specific percentile of income distribution. Dark bars represent estimates significant at 5% after adjusting the standard errors for clustering. Light bars represent statistically insignificant estimates. Specifically, we report the estimates of γ from 19 separate regressions of the following form:

$$Y(i)_{st} = \alpha + \gamma D_{st} + A_s + B_t + \varepsilon_{st}$$

where $Y(i)_{st}$ is the natural logarithm of i^{th} percentile of income distribution in state s and year t. D_{st} is a dummy variable which equals to zero prior to bank deregulation and equals to one afterwards. $\mathbf{A}_s$ and $\mathbf{B}_t$ are vectors of state and year dummy variables that account for state and year fixed effects, respectively. Each of the 19 regressions has 1,519 observations corresponding to 49 states (we exclude Delaware and South Dakota) times 31 years between 1976 and 2006.

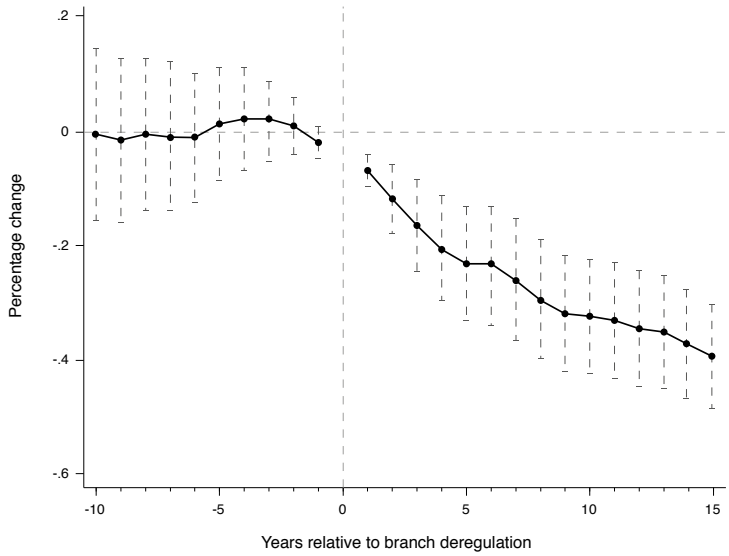

Figure 9: The Dynamic Impact of Deregulation on the Unemployment rate.

The figure plots the impact of intrastate bank deregulation on Unemployment. At first we de-trend Unemployment by subtracting out the mean and time trend before deregulation. We then consider a 25-year window, spanning from 10 years before deregulation until 15 years after deregulation. The dashed lines represent 95% confidence intervals, adjusted for state-level clustering. Specifically, we report estimated coefficients from the following regression:

$$\log(Unemployment)_{st} = \alpha + \beta_1 D^{-10}{}_{st} + \beta_2 D^{-9}{}_{st} + \cdots + \beta_{25} D^{+15}{}_{st} + A_s + B_t + \varepsilon_{st}$$

The D's equal zero, except as follows: D^{-j} equals one for states in the j^{th} year before deregulation, while D^{+j} equals one for states in the j^{th} year after deregulation. We exclude the year of deregulation, thus estimating the dynamic effect of deregulation on Unemployment relative to the year of deregulation. $\mathbf{A}_s$ and $\mathbf{B}_t$ are vectors of state and year dummy variables that account for state and year fixed effects, respectively.