

Buck, Florian Christopher

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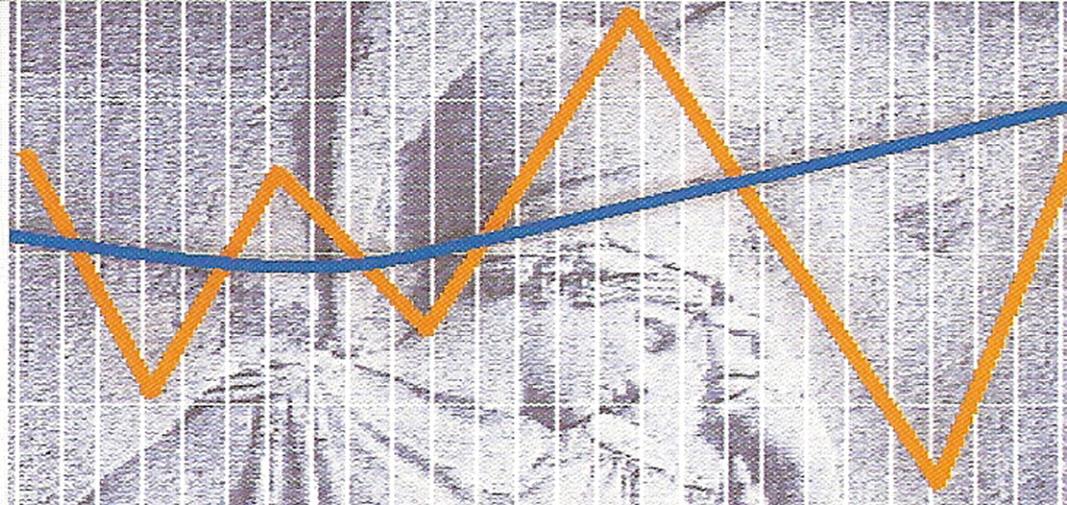
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ifo Beiträge zur Wirtschaftsforschung

The Rents of Banking A Public Choice Approach to Bank Regulation

Florian Christopher Buck

ifo Institut

Leibniz-Institut für Wirtschaftsforschung
an der Universität München e.V.

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zur Wirtschaftsforschung

**The Rents of Banking
A Public Choice Approach to Bank
Regulation**

Florian Christopher Buck

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Preface

The rise of a crisis-prone banking sector and its political power has received significant attention following the most recent financial crisis. The crisis sparked a growing interest in understanding how and why we have created a world of large, unstable banks.

Excessive banking activity arose not by chance. Using theoretical models from a public choice perspective, the thesis rationalizes this trend as the outcome of political decisions. I argue that the asymmetric information on the costs of banking regulation (and on the social value of making credit available to selected borrowers) incentivizes politicians to combat banking panics and equally preserve electoral support through the smart design of banking rules, and most importantly the provision of an underpriced safety net for banks. However, this incentive structure has produced a regulatory framework that now favors the emergence of large, systemically important financial institutions. Once established, the created rents for banking activity are likely to persist due to political and institutional lock-in effects.

This thesis discusses the linkages between banking regulation, rents and financial activity in five chapters, which can be broadly structured into two parts.

Part One examines the secular intensification of banking activity over the last century from a public choice point of view. Chapter 2 analyzes the emergence, chapter 3 the growth and chapter 4 the stabilization of the banking rents. The common theme is that politicians can favor bank over market finance when they are able to use the banking sector as a tool to create regulatory rents to a subgroup of citizens for redistributive reasons. The persistent political power of banks is explained by the incentive conflicts of policy-makers and subsequently the bank's ability to form strategic coalitions with other actors, which has helped them to extract rents until the present day.

Part Two addresses the question of how regulators should deal with the fragile and highly subsidized banking sector. The aim of prudential regulation is to reduce the risk of banking crises at minimum intervention costs. To assess the optimal policy approach a normative benchmark for domestic banking regulation is developed in chapter 5, while chapter 6 studies the optimal coordination of regulators on a supranational level. The thesis concludes with an outlook on feasible and necessary institutional reforms to ensure financial stability.

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Florian Buck

München, 23.06.2014

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1 Introduction

"Therefore a wise prince ought to adopt such a course that his citizens will always in every sort and kind of circumstance have need of the state and of him, and then he will always find them faithful."

Niccolò Machiavelli: "The prince"; chapter IX: concerning a civil principality.

1.1 The challenge of bank regulation

The banking sector is one of the most regulated industries in the world, and for good reason. Bank failures can cause significant externalities for other banks, households and firms and imprudent bank lending is a highly significant predictor of financial crises.¹ However, bankers are rarely held accountable for these negative spillovers. In modern banking systems, they benefit from deposit insurance, bailouts and other safety net mechanisms, which allows individual banks to pass losses to other parties in case of a bad shock. Owing to limited liability, bank owners have an incentive to build up excessive risks when determining their portfolio choice. They would invest more prudently if they had to compensate those firms and households for their losses suffered in a disruptive banking crisis. Modern safety net mechanisms protect them, albeit at the expense of exposing others to their risk-taking.

A benevolent and all-knowing regulator could correct these market failures. Market imperfections concerning the prudent management of risk justify government intervention in many aspects of banking, including the indirect allocation of credits with risk-weighted algorithms like in the Basel framework or other restrictions on bank behavior to reduce the economy-wide losses from failures. In the real world, banks must comply with a rising tide of regulatory rules and are supervised by a growing number of regulatory agencies, including national regulators and supranational bodies such as the European Banking Authority and the European Central Bank. Hence, current regulation exercises significant control over the extent and quality of intermediation activity in the economy and most importantly the attendant risk.

¹The historical evidence suggests that the severity of economic crises following the bursting of a bubble is strongly linked to the financing of the bubble. Crises are most severe when they are accompanied by a bank lending boom and high leverage of financial institutions (Brunnermeier and Schnabel 2014; Schularick and Taylor 2012; Reinhart and Rogoff 2009).

However, the increasing complexity of banking and financial markets makes regulation difficult and lobbying very likely. It is challenging to measure and supervise the risk-taking of financially integrated banks, which is reflected in increasingly sophisticated regulatory rules. The regulation of capital standards for European banks alone includes more than 1,000 pages and involves more than 200,000 risk categories requiring more than 200 million calculations (Haldane 2011). This economic complexity opens the door for political discretion and rent-seeking in the form of lobbying. The reason for this is that political choices on banking regulation will not only affect the banking sector itself, but also the allocation of scarce capital across sectors and interest groups in the economy. If credit availability is concentrated in heavily regulated institutions, politics can determine market access and thus create rents. Accordingly, this is why banking has to be considered not only from a macroeconomic perspective, but also from a public choice point of view.

1.2 A public choice view: Banks and rent-seeking

This thesis studies the intricate links between banking and politics. The central hypothesis is that regulation is undertaken by politicians and, thus, is always subject to political biases that can undermine the goal of regulation, namely prudent risk-taking and a stable banking sector.

Banking regulation is an instrument of power. Regardless how politicians operate to control and manipulate risk-taking by banks, they necessarily change financial market conditions. Rent-creation for a subgroup of citizens through government intervention is likely to emerge, which in turn affects electoral outcomes. A major attraction of the regulation of credit allocation is that the political accountability is reduced by postponing the recognition of social costs for many years. Since policy-makers need the support of their electorate, a public choice approach to banking regulation requires addressing both the incentive problems of banks to prevent financial fragility and the incentive conflicts of politicians.

Therefore, this thesis provides theoretical guidelines about the winners and losers from different variants of banking regulation, which helps to identify the constituency that supports and stabilizes it. Furthermore, it derives predictions about how prudent reforms can be made politically viable, depending on their institutional design. The central regulatory challenge for economists is to create an institutional structure that induces *the regulation* to behave in the public interest.

This is explored by introducing several concepts of public choice into the arena of banking regulation, whereby the concept of a rent lies at the heart of this thesis.

The main feature of regulation: Rents

A rent refers to excess income above the "normal levels" generated in competitive markets (Tollison 1982). A citizen obtains a rent if he earns an income higher than the minimum that he would have accepted but that is obtained only due to his positional advantages. Rent-seeking is an attempt to obtain such an artificial advantage by manipulating the regulatory environment in which economic activities occur, rather than by creating new value. In economic theory, a rent is hence the most appropriate measure of market imperfections. Inefficiency arises as long as the rent is positive, since in a perfectly competitive market there must be market entry and rents must disappear. The concept of a banking rent is useful when analyzing the regulatory process, because this enables identifying the distributive effects of state intervention and illustrates the underlying incentives of citizens.

Interestingly, rents in banking are unavoidable and arise for two sets of reasons. First, they arise due to microeconomic frictions such as information asymmetries that harm alternative direct forms of finance. This is a precondition for the existence of banks as financial intermediaries.

In the ideal world of frictionless and complete financial markets, also known as the Arrow-Debreu world, both lenders and borrowers would be able to diversify their portfolio perfectly and obtain optimal risk-sharing strategies. Consequently, in a competitive equilibrium, the composition of banks' balance sheets have no effect on other economic agents.² In other words, in the Arrow-Debreu world, banks are redundant institutions. However, as soon as we introduce indivisibilities and non-convexities in transaction technologies, perfect diversification by private parties is no longer feasible (Freixas and Rochet 2008). Information asymmetries, whether ex-ante (adverse selection), interim (moral hazard) or ex-post (costly state verification), generate market frictions that can be seen as forms of transaction costs, which can be overcome by financial intermediaries, known as banks.³ Therefore, rents to fund these transaction costs are a necessary condition for banking.

Second, banking rules can have the side-effect of increasing the rents of financial intermediation. They often do so by magnifying the microeconomic frictions, for example, by harming alternative forms of finance such as equity, through reducing investor protection or by making banking more attractive through safety net provision financed by

²According to Freixas and Rochet (2008) and Hagen (1976) this is the banking analogue of the Modigliani-Miller theorem for the financial policy of firms.

³Diamond (1984) introduced the delegated monitoring theory of intermediation. Monitoring typically involves increasing returns to scale, which implies that it is more efficiently performed by specialized institutions.

the general public. These activities increase the (private) value of banking and thereby banks' ability to collect deposits. In other words, the rent of banking may be also high because the society chooses a set of institutions that generate a high rent. If this is the case, the support for banking rents must come from a subset of citizens that benefits.

The history of banking regulation can thus be interpreted as a history of rent-seeking by both banks and the end-users of financial services.⁴ Accordingly, rents for banking activity can arise as the outcome of political decisions of re-election minded politicians. Put differently, politicians will deliver such rents, when the electoral gains are sufficiently high. One recent example are US activist groups such as ACORN (the Association of Community Organizations for Reform Now), who succeeded in lobbying for policies of subsidized lending to the poor, which contributed to the bank-driven subprime lending boom. US politicians loosened regulation in this area precisely to improve their electoral support.

1.3 Contributions and main findings

The starting point of this thesis is that the rents of banking activity have continuously grown over the last 100 years. Since World War II (WWII), banks' balance sheets have dramatically increased relative to the underlying economic activity, reflecting hidden subsidies created by regulation. Using theoretical models from a public choice perspective, the thesis rationalizes this trend with the incentive conflicts by politicians. The asymmetric information on the costs of banking regulation (and on the social value of making credit available to selected borrowers) tempts politicians to preserve electoral support through the design of banking rules, and most importantly the provision of an underpriced safety net. This has produced a regulatory framework that favors the emergence of large, systemically important financial institutions. Once established, the created rents are likely to persist due to political and institutional lock-in effects.

The dissertation contributes to the literature in two main ways.

The first contribution is to explain the emergence of mega-banks and the resulting fragility from a public choice perspective, taking into account decision-making by re-election minded politicians. By applying the concept of rent-seeking of multilateral groups to the arena of banking, this thesis highlights an aspect of regulation that has often been overlooked in the literature, namely banks' ability to form strategic coalitions.

⁴The concept of rent-seeking was first illustrated by Krueger (1974), who highlights that state intervention such as import licenses often give rise to rents which cause agents to compete for these licenses or rents, respectively. This rent-seeking sometimes takes legal forms such as lobbying or illegal forms as bribery. Furthermore, she shows that the devotion of resources to rent-seeking leads to a welfare loss.

tions with other groups outside the financial sector to establish and protect regulatory rents via supporting distortive regulation. Therefore, the mobilization of a plurality of groups among different sectors is a key force in affecting the policy outcome. Thinking of banking systems as a manifestation of political deals, the thesis shares the insights of the "game of bank bargains" by Calomiris and Haber (2014). In their work, the authors demonstrate that politicians use banks to make credit available to the state and to targeted constituencies, who vary from nation to nation and from era to era.

Despite these advances, much of the related economic literature on reforming the banking sector neglects the role of re-election minded politicians and does not devote much attention on the underlying incentive conflicts when designing a regulatory framework. In most cases, bank regulators are portrayed as omniscient benevolent planners with no self-interest (see Dewatripont and Tirole 1994; Brunnermeier et al. 2009). Accordingly, this strand of literature produces macro- and microprudential arguments to minimize the social cost of financial safety nets, e.g. by imposing limits on leverage, deposit insurance coverage, risk exposures etc. However, the resulting policies are unlikely to be effective when politicians face a time-inconsistency problem, especially under the pressure of an actual crisis. Moreover, globalization has triggered competition among national governments and consequently changed the policy-making process. According to the "systems competition" view introduced by Sinn (1997) international banking competition creates additional constraints for domestic politicians and gives rise to deregulation. In other words, a public choice approach helps to understand the decision-making and normative analysis of efficient banking regulation.

The seminal cross-country study by Barth et al. (2006) provides empirical support for the public choice view on banking regulation. Theory suggests that governments, that play a greater role in shaping the financial market could improve the allocation of capital, although evidence indicates that they actually use that power in a manner that helps political survival, rather than society (see Haber et al. 2008; Khwaja and Mian 2005; Sapienza 2004; Rajan and Zingales 2003; La Porta et al. 2002). Evidence is not restricted to developing and emerging countries with weak institutions; for instance, Englmaier and Stowasser (2013) demonstrate that German savings banks, where local politicians are involved in the management, systematically adjust lending policies to local electoral cycles. Whether it is corruption, adherence to flawed ideology or electoral calculus, evidence suggests that the regulatory apparatus does not act with sufficient competence to eliminate market failures and promote social welfare. Accordingly, prudent bank regulation ought to address the potential of policy failures.

The second contribution of this dissertation is to develop a microeconomic model of banking regulation that links the financial sector and its regulation to the market entry

and growth opportunities of agents in the private sector, thus allowing us to specify the rents that are not only created for banks, but also for the end-users of financial services. To the best of our knowledge, this is the first model to explicitly analyze the spillover effects of bank regulation on the rents in the real economy. The electoral support model subsequently provides a frame of reference that is appropriate for describing a politician's choice of banking regulation. Throughout the thesis, policy-makers are portrayed as pursuing their self-interest by choosing banking policies to maximize their probabilities of re-election.

Previous literature on the politics of banking regulation focused mostly on direct rewards of politicians, e.g. through campaign contributions, the allure of lucrative jobs after exiting politics (revolving door compensation) or direct bribes (see Admati and Hellwig 2013; Igan et al. 2011; Johnson and Kwak 2011; Mian et al. 2010). This thesis broadens this perspective by also considering indirect political gains of distortionary regulation. The argument is that politicians shape banking regulation in favor of certain social groups to remain in power and preserve electoral support in a Machiavellian fashion. Such rents from banking can be easily generated, also because the resulting redistributive effects are less visible to the average taxpayer than in other fields such as direct taxation. Subsidized lending programs to specific asset holders or safety net guarantees are not part of the government's budget, but provide effective ways to enhance the popularity among the electorate. Politicians gain support by creating contingent rather than real liabilities.

In the framework of this thesis, political conflicts of interests regarding regulation do not only arise between banks, but also outside of the financial industry and consequently involve a broader set of players. This also differs from previous studies, which mostly focus on intra-sectoral competition for market shares and conflicts between large and small banks (see Haber and Perotti 2008, and Pagano and Volpin 2001, for surveys on this issue).⁵ The thesis therefore contributes to the literature by incorporating probabilistic models of electoral support to the arena of banking regulation. The resulting model setup allows to study rent-seeking in the banking industry from a new perspective and helps to rationalize the empirical patterns of regulation.

1.4 Summary of each chapter

This thesis tells the story of the (ir)resistible rise of banking rents in five chapters, which can be broadly structured into two parts.

⁵For example, Kroszner and Strahan (1999) provide empirical evidence how political rent-seeking influenced bank branching restrictions in the US, and similar results have been found on usury laws (Benmelech and Moskowitz 2010) and credit access regulation (Rajan and Ramcharan 2011).

Part One examines the rise of rents over the last 100 years using theoretical models with a public choice perspective. Chapter 2 analyzes the emergence, chapter 3 the growth and chapter 4 the stabilization of the banking rents. The common theme is that politicians use the banking sector as a policy tool by creating regulatory rents to a subgroup of citizens to carry out re-distributional objectives. The persistent political power of banks is explained by the regulatory process and the bank's ability to form strategic coalitions with other actors, which has helped banks to extract rents until the present day.

Part Two addresses the question of how regulators should deal with the fragile and highly subsidized banking sector. The aim of prudential regulation is to reduce the risk of banking crises at minimum intervention costs. To assess the optimal policy approach a normative benchmark for domestic banking regulation is developed in chapter 5, while chapter 6 studies the optimal coordination of regulators on a supranational level. The thesis concludes with an outlook on feasible and necessary reforms to ensure financial stability.

Chapter 2 (The emergence of bank-oriented financial systems) asks a simple yet fundamental question to understand the emergence of banking: why are some financial systems dominated by banks and others by financing through capital markets? The advent of bank-oriented systems is explained with public choice arguments, and particularly the political system in the pre-WWII era. Electoral rules matter because they constitute the balance of political power and dictate what a politician must do to become elected. The chapter demonstrates that the industrial elite has an incentive to establish poor state protection against entrepreneurial hold-up to increase financial entry costs for entrepreneurship. The politician sets entry optimally to gain electoral support and those citizens satisfying the political entry requirement start a firm and earn a regulatory rent. If the political system privileges the elite (autocracy), society shapes institutions with low legal control and more reliance on banks that offer private arrangements to substitute the lack of state control (delegated monitoring). Banking rents arise as a by-product of poor legal control rights, which triggers path dependencies and can explain the dominance of forms of informed lending by banks until this day. New data on the emergence and evolution of the bank-oriented financial systems supports the model predictions.

Chapter 3 (The growth of banking) rationalizes the long-run dynamics in the banking sector and its regulation during the last century. Following the Great Depression and WWII, there has been an unprecedented expansion of the size of the banking sector, which can be attributed to regulation, and specifically the salient establish-

ment and hysteresis of the banking safety net, comprising liquidity insurance, deposit insurance and capital insurance for banks. Nets provide loss-absorbing funding, at times when private investors will not. While bank failures in the 19th century hurt bank stakeholders most, today, the significant part of the costs of bank distress can be shifted to the taxpayers, which induces excessive risk-taking by banks: first, debtor-oriented laws allow bank owners to reduce the cost that they pay for taking risks, and second, bailouts, deposit insurance and bank resolution facilities allow banks to raise funds more easily. As a result, neither debt nor equity holders have an incentive to constrain bank risk-taking. Critically, banks can make their money with these state guarantees and moral hazard incentives are as strong as ever. In a simple model it is shown that a bank now can maximize its value (and the rents inherent in the safety net) by minimizing the equity-to-asset ratio, expanding the balance sheet and following mergers and acquisition strategies (thereby gaining systemic importance). Ultimately, the safety net is better understood as a tax-transfer scheme that has amplified the political power of the banking sector over the years, resulting in corrosive capture and persistent bank rents.

Chapter 4 (The persistence of bank rents) introduces an analytical framework to help understand why citizens in a democracy tolerate an undercapitalized and crisis-prone banking sector. The main argument is that banks are able to increase their political influence by forming strategic coalitions with other groups. The relevance of banking for the rest of the economy makes them predestinated for such coalition building with the end-users of bank credits. Therefore, chapter 4 analyzes how a group of supporters with shared economic interests evolves when the policy-maker intervenes in a bank's credit allocation by subsidizing specific forms of investment. In contrast to chapter 2, regulation emerges as a trade-off between the regulatory rent for the coalition of supporters and the associated welfare loss for the society. Thereby, lobby contributions by the coalition can influence the outcome of elections by enhancing the politician's popularity. We motivate this mechanism with the example of financial repression, whereby subsidized lending to the sovereign is a way of changing the distribution of income through the back door that creates electoral support for the deregulation of the banking sector.

Chapter 5 (Optimal national banking regulation) adopts a public interest view on banking regulation to discuss how the regulatory-supervisory system should be reformed to limit the frequency and cost of a banking crisis. In contrast to the previous chapters, the regulator's objective abstracts from electoral support and only aims to prevent a costly financial meltdown. For this purpose, a model of banking regulation with two policy instruments is developed, whereby both minimum capital requirements

and the supervision of domestic banks alleviate the vulnerability of banking. Direct forms of regulation (supervision) enhance the ability of the average bank to control risk whereby indirect regulation via capital requirements establishes incentives that elicit socially desired monitoring activity by banks. However, each instrument imposes a cost on different interest groups: high capital requirements cause a decline in the banks' rents - whereas strict supervision reduces the scope of intermediation and is costly for taxpayers. The model shows that a mix of both instruments minimizes the costs of preventing the collapse of financial intermediation. However, once we allow for cross-border banking, the optimal policy is not feasible and countries are better off by harmonizing regulation on an international standard.

Accordingly, **Chapter 6 (Supranational banking regulation)** sheds light on the question of how a group of countries that are heterogeneous with respect to their optimal domestic regulation and supervision jointly provide the public good "financial stability". A simple model shows that the current procedure in the Basel Committee to implement international banking regulation, namely the unanimity rule as repeated voting procedure, implies a tendency for proposals with lax regulation. The reason for this is that the voting outcome is determined by the distribution of expected fiscal losses in a financial crisis. The willingness to wait for a consensus declines if country-specific fiscal costs are large. Therefore, the model suggests that the constitutional design changes the pivotal jurisdiction in the voting process on international banking regulation and unanimity creates *de facto* voting power to patient jurisdictions that support the status quo. With unanimity the Basel Committee is locked in a status quo bias. The implementation of a simple majority rule in the Basel Committee may help to implement stricter regulation.

In **Chapter 7 (Shaping the future)**, the results are summarized and implications for the design of prudent regulation of banks are developed.

2 The emergence of bank-oriented financial systems

This chapter provides a public choice explanation for why some societies have developed bank-oriented financial systems, while others rely on capital markets and bond financing. A model is proposed whereby the allocation of political power among citizens affects the structure of financial systems via corporate control rights such as investor and creditor protection. Due to poor legal protection of claimholders, financial entry costs for entrepreneurs rise so that the industrial elite benefits from monopoly rents in the private sector. If political power is restricted to the elite, this leads to poor corporate control rights and more reliance on banks that offer substitute mechanisms of corporate governance. The model suggests that such a lack of legal rights triggers path dependencies and might explain the dominance of banks until the present day.

2.1 Why do some economic systems depend on bank financing?

Why is bank finance dominant in some societies and much less important in others? According to Modigliani and Miller (1958), the financial structure of a firm should be arbitrary. In the absence of taxes, transaction costs and asymmetric information the value of a levered firm equals the value of an unlevered firm. It does not matter whether the firm's capital is raised by issuing stock or selling debt. Nonetheless, cross-country variation of firms' financial structure is notable, with some countries having a much higher share of bank finance than others. Accordingly, Figure 2.1 shows such differences in bank orientation around the world. The role of bank finance in a given country is measured as the relation of bank deposits to stock market capitalization, which gives us an idea of the importance of the banking sector compared to other sources of finance. We refer to a given country as being bank-oriented if the size of its banking sector is larger than the size of its stock market.

Bank orientation varies considerably as shown in Figure 2.1 with a median of 1.6. This indicates that most countries indeed have a bank-based financial structure. In the United States and the United Kingdom competitive stock markets have a long tradition and dominate the financial landscape, whereas continental Europe is characterized by a bank-bias since banks play a more important role. Thereby cross-country differences are striking; for instance the Austrian banking sector is five times larger than

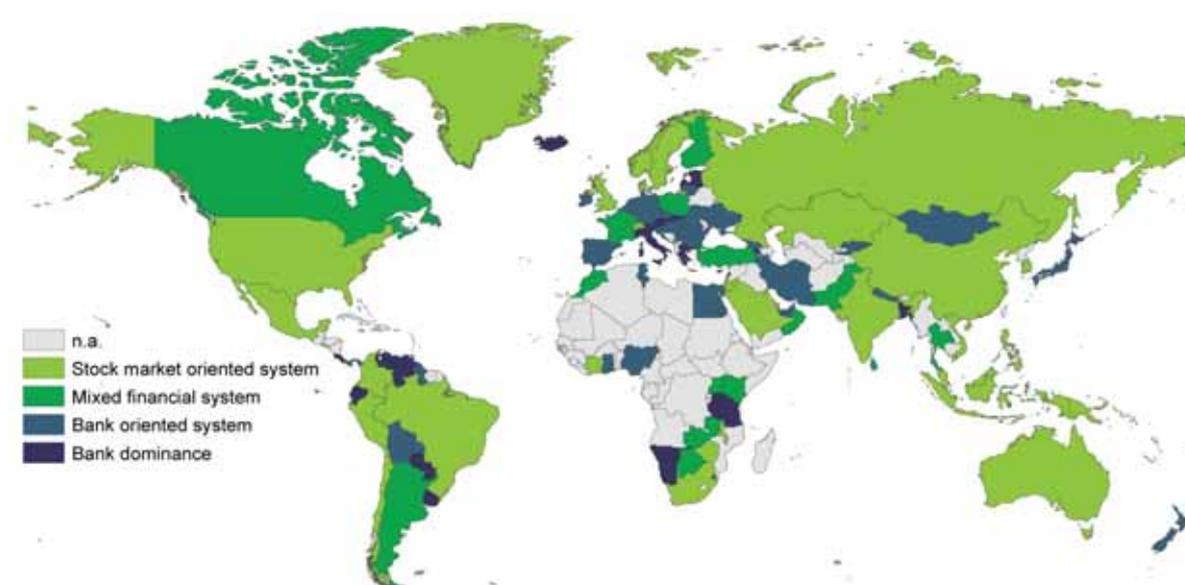


Figure 2.1: Bank orientation 2010

Bank orientation is defined as the ratio between bank deposits to GDP and stock market capitalization to GDP. Countries, where this ratio is between 0 - 1 are referred as "stock market-oriented systems"; 1 - 1,5 as "mixed financial systems"; 1,5 - 4 as "bank-oriented systems", and countries with a ratio > 4 as "bank dominance".

Own calculations. Source: Beck et al. (2010).

the stock market, whereas the Swedish banking sector is just half the stock market's size. What explains the variation of financial structure around the world? Why are banking systems well-developed in some countries while being of secondary importance in others?

Although answers to this perennial question have evolved over time, most of the related literature concentrates on the determinants of stock market development *per se*. More than a decade ago, La Porta et al. (1998) placed emphasis on the origin of legal systems. The law and economics approach states that the legal origin as a style of social control of economic life affects financial development. Due to higher shareholder rights, stock markets are significantly larger relative to bank-finance in common law countries than in those with civil law tradition. The reason is that the British common law system evolved to protect private property holders against the crown, whereas the French civil law system originally reduced the discretionary power of the corrupt judiciary.⁶ The second explanation is the social capital view of the financial structure. Countries with

⁶The law and economics approach is not undisputed, e.g. it cannot explain the fact that countries change over time. For example, Rajan and Zingales (2003) show that France and Japan had vibrant securities markets before WWI. After the war, policy and regulation changed and political factors - protectionist lobbies, trade unions and banks - pushed for a system that favored blockholder control (see La Porta et al. 2008 for a discussion).

high level of social capital suffer less from moral hazard problems which allows more direct forms of finance (Guiso et al. 2004). Accordingly, social capital and informal rules allow financial institutions to save on monitoring cost and non-monitoring (market-oriented) finance dominates relative to monitored (bank-oriented) finance. Instead, the third strand of the literature emphasizes the political economy perspective, taking into account the role of centralization (Verdier 2002), the design of the constitutional system (Pagano and Volpin 2005), the wealth distribution of investors (Perotti and von Thadden 2006) and the accountability of opportunistic politicians (Perotti and Volpin 2012) in producing more or less developed financial markets.

However, most of these rather mechanical links do not consider the fact that the supply of corporate law and the evolution of financial systems is deeply rooted in history reflecting political majorities that have followed historical events. The reason is that the observed patterns persist over time and have been heavily influenced by the experience and created institutions of the 19th and early 20th century, most of them as regulatory responses to severe market failures like the Great Depression (Allen and Gale 2001). As a turning point, there have been diverging ways of dealing with the banking crises of the 1930s: On the one hand, the suppression of financial markets that has historically occurred in countries such as Italy and Germany, or on the other hand strict regulation of the financial system that had occurred in the United States. Thereby those legal and informal rules on corporate governance that have emerged during this era turn out to have a long-run effect on the formation and the design of financial markets today (Grossman 2010). This chapter provides evidence for path dependence of the financial structure of a country that is linked to the political system in the past. Taking the approach of historical legacy, we develop a theory based on the allocation of political power to rationalize why a society has produced a specific financial system and to explain variations among countries with the same legal origin. The emergence of bank-oriented systems is modeled as a consequence of politics, specifically public choice.

2.1.1 The argument: Entry deterrence via legal protection

The model of this chapter offers two main arguments, the first of which is that the structure of financial systems depends on the level of legal protection available for shareholders and creditors. Low levels of protection for legal claimholders lead to a high market share of banks. Figure 2.2 presents some suggestive evidence that such a negative correlation between investor protection and bank orientation is present.

The intuition for this argument builds on the fact that these legal rules measure the ease with which investors can exercise their powers against opportunistic managers

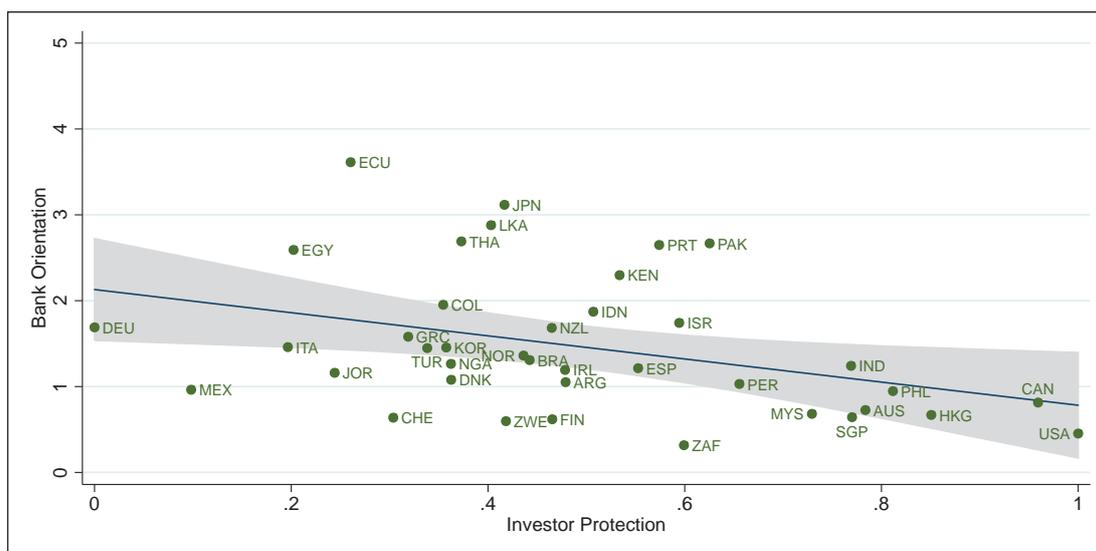


Figure 2.2: Bank orientation and investor protection 2000

Note: Data suggesting a possible negative relationship between the structure of the financial system and the quality of investor protection, measured by the protection index developed by La Porta et al. (1998), where an index of 1 captures the highest protection. The shaded area depicts the 95 percent confidence interval.

Own calculations. Sources: Bank orientation: Beck et al. (2010); investor protection: La Porta et al. (2006).

who are subject to a hold-up problem. The ability of firms to raise capital is impaired if institutions promote a high expropriation risk for claimholders resulting from poor legal protection. This leads to an undersupply of external finance: in other words, in such a climate of low public confidence, the need for alternative mechanisms of corporate governance soars. Banks offer substitute services through their monitoring expertise and information acquisition capabilities (Diamond 1984) and supply forms of informed lending. Therefore, lower legal protection of claimholders leads to a higher demand for bank services, most prominently for bank debt. The rents of banking rise inversely with legal protection. Put differently, if legal protection is sufficiently low, the structure of the financial system shifts from market finance to a predominance of intermediated finance. Therefore, the first argument is that uncertainty of investors discourages direct forms of finance so that informed lending becomes attractive. Thus, bank orientation is a side-effect of the lack of state control.

Secondly, the level of legal protection is the outcome of a conflict of interest among domestic citizens. Importantly, low legal protection prevents poor entrepreneurs from entering the market. In fact, imperfect legal protection creates a pecking-order among firms that compete for external funding. Thus, restricting access to external finance works as an entry barrier and reduces competition. The benefits and costs of this outcome are differently distributed across interest groups in the society. If the legal



Figure 2.3: Interaction of preferences, institutions and market outcome

framework weakly protects claimholders, only a wealthy elite is able to obtain the necessary financial means. Therefore, the wealthy elite prefers inadequate state protection, which results in higher profits for the few firms that remain able to enter the market. The elite is interested in stabilizing the social status quo - by effectively deterring poorer agents from becoming entrepreneurs. Since entry is the key form of economic renewal and strongly affects economic growth (Hause and Du Rietz 1984; Klapper et al. 2006), the suppression of competition is the main social cost of low legal protection.

To illustrate the point that the degree of legal protection affects the distribution of rents within the society, consider Figure 2.3.

The resulting conflict of interest among the electorate is captured in the first box. There are four relevant groups in the society: the stakeholders of incumbent firms (both the manager and the workers) want to block potential competitors to gain monopoly rents in the product market. Thereby, the workers' compensation, e.g. enforced by a labor union of incumbent workers, is strictly rising with the firms' profits.⁷ Hence, stakeholders have a common preference for increasing the entry cost to their market by making lending expensive for investors; for example with inadequate legal protection.⁸ The choice of legal protection (the second box) is just a strategic instrument to generate rents. In fact, the creation of additional entry barriers redistributes income towards incumbent firms and distorts the allocation of resources because it prevents entry into entrepreneurship.

The rent of the second group, potential entrants, increases with the degree of protection enabling them access to finance, competing away the incumbents' profits. Due to

⁷There is clear empirical evidence that a rise in a sector's profitability leads to an increase in the long-run level of wages in that sector (see Salinger 1984, Hildreth and Oswald 1997 and Blanchflower et al. 1996). Their studies support the idea of a rent-sharing between workers and shareholders of a firm. Thus, for expositional purpose, we make the simplifying assumption that there is a common interest of a firm's workers and shareholders to maximize firm's profits.

⁸The reason for increased borrowing costs is the risk premium investors will demand. Investors face the problem of asymmetric information and possible hold-up by entrepreneurs. If corporate law allows them to extract some rents, they cannot commit not to do so ex-post. Hence, rational investors will price in the hold-up in their optimal financial contract.

the anti-competitive effect of a weak legal framework on market access, the same preferences are true for consumers (and non-unionized workers), who fear high monopoly prices.

Assuming perfect competition in the financial market, investors as a fourth group are always perfectly compensated by adjusting their lending interest rates to the degree of legal protection; therefore, they are indifferent and will be neglected as political players in the remainder of this chapter.

Politicians, i.e. the legal institutions, respond to demand of their constituents, although the way they do so, is a function of preferences. When preferences are assumed to be constant, the balance of political power, proxied by suffrage institutions, determines the legal protection and hence the policy outcome. Thus, varying the electoral institutions will produce different market outcomes (the third box) regarding the industrial and the financial structure. Bank finance arises with weak legal protection, given that financial institutions offer monitoring devices as a substitute. Financial intermediation activities are simply a way to overcome imperfections in the financial market. Once in place, these market outcomes are likely to persist for historically contingent reasons.

The remainder of this chapter is structured as follows. The next section discusses the related literature, before Section 2.2 introduces the basic model whereby low legal protection is a channel to create rents for the industrial elite. The political equilibrium depends on the suffrage institutions that implicitly affect the structure of financial systems. Section 2.3 discusses our main results and illustrates some evidence supporting the predictions of the model. Thereby we test the model's predictions by tracking the emergence and evolution of the bank-oriented financial system in Germany since the 19th century. We show that our elite-dominated model mechanism indicates a possible reason for why Germany has developed such a unique universal bank-oriented financial system in the last century compared to market-oriented systems like in the US.

2.1.2 Related literature

The idea that the political elite can use access to finance to protect rents and entrench their dominant position is not new to the literature. Empirical evidence supports the view that politics is a key factor in explaining a country's formation of laws to block entry by "outsiders", such as corporate challengers or minority shareholders (Haber et al. 2008; Barth et al. 2006).

In line with Acemoglu and Robinson (2008) an existing elite is defined as an interest group that uses the monopoly of political power for their own interests, even when it is costly to society. The public choice theory explains the heterogeneity of finan-

cial markets with regulatory capture of the domestic political elite that constantly use regulation to protect their privileged positions (Rajan and Zingales 2003). Incumbent firms have self-serving, anti-competitive objectives such that repressing financial development protects them from competition.⁹

Both Rajan and Ramcharan (2011) and Benmelech and Moskowitz (2010) demonstrate empirically how a rich elite has used financial regulation through credit availability to protect its rents. Rajan and Ramcharan (2011) provide evidence that the creation of formal credit institutions across counties in the United States in the early 20th century was driven by the distribution of land within the county. Among landlords, large landowners had an incentive to restrict access to credit from alternative sources, especially for small farmers and tenants, to lock them in and charge exorbitant prices or to buy their land cheaply. Benmelech and Moskowitz (2010) find that usury laws, when binding, lead to a contraction of credits and economic activity, which especially harm smaller firms. They examine the motives of regulation and show that in the case of usury laws, a stricter regulation mainly favors wealthy political incumbents due to reduced competition. Consistent with our arguments, Gerschenkron (1962) views scarcity of capital in what he calls "backward countries" as possibly leading to a dominant position of intermediary markets due to either the bank or the state stepping in. However, according to Verdier (2002) "[Gerschenkron] left the causes of capital scarcity under-explored". This chapter provides a possible reason for capital scarcity in those countries, namely a lack of legal protection of claimholders.

Glaeser et al. (2003) also discuss an economy in which the wealthy agents support a regime of incomplete protection of property rights. Wealthy agents use their accumulated political power to shape economic institutions in their favor. They show that inequality encourages institutional subversion by the wealthy, leading to more inequality.

Pagano and Volpin (2005) translate this mechanism in a political economy model whereby controlling stakeholders (the "elite") support low investor protection to directly extract private benefits via the expropriation of shareholders, which they may obtain with the political support of workers. To form such a coalition, they have to make some compensation to workers which takes the form of constraining their discretion in firing decisions. The success of this corporatist coalition depends on the distribution of equity ownership in the economy. If workers own little, the elite and workers will strike a political deal whereby workers trade low shareholder protection

⁹An illustrating case is Mexico at the end of the 19th century, when the rich elite controlled the banking system during the regime of Porfirio Díaz (1876–1911). The protection by entry barriers, and the resulting lack of loans for new entrants enabled the elite to maintain a monopoly position in other sectors (Haber 1991; Maurer and Haber 2007).

for high job security.¹⁰ This idea of a labor-entrepreneur alliance against shareholders is also stressed by Hellwig (2006). However, the corporatist-approach cannot explain variations in bank-orientation among corporatist-countries, unlike the public choice model in our approach. To our knowledge, no study has explicitly compared the cases of bank-oriented and market-oriented economies within a political economy framework.

Therefore, we perceive our model as providing a complementary explanation which is entirely based upon legal and corporatist determinants that takes market structures as given. Whereas the corporatist-framework indirectly ignores the anti-competitive consequences of poor state protection against hold-up, we extend their approach by modeling the feedback effects on entry. This represents the central channel for rent-creation within our economy. Specifically, our model links the funding conditions available for entrepreneurs and the market structure that materializes as the outcome of the legal system. Thus, we show that a ruling elite can use investor and creditor rights to maximize their own regulatory rent by creating financial frictions imbedded in country-specific institutions. The elite can take many forms, being either a wealthy upper-class, well-endowed with human capital or a union of workers. Hence, our model highlights the role of the political system that shapes the financial system. The variation of political systems has a fundamental impact on policy choices that elected representatives make when there is a need for reform. In this context, our first contribution is to provide microeconomic and political foundations for why some societies have historically produced weak legal protection for claimholders.

The second contribution of this chapter is to highlight the potential link between the political system and the structure of the financial system. The model rationalizes the empirical finding that countries with a lack of legal protection in the past develop alternative mechanisms of corporate governance, and most importantly forms of informed lending offered by monitoring banks. The model predicts that the share of bank-financed firms rises with lower legal protection for claimholders. Bank orientation may thus be a reflection of poor legal protection. Thereby, this chapter discusses evidence that the design of corporate law (that is emerged at the beginning of the 20th century as a regulatory response to market failures) might have a long-run effect on the formation of financial institutions today. We present new stylized facts on the evolution of the structure of financial systems thereby documenting and rationalizing that bank orientation is related to something one might refer to as "shadow of history" or "institutions" that have evolved after the Great Depression.

¹⁰Moreover, both creditors and workers prefer a less risky environment even when this reduces profits so that they forge an alliance against non-controlling shareholders and support bank- over equity-dominance. Perotti and von Thadden (2006) formalize this idea arguing that rentier societies with significant financial assets prefer strong investor rights and favor stock market development.

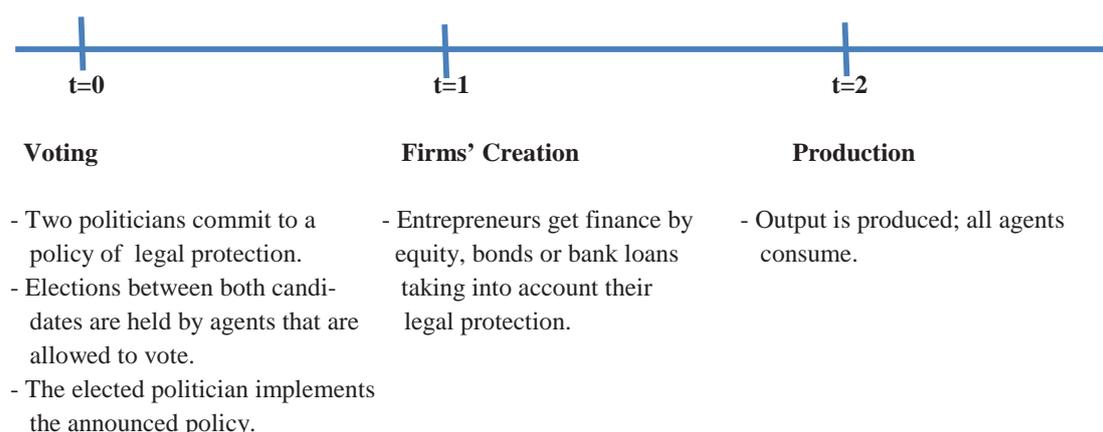


Figure 2.4: The timeline of events

2.2 The economic model: Political power and legal protection

2.2.1 Structure of the model

We consider an economy with a population of a continuum of risk-neutral agents which is normalized to one. There are two types of citizens: a fraction $m < \frac{1}{2}$ having the human capital to open a firm which we call "potential entrepreneurs", while the rest $1 - m$ are pure "consumers".

Consumers are endowed with equal wealth denoted by $w = \underline{w}$, whereas entrepreneurs differ in initial wealth w_i . This wealth is uniformly distributed on the interval (\underline{w}, I) where I captures the set up cost to start a firm.

In the economy every potential entrepreneur can found a firm. This allows her to produce one unit of a non-tradable good y from which she can earn an entrepreneurial rent Π_i . The number of firms in the market for the entrepreneurial good is endogenous. We conceptualize market entry in a two-stage process in which every potential entrepreneur incurs an upfront set up cost I (stage $t = 1$). Once this cost is sunk, she competes for business (stage $t = 2$). If initial wealth is not sufficient to finance the foundation of the firm by herself, $w_i < I$, she needs finance and raises money by external claimholders.

We consider three potential sources for external finance at stage $t = 1$: finance through equity or bonds (uninformed lending) and bank loans (informed lending because of costly monitoring expertise). However, the legal system is associated with the probability of stealing by the entrepreneur. Hold-up costs B are interpreted as a proxy for the level of legal protection for claimholders. Lower hold-up costs imply better protection of outside stakeholders from expropriation by the firm's insiders (the entrepreneur).

This highly stylized approach allows us to think about financial frictions that affect agency problems between outsiders and firms' insiders. The actual level of legal protection will be determined by majority voting and is assumed to be known before firms are created. In other words, hold-up costs undermine the ideal of costless access to finance for potential entrepreneurs. Expropriation risks - due to insufficient legal investor and creditor rights - force claimholders to ask for collateral. When the pledgeable wealth of individual entrepreneurs is insufficient to obtain a financial contract, the market entry is constrained. Therefore, the initial wealth w_i becomes binding, preventing less rich entrepreneurs from entry, which effectively reduces the number of firms. Throughout the chapter, we assume that there is competition in the capital market such that external claimholders (investors and banks) make zero expected profits and are no relevant players in the setting. The level of legal protection available for claimholders implicitly determines market entry by entrepreneurs whereby this is the outcome of voting among citizens at stage $t = 0$.

Figure 2.4 summarizes the sequence of events. At the initial date $t = 0$, elections are held in which citizens choose between two politicians by simple majority. The elected politician implements the announced legal regime, which involves a level of control rights that strongly influences corporate decisions. Before paying dividends to shareholders or repaying debt, the entrepreneur can expropriate rents for herself. However, the maximum amount of expropriated rents, i.e. hold-up costs B , is limited through corporate rules. A rise of expected expropriation reduces the availability of external finance.

At $t = 1$, the market structure materializes whereby every firm produces exactly one unit of an entrepreneurial good y . Firm's entry takes place if an individual entrepreneur sets up a firm with a fixed amount of upfront entry cost I , which can be interpreted as necessary capital investment. Citizens who cannot pay entry costs from their own wealth, can raise finance from banks, bonds or by selling shares. The availability of finance determines the number of entrepreneurs and consequently the market structure.

At $t = 2$ the market of the entrepreneurial good opens, equilibrium prices p and quantities y are determined. Output is directly driven by the number of firms and thus by the level of legal protection.

In the next sections we solve the model by backwards induction to find the sub-game perfect Nash equilibrium.

2.2.2 Market equilibrium

At $t = 2$, citizens choose their consumption bundle. They face the choice between the consumption of the produced good y and a numeraire X that can be consumed for a given competitive market price. Each citizen i maximizes her quasi-linear utility function:

$$U(X_i, y_i) = X_i + \underbrace{a \cdot y_i - \frac{1}{2}y_i^2}_{\text{entrepreneurial good}}, \quad (2.1)$$

where a is a non-negative constant. Equation (2.1) is subject to an individual budget constraint depending on the expected rents of entrepreneurs and the initial wealth. The budget constraint can be written as $X_i + p \cdot y_i \leq w_i + \Pi_i$, where X is a numeraire and p denotes the price for the entrepreneurial good y , while w_i denotes the initial wealth of citizen i and Π_i the entrepreneurial rent of those potential entrepreneurs that succeeded getting finance.¹¹

Inserting the budget constraint in (2.1) and deriving the first order conditions with respect to y_i and X_i yields:

$$y_i = y = a - p \qquad X_i = w_i + \Pi_i - (a - p) \cdot p,$$

which generates the standard result that, due to the quasi-linearity of the utility function, the consumption of the good y produced by entrepreneurs is equal for all citizens and it is completely inelastic in income. By contrast, the consumption of the numeraire good X increases with each citizen's disposable wealth.¹²

Before clearing the market, we need to consider the aggregate supply of the consumption good y . Due to the symmetry of firms, we abstract from the production decision of each firm and concentrate on the equilibrium number of firms. Therefore, our industry sector comprises n firms, each producing one unit of the homogenous good y . With the derived optimal demand $y = a - p$ we can solve for the price in market equilibrium:

$$\underbrace{n}_{\text{supply}} = \underbrace{a - p}_{\text{demand}} \quad \Leftrightarrow \quad p = a - n.$$

¹¹The specific functional form of the utility function simplifies the analysis and is standard to analyze political economy issues in a multisectoral general-equilibrium framework (see Krugman 1993; Mitra 1999; Perotti and Volpin 2012 in a finance context). The reason is that the partial-equilibrium intuition goes through and general-equilibrium concerns are not uppermost in the objective function. Thereby we get the same qualitative results for any quasi-linear utility function.

¹²For active entrepreneurs, the consumption of X directly increases with the entrepreneurial rent Π_i . Thus, the variation in the consumption level of X can be interpreted as a measure of inequality since it reflects the difference in income between active entrepreneurs and consumers in $t = 2$.

It follows that market equilibrium requires a price for the entrepreneurial good that is equal to $p = a - n$; in other words, the price is decreasing in the number of entrepreneurs. Inserting the optimal consumption bundle in (2.1) yields the utility function of a pure consumer V^C and an active entrepreneur V^E :

$$V_i^C = \underline{w} + \frac{1}{2}n^2; \quad V_i^E = w_i + \Pi_i + \frac{1}{2}n^2. \quad (2.2)$$

It is straightforward that the utility function comprises two parts, namely the initial wealth (plus the entrepreneurial rent Π_i) and the utility derived from consumption in $t = 2$, which strictly increases with entrepreneurial entry ($\frac{1}{2}n^2$). Next, we formalize the entry decision at the first stage to endogenize the number of firms.

2.2.3 Firms' creation

At $t = 1$, potential entrepreneurs can set up a firm by investing a fixed amount of money equal to I as the only input factor. Firms behave as price takers whose output is completely inelastic.

To finance entry, potential entrepreneurs need to raise external capital $I - w_i$ in addition to their own wealth w_i . There are three different ways to access external finance: they can raise funds (1) in the capital market by selling shares of their firm; (2) lend bonds; or (3) lend credit from a bank as debt. In all cases, the participation constraint of financial claimholders determines the amount of wealth necessary for a citizen to set up a firm and, hence, the resulting market structure with n entrepreneurs.

In doing so, financial claimholders have to deal with two sources of market inefficiencies when investing their money. As the key mechanism in our model, both sources effectively restrict the firm's access to the capital market, since they redistribute wealth from investors to entrepreneurs.

First, there is a risk of hold-up, i.e. stealing by the entrepreneur who is the founder and manager of the firm. This can be interpreted as a classical principal-agent problem. Insufficient legal rules reduce expected returns on investments. The level of legal protection determined at stage $t = 0$ reduces possible expropriation by entrepreneurs and thus can enhance the investor's confidence.¹³

The second threat for claimholders' returns stems from moral hazard incentives for entrepreneurs due to the limited liability regime. Following Sinn (1982), if the production

¹³Due to asymmetric information there is a commitment problem of entrepreneurs lending from investors. Entrepreneurs cannot credibly commit not to extract rents ex-post, thus hold-up is reflected in more expensive lending conditions.

of the consumption good fails, the entrepreneur is only liable for her own investment in the company. This can lead to excessive risk-taking by the entrepreneurs. To capture the notion that limited liability creates moral hazard incentives for entrepreneurs in a simple way, we assume that the entrepreneur can affect the risk-return profile of the production by choosing the corporate strategy. She can choose between a safe strategy with lower payoffs and a risky strategy with higher payoffs in case of success. More precisely, suppose that a safe strategy offers a return of $p - \psi - I > 0$, where $\psi > 0$ represents a cost to enhance the success probability of production up to one.

By contrast, a risky corporate strategy offers an expected return of $\theta \cdot p - I < 0$ with $\theta < 1$ being the probability of success. This implies that the risky strategy has a negative expected value for the firm. However, since entrepreneurs enjoy higher returns in case of success compared to the safe strategy, they can jeopardize the payment of interest and may have incentives to select the risky strategy.

Equity financed firms

First, we study entry when the necessary amount of additional finance for the corporation is funded by external capital in the form of shares. Specifically, the process of equity funding can be divided into two steps.

In the first step, a potential entrepreneur raises external capital by selling her firm at market value A . At this stage the firm is equivalent to the business idea. After the company is sold, shareholders are in control of the firm's corporate strategy decision. As the entrepreneur has no say in corporate strategy decisions, there is no room for any divergence of interest in terms of the chosen corporate strategy between the entrepreneur - in her managing function - and equityholders.

During $t = 2$ production generates a cash flow; however, the profit available for equityholders as residual claimants is reduced by the amount of private benefits that corporate law allows the entrepreneur to extract.¹⁴ Thus, corporate law constrains the scope of rent extraction by setting a limit B to the resources that the entrepreneur can divert from the firm. Rational investors know that they can only prevent private benefits in so far as legal rules hold. They only expect entrepreneurs to pay the minimum fraction of their output in the form of dividends. As a result, when they decide to invest in a firm's shares, investors will take hold-up costs into account and expect profits of $p - B - \psi$ in case of the safe strategy and $\theta(p - B)$ otherwise.

¹⁴This setting is closely related to the model of captured regulation by Perotti and Volpin (2012) where wealthier agents form a lobby for weak proportional investor protection to limit access to funding for other entrants. A higher shadow cost of entry barriers increases required bribes and induces lobbyists to accept more competition.

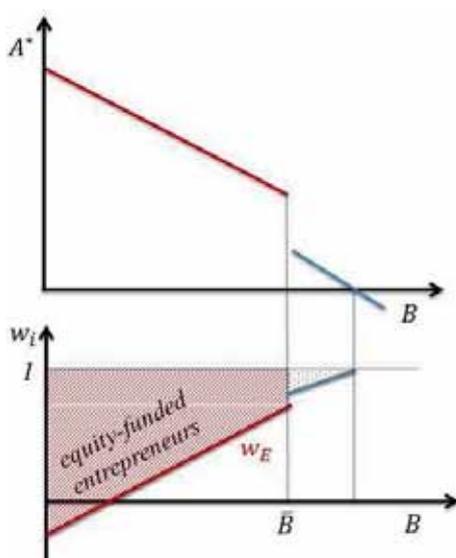


Figure 2.5: Wealth as an entry barrier to get equity funding

The figure plots the relationship between a firm's market price A^* that an investor is willing to pay and the necessary amount of entrepreneurial wealth, $w_E = I - A^*$, to cover the set up cost of I . Since the market price is a decreasing function of possible hold-up B , the wealth entry barrier to become an entrepreneur strictly increases in B .

Shareholders maximize the firm's market value A for a given expropriation limit B . It directly follows that shareholders decide for the safe strategy, as long as it offers higher returns, if and only if $B \leq \bar{B} = p - \frac{\psi}{1-\theta}$.

The resulting market price A^* is equal to the price at which the entrepreneur can sell the firm at $t = 1$.

$$A^* = \begin{cases} p - B - \psi & \text{if } B \leq \bar{B} = p - \frac{\psi}{1-\theta} & \text{(safe strategy)} \\ \theta(p - B) & \text{if } B > \bar{B} = p - \frac{\psi}{1-\theta} & \text{(risky strategy)} \end{cases} \quad (2.3)$$

In the remainder of this chapter, we restrict our attention to the plausible case whereby shareholders always select the safe strategy. Figure 2.5 illustrates the case of equity funding. The market price A^* that investors are willing to pay for a firm is a decreasing function of the allowed level of expropriation B by entrepreneurs. This translates into a borrowing constraint, since the entrepreneur can only raise external finance up to the equity capacity A^* . For given investment I of starting a firm, the entrepreneur's minimal wealth to provide equityholders with proper incentives to invest thus amounts to $I - A^*$.¹⁵ Intuitively, as initial founders of the company, entrepreneurs bear the

¹⁵You can re-interpret this condition as a situation where it is optimal to let the entrepreneur enjoy a share of the rent to discourage him from diverting output to private consumption (Lacker and Weinberg 1989; Holmstrom and Tirole 1997). Note that A^* ensures that entrepreneurs chose

agency cost of weak control rights in the form of reduced availability of equity capital. Hence, we obtain a useful first result:

Lemma 1: *Given setup costs upon entry of I , only entrepreneurs with a wealth of $w_i \geq w_E = I - A^*$ can set up a firm via equity.*

The availability of equity capital for the entrepreneur is effectively constrained by the equityholders' willingness to invest, i.e. the participation condition of uninformed investors that can be expressed as a function of hold-up risk. In other words, Figure 2.5 tells us that with lower hold-up costs B , entrepreneurs can raise more external capital and require less personal wealth w_i to set up a firm. This means that the number of firms active in the market for entrepreneurial goods is a decreasing function of the degree of B . In our setting the number of equity financed firms simply reflects the level of investor protection and poor legal corporate control works as an effective barrier to entry.

Debt financed firms

The entry decision for citizens who want to finance their production with debt is constrained by very similar mechanisms.

First, debt-holders' willingness to borrow money, denoted by R_K , is again a decreasing function of hold-up costs institutionalized in corporate law. Accordingly, the participation constraint by bond lenders is equal to $p - B - \psi \geq R_K$ in the relevant case of the safe strategy. The participation constraint is equivalent to a zero-profit condition for lenders. Therefore, in capital market equilibrium, the firm's remaining cash flow after expropriation must be at least equal to the face value of debt:

$$\underbrace{p - B - \psi}_{\text{cash-flow after hold-up}} \geq \underbrace{R_K}_{\text{expected returns}} \geq \underbrace{I_K}_{\text{lender's capital at risk}} \quad (PC)$$

The most important distinction between debt-holders and shareholders is their return structure, *i.e.* participation in a firm's corporate strategy and their control rights.

While shareholders are in control of the business decisions, debt-holders, with their concave claim, are hurt from increased risk due to limited liability. They have no

the socially optimal corporate strategy independently of the hold-up costs, since equityholders can induce the entrepreneur to select their preferred corporate strategy that coincides with the social optimal one. This is because equityholders, participating full in the upside and downside of corporate risk (unlimited liability), are assumed to perfectly control the corporate effort strategy of the firm.

control of the firm's corporate strategy and thus rely on incentive-compatible contracts to reduce the moral hazard incentives of entrepreneurs.¹⁶

Since $\theta \cdot p - I < 0 \Leftrightarrow R_K < I_K$, the only way that debt finance can take place is through an incentive-compatible contract that leads to the implementation of the safe strategy.

The entrepreneur will be diligent and selects the safe strategy if and only if the returns from the safe strategy exceeds those of the risky one, i.e. $p - \psi - R_K - w_i \geq \theta(p - R_K) - w_i$ for all $p - B - \psi \geq R_K$. Therefore, if the participation constraint holds, the lending amount must be sufficiently low to incentivize the entrepreneur to take the safe strategy, which is

$$R_K \leq p - \psi \cdot \frac{1}{1-\theta}. \quad (IC)$$

We have now derived a participation (PC) and an incentive constraint (IC), both of which must hold for access to debt finance. Which constraint is binding depends on the value of hold-up costs B . It is easy to show that there is a threshold of possible expropriation in the form of private benefits \hat{B} , at which the participation constraint by lenders becomes binding. Intuitively, the loss on returns due to limited liability is exceeded by the loss due to hold-up at a certain split-off point of B . Thus, we conclude that if $B \geq \hat{B}$, the principal-agent problem of expropriation is more severe (the participation constraint of lenders is binding) and for all $B < \hat{B}$ expropriation is less important, since the moral hazard induced by limited liability determines the willingness to borrow (the incentive constraint for the safe strategy is binding). This allows us to compute the necessary returns that bond lenders will require:

$$R_K = \begin{cases} p - \frac{\psi}{1-\theta} & \text{if } B < \hat{B} = \frac{\theta}{1-\theta} \cdot \psi & (IC) \\ p - \psi - B & \text{if } B \geq \hat{B} = \frac{\theta}{1-\theta} \cdot \psi & (PC). \end{cases} \quad (2.4)$$

This expression is also illustrated in Figure 2.6. The willingness to lend bonds $R_K(B)$ is a function consisting of two parts. For sufficiently low levels of legal protection, i.e. $B < \hat{B}$, stealing by entrepreneurs (hold-up) does not affect bondholders' competitive returns. The function is flat since the required returns depend on the scope of moral hazard induced by limited liability. However, with $B > \hat{B}$ lending becomes more expensive and bondholders will price the hold-up risk such that expected returns from lending decrease with B . As in the case of equity-finance, we can translate the R_K -

¹⁶As the founders of the company, entrepreneurs enjoy the benefits of limited liability in case of failure, it is not sufficient to meet all outstandings. Hence, the debtholder will not receive the promised return if the firm's capital is exhausted (Sinn 1982). This means that a firm maximizing its profits shows an asymmetric risk-behavior resulting from the limited liability.

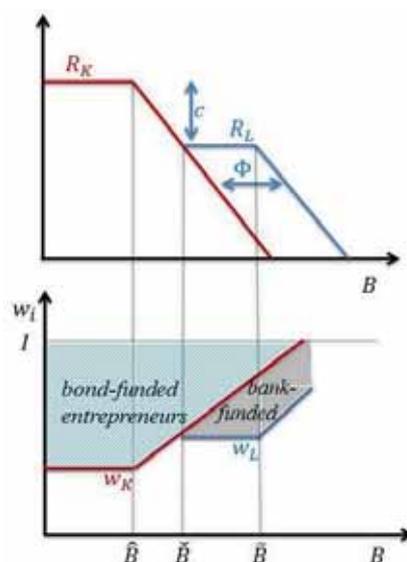


Figure 2.6: Wealth as an entry barrier for debt funding

The top figure plots the willingness to lend bonds (R_K) and bank loans (R_L) as a function of possible hold-up B . Due to the costly monitoring technology, low levels of $B < \hat{B}$ make banking not profitable, since $R_L - R_K \geq c$. The lower graph shows the resulting wealth entry barriers, whereby entrepreneurs with less than $w_K \geq I - R_K$ cannot secure bond lending and entrepreneurs with less than $w_L \geq I - R_L + c$ cannot obtain a loan.

function into a borrowing constraint that must be satisfied for entrepreneurs to raise funds by uninformed lenders. Only entrepreneurs with $w_i \geq w_K = I - R_K$ can offer a participation-compatible debt contract and are able to set up a firm. Again, R_K is the implicit entry barrier for entrepreneurs to secure bond finance, yielding a number of active firms n_K financed by bonds.

Let us now concentrate on entrepreneurs with wealth below w_K who do not have sufficient own wealth at stake and thus need an additional share of production surplus to invest. A natural way of attracting investments is to substitute the lack of state control via forms of private arrangements, thereby reducing the hold-up risk by entrepreneurs. A less wealthy entrepreneur can turn to an intermediary with monitoring expertise, which we call a "bank". By definition, only banks can invest in technologies that allow them to screen loan applicants and monitor their projects to partially resolve the agency problem (Diamond 1984). Following Mayer (1988), the monitoring technology implies that entrepreneurs and banks develop long-term relationships that mitigate the effects of hold-up.¹⁷ A simple way of modeling monitoring is to enable the bank to place

¹⁷According to Freixas and Rochet (2008) this is one of the main differences between bank lending and bond lending. Whereas bond prices reflect market information, the value of a bank loan results from this information processing relationship and is *a priori* unknown to the market.

constraints on an entrepreneurs' behavior that reduce hold-up risk B to $f(B) = B - \Phi$ for monitoring cost c .¹⁸

When banks assume the role of delegated monitors, the participation constraint by banks changes to $p - \psi - (B - \Phi) \geq R_L - c$. Consequently, the threshold \tilde{B} at which the PC becomes binding increases such that the necessary and sufficient amount of expected returns for the bank is now given by

$$R_L = \begin{cases} p - \frac{\psi}{1-\theta} & \text{if } B < \tilde{B} = \frac{\theta}{1-\theta} \cdot \psi + \Phi & \text{(IC)} \\ p - \psi - (B - \Phi) & \text{if } B \geq \tilde{B} = \frac{\theta}{1-\theta} \cdot \psi + \Phi & \text{(PC)}. \end{cases} \quad (2.5)$$

The bank's lending function R_L is illustrated in Figure 2.6 which indicates that for given monitoring cost c , the expected returns are lower compared to bond-lending until a split-off level \tilde{B} . At the intersection point of R_L and R_K , expected returns of bond-lending and bank-lending are equal: in other words, banks will provide monitoring service only if the gains from resolving the agency problems in the form of lower hold-up risk outweigh the monitoring costs. Informed bank-lending becomes feasible for sufficiently poor legal protection (see Appendix 2A for the derivation of \tilde{B}).

With bank-lending, $R_L = I_L + c$, we can again derive the required wealth for entrepreneurs to gain access to finance via bank loans, which is $w_i \geq w_L = I - \underbrace{R_L + c}_{I_L}$.

As a result, we now distinguish two types of firms financed by debt that are competing in the product market. More wealthy citizens with $w_i > w_K$ can finance the necessary fraction of their production with bonds, whereas on the other hand, entrepreneurs with $w_K > w_i > w_L$ are financed by bank loans. This finding formalizes Gerschenkron's "capital scarcity" and allows us to state the following Lemma arguing that the availability *and* the type of external finance depends on the level of expropriation B .

Lemma 2: *Suppose entrepreneurs need to setup cost of I .*

- *If $B \leq \tilde{B}$ citizens with wealth $w_i \geq w_K = I - R_K$ can set up a firm financed by bonds.*
- *If $B > \tilde{B}$ citizens with $w_i \geq w_K$ are financed by bonds, citizens with $w_K > w_i \geq w_L = I - R_L + c$ are financed by bank loans.*

¹⁸ Loan covenants serve this purpose. Covenants are contracts that restrict the production and the flexibility of the entrepreneur to prevent moral hazard, e.g. by giving the bank veto rights on the sale of strategic assets or by forbidding the firm from paying dividends if certain financial conditions are violated (see Smith and Warner 1979).

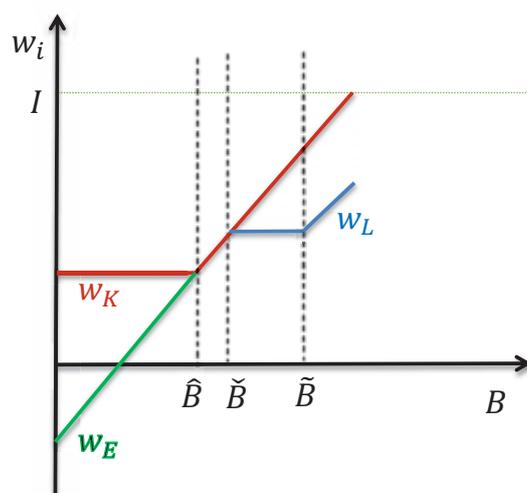


Figure 2.7: Corporate law and the financial structure

The figure plots the wealth barriers for equity finance (w_E), bond finance (w_K) and bank finance (w_L) as a function of hold-up risk B . The total number of entrepreneurs is decreasing in B , whereas the fraction of bank-funded entrepreneurs increases in hold-up costs.

Equilibrium market structure

Based upon the scope of the expropriation risk (hold-up) and limited liability (moral-hazard) three constraints, i.e. entry barriers for citizens to start a firm, have been developed. Figure 2.7 plots the resulting financing constraints that automatically determine the number of potential entrepreneurs who succeeded in producing the consumption good in $t = 2$.

The figure illustrates that the entry costs in the form of higher initial wealth by citizens are increasing in the scope of hold-up B , which is allowed because of inadequate legal institutions, i.e. corporate law. The market structure is endogenous and responds to the degree of legal protection against hold-up. It is easy to see that the number of entrepreneurs (output) decreases with B , based upon the following intuition.

In the ideal case of zero expropriation risk, there is no entry barrier and all "potential entrepreneurs" can setup firms, due to the certainty that owners will recover their investments. Investors simply accept low levels of wealth. The fraction of citizens with wealth $w_i \in [0, w_K]$ will be funded via equity, citizens with wealth $w_i \in [w_K, I]$ can obtain finance through equity or bonds, being indifferent between both forms. Interestingly, only wealthy citizens have access to the bond market, given that due to limited liability debt-holders will ask for compensation in the form of higher pledgeable wealth. The required wealth reflects the debt-holders' expected loss in case of default.

However, both wealth barriers coincide with the expropriation level \hat{B} onwards, since the hold-up risk subsequently dominates the limited liability effect (the participation constraint by lenders becomes binding). Most importantly, as we have seen in the last subsection, with a high scope of rent expropriation B , the number of citizens that gain access to external finance shrinks. Entry deterrence takes place through borrowing channels. Interestingly, a mixed financing structure results.

The cut-off level \check{B} provides us with two important insights. First, this threshold is the minimum hold-up cost that establishes the existence of banks as providers of credit. Banks only provide monitoring services when the expected return is sufficiently high to compensate them for the monitoring activities. At \check{B} monitoring becomes incentive-compatible, because the cost of monitoring equals the value-added, i.e. prevented extraction of private benefits. Since monitoring reduces the *de facto* scope of hold-up, the wealth barrier for firms with a bank loan drops. It is straightforward that bank financing is less attractive than other forms of finance, owing to the lower resulting entrepreneurial rent, given that entrepreneurs are faced with the disadvantage of higher refinancing cost due to monitoring ($R_L = I_L + c$). Thus, only "poor" entrepreneurs with wealth $w_E < w_i \leq w_L$ select a bank loan, whereas more wealthy entrepreneurs prefer finance by equity or bonds.

Second, note that for low levels of expropriation $B \in [0, \check{B}]$, the total number of active firms n , each producing one unit of output, is determined by the equity barrier w_E . In other words, in this range the borrowing constraint and thereby the market structure is defined by the participation constraint of equity owners. In contrast, for sufficiently high levels, $B \in [\check{B}, +\infty]$, banking becomes feasible as banks accept lower wealth of entrepreneurs. Subsequently, it emerges that the bank barrier w_L becomes binding for the equilibrium number of firms.

Summarizing this argument, we obtain the following equilibrium market structure in the model:

Proposition 1 (Equilibrium Market Structure) *The total output and the number of firms is given by:*

$$n = \begin{cases} a - \psi - I & \forall B \in [0, \underline{w}] & \text{market-oriented (equity finance)} \\ \frac{m(a-\psi-B)}{I-\underline{w}+m} & \forall B \in [\underline{w}, \check{B}] & \text{market-oriented (equity and bond finance)} \\ \frac{m(a-\frac{\psi}{1-\theta}-c)}{I-\underline{w}+m} & \forall B \in [\check{B}, \tilde{B}] & \text{mixed system (bank, equity and bond finance)} \\ \frac{m(a-\psi-B+\Phi-c)}{I-\underline{w}+m} & \forall B \in [\tilde{B}, +\infty[& \text{bank-oriented (bank, equity and bond finance)}. \end{cases}$$

Proof: *in Appendix 2B.*

The logic of the result is straightforward. The quality of corporate law to protect claimholders affects their willingness to provide funds to entrepreneurs. In effect, entry deterrence occurs by changing their participation constraint towards firm financing. The necessary wealth of the marginal entrepreneur increases and the number of firms declines: in other words, a high risk of rent extraction induces a reduced lending capacity in our economy. A legal regime that produces such a risk proves to be anti-competitive, since the number of funded firms decreases with hold-up risk, $\frac{\partial n}{\partial B} < 0$ if $B > \underline{w}$ and $B \neq [\check{B}, \tilde{B}]$. As we are interested in the financial structure of the entrepreneurs who succeed in opening a firm, we can show the following Lemma:

Lemma 3: *The fraction of bank-financed firms $\frac{n_L}{n}$ is increasing in the scope of possible expropriation B .*

Bank finance emerges, because financial institutions offer a monitoring device as a substitute for weak legal protection, which is why external finance becomes available for less wealthy entrepreneurs. As one would expect, we observe that the number of entrepreneurs funded with bank loans increases with B : in other words, bank orientation is the result of weak claimholder protection. This is the first important result of this chapter.

Now, we can turn to the political equilibrium at the first stage to find the optimal legal framework for a politician to be elected.

2.2.4 Voting

Politicians respond to the demands of their electorate. The timing of events at the voting stage is as follows: (1) At the beginning of period $t = 0$, two office-seeking politicians, $j \in 1, 2$, simultaneously and non-cooperatively, commit to a value of hold-up risk B_j in the course of the political campaign in advance of the election. According to Proposition 1 every B corresponds to an equilibrium number of firms that citizens anticipate. Thus, citizens effectively vote for the market structure in the product market. (2) Elections are held, in which voters choose between both politicians. (3) The elected politician implements her announced policy platform.

In this model, we abstract from universal suffrage by defining property qualifications citizens have to fulfill to gain active voting rights. We assume that only citizens with an initial wealth $w_i > w(\Omega)$ meet the requirements to be eligible to vote. Subsequently, $\Omega \in [0, 1]$ identifies the fraction of citizens who have the right to vote.

In the economy, there are three distinct groups of voters $h \in \{E, L, C\}$, namely entrepreneurs (with index E) financed by equity or bonds, entrepreneurs financed by

bank loans (with index L) and consumers (with index C). Citizens perfectly anticipate their voting type, i.e. potential entrepreneurs know if and how they have access to finance. Political preferences are purely shaped by economic motives such that each voter's objective is to maximize her personal welfare. Every group shares the same economic characteristics and preferences. Recall that for a given value of B , only the $n(B)$ wealthiest entrepreneurs can setup a firm which is either equity or bank financed.

According to (2.2), we can rewrite the utility of consumers as $V_i^C = \underline{w} + \frac{1}{2}n^2$. It is clear that consumers strictly prefer the maximum number of firms, since $\frac{\partial V^C}{\partial n} > 0$. Thus, every consumer's utility peaks when the number of firms in the market up to the maximum $n = m$.¹⁹ Substituting the entrepreneurial rent Π into (2.2), entrepreneurs maximize their utility, conditional on being equity or bank-financed, by solving

$$V_i^E = w_i + \underbrace{a - n - \psi - I}_{\Pi(n)} + \frac{1}{2}n^2 \quad V_i^L = w_i + \underbrace{a - n - \psi - I - c}_{\Pi(n)} + \frac{1}{2}n^2.$$

Every entrepreneur strictly prefers to start a firm instead of being a pure consumer. However, once active in the product market, she wants the lowest number of competing firms, $\frac{\partial V^E}{\partial n} < 0$, $\frac{\partial V^L}{\partial n} < 0$. Therefore, both types of entrepreneurs try to minimize the number of firms in the market subject to the condition that they are able to set up a firm by themselves, i.e. have access to finance. Intuitively, they want to implement a "financial barrier to entry" in the product market to restrict the access of less wealthy entrepreneurs. Given that there is heterogeneity in wealth w_i among entrepreneurs, it follows that every entrepreneur has a distinct ideal point of hold-up risk B . The utility functions of each voter can thus be thought of as curves with peaks at each voter's ideal point. Hence, the balance of power between consumers and the entrepreneurs as well as within the group of entrepreneurs determines the political outcome.

To solve for the political equilibrium, we use a standard model of electoral competition between two office-seeking candidates under probabilistic voting à la Persson and Tabellini (2002). Both candidates $j \in 1, 2$ credibly commit to a value of hold-up risk B_j that is institutionalized in corporate law. We define θ_i as the probability that voter i votes for candidate 1 given B_1 and B_2 . The probabilistic voting assumption thus transforms the voter's utility mountains into probability mountains with the probability of any voter voting for a given candidate reaching a peak when the candidate takes a position at the voter's ideal point. θ_i is a continuous and concave function of

¹⁹For ease of exposition, suppose further that $m = a - \Psi - I$. This means, that the number of potential entrepreneurs is equal to the number of firms in a competitive equilibrium with zero profits. This condition can be reinterpreted as a situation where the available human capital (in the form of entrepreneurs) is sufficiently large to support perfect competition. Then the human capital constraint is never binding. However this assumption is not necessary for our results which hold for any $m \leq 1$.

differences in utilites promised by the two candidates' platforms:

$$\theta_i = \frac{1}{2} + H^i(B_1) - H^i(B_2). \tag{2.6}$$

Both politicians seek to maximize their expected number of votes, defined as the sum of the probabilities that each citizen will vote for the politician. The competition between both politicians drives them to the peak of the probability distribution. Following Persson and Tabellini (2002), we define EV_1 as the expected votes of politician 1.

$$EV_1 = \int_0^1 \theta_i di = \int_0^1 \frac{1}{2} + [H^i(B_1) - H^i(B_2)] di. \tag{2.7}$$

Due to the symmetry of the problem, it is clear that both candidates will choose the same policy platform B^* maximizing the aggregate utility of all eligible voters Ω .

Hence, the maximization problem reads $\max_{B_j} EV_1 = \max_{B_j} \int_0^1 \frac{1}{2} + [H^i(B_1) - H^i(B_2)] di$ so that any solution of the political game is welfare optimizing for the electorate. Intuitively, by determining the number of firms $n(B)$, the politician is faced with a central trade-off, whereby if entry is lower, the monopoly power of a firm increases along with their entrepreneurial rent. This can be referred to as a positive income effect for entrepreneurs. Second, due to increased prices, consumption becomes more expensive for everyone (negative price effect).

For the ease of exposition we follow Repullo and Suarez (2000) in this section by solving the politician's maximization problem for the case of costless monitoring, i.e. $c = 0$. However, the model mechanism is unaffected by the cost of the monitoring technology.²⁰

The objective function of the politician has two intervals and can be written as:

$$\max_B EV_1 = \begin{cases} v_E + \Omega[\Pi(n) + V^C(n)] & \forall B \in [0, B^\Omega] \\ v_E + n(B) \cdot \Pi(n) + \Omega \cdot V^C(n) & \forall B \in [B^\Omega, +\infty] \end{cases} \tag{2.8}$$

The first interval describes the politicians' maximization problem when every voter is able to start a firm. In this context, the threshold B^Ω captures the maximum value of legal expropriation B such that the equilibrium number of firms is equal to the number of voters.

In this case, the total utility of the electorate in (2.8) comprises the aggregate wealth v_E of the electorate, the generated entrepreneurial profits and the utility derived from

²⁰Buck and Hildebrand (2014) solve the political equilibrium for positive monitoring costs in a similar setting where entrepreneurs have the possibility of mixed finance.

consumption. Maximization with respect to B yields $\frac{\partial EV_1}{\partial B} = \frac{\partial EV_1}{\partial n} \cdot \frac{\partial n}{\partial B} > 0$, since $\frac{\partial EV_1}{\partial n} = \Omega(-1 + n) < 0$ and $\frac{\partial n}{\partial B} < 0$ as shown in Proposition 1. In other words, in the first interval, $[0, B^\Omega]$, there will always be a corner solution with B^Ω as it costs every voter money to expand the number of firms but nobody benefits. Intuitively, we know that a single entrepreneur's utility is peaked when she is the poorest entrepreneur able to setup a firm. It follows that the solution for an optimal number of firms n must always be smaller or equal to the corner solution with $B_1^* = B^\Omega \leftrightarrow n_1^* \leq \Omega$.

In the second interval with sufficiently high levels of legal expropriation B , $[B^\Omega, +\infty]$, only a part $n(B) < \Omega$ of voters can start a firm. We obtain the two effects described above: the income effect for entrepreneurs due to reduced competition is weighted by the number of entrepreneurs n in the accumulated welfare function, while the Ω weights the price effect and amounts to the number of eligible voters. The combination of the decreasing income effect and the constant price effect leads to an interior solution for the politician's maximization problem. With $\Pi = a - \psi - I - n$, this gives us the following first order condition:

$$\frac{\partial EV_1}{\partial B} = \frac{\partial EV_1}{\partial n} \cdot \frac{\partial n}{\partial B} = [a - \psi - I + n(\Omega - 2)] \cdot \frac{-m}{I - \underline{w} + m} = 0.$$

Substituting n from Proposition 1, we have an interior solution for this interval with $B^* = \frac{I - \underline{w} + m}{\Omega - 2} + a - \psi$. Using B^* , we see that the resulting number of firms is equal to $n^* = \frac{a - \psi - I}{2 - \Omega} = \frac{m}{2 - \Omega}$.

Summarizing the solution for both intervals, we obtain that $n^{opt} = \min[\Omega, \frac{m}{2 - \Omega}]$ describes the optimal policy. Thus, the solution of the politician's maximization problem can be described by the following Proposition.

Proposition 2 (Political equilibrium under elite domination): *There is a unique Nash equilibrium, where both politicians select a policy with B^* , enabling access to finance for $n^{opt}(\Omega) = \min\{\Omega, \frac{m}{2 - \Omega}\}$ entrepreneurs.*

Intuitively, when the legal system does not protect against hold-up B , the number of entrepreneurs who succeed in starting a firm $n^*(B)$ is reduced. If the number of citizens who are entitled to vote is restricted, it becomes optimal for the politician to select a policy with higher hold-up costs B^* by entrepreneurs thereby creating a financial barrier in the product market. The reason is that this policy generates rents for wealthy entrepreneurs at the expense of consumers. If $\Omega \rightarrow 0$ and only the wealthiest citizen is allowed to vote, then the optimal policy for a politician is to implement B^* such that $n^* = \min\{1, \frac{m}{2}\} = \frac{m}{2}$ firms enter the market. Therefore, low levels of legal protection can be incentive-compatible for politicians in elite-dominated political systems to get

elected. In contrast, if $\Omega = 1$ (universal suffrage) we obtain the social optimum with $n^* = \min\{1, m\} = m$ where all potential entrepreneurs can open up a firm.

In summary, the main message of the theoretical model is that the allocation of political power can play a significant role in shaping the regulatory environment in finance. A society in which the political power is in the hands of very few wealthy producers protects their rents by erecting significant financial entry barriers through low levels of legal protection. The elite artificially preserves market inefficiencies in the form of hold-up costs. The reason is simple: poor legal protection is a way of increasing entry costs for potential entrepreneurs, since liable wealth is a substitute for legal certainty. Autocratic economies discourage institutions that may grant access to opportunities for emerging groups. The elite wants to "tax" potential investors to impoverish them and consolidate their own political power.

This is a new form of entry deterrence that is nonetheless potentially important in times when funding opportunities are relatively scarce. By preserving market frictions, the elite indirectly produces banking rents, since banks substitute the lack of state control with private corporate governance systems like delegated monitoring or proxy voting. As shown in Lemma 3, the fraction of bank-funded firms increases with the politician's reluctance to protect financial investors via corporate law. Therefore bank-oriented financial systems can be interpreted as the market outcome of the political conflict between the incumbent elite and potential rivals and consumers.

2.2.5 Policy implications

This chapter makes the point that corporate law and the structure of financial systems must be endogenous to the evolving political majority. Therefore, a public choice model is developed to study the welfare effects of corporate control rights on the electorate. Entry-barriers in the form of poor legal protection are erected if the political power is controlled by an incumbent elite. This generates less aggregate output and thereby inefficiencies.

In the model, the creation of financial barriers and bank-oriented financial systems go hand-in-hand and result from a politically-directed regulatory choice. It is not the legal origin of a country or risk-preferences of entrepreneurs that grant dominance to banks versus equity, but rather the regulatory environment made by the political majority. Corporate law shapes the financing structure of firms, e.g. indirectly by offering poor control rights (thereby allowing hold-up by entrepreneurs) or can also take more direct forms, for example, by dictating systems of co-determination by the creation of supervisory boards where worker and stakeholders have influence. Therefore, entry

deterrence can also occur when the political system is characterized by other political majorities.

We can extend our analysis insofar that the firm's profits are shared among the entrepreneur and some other stakeholders, say the workers who are represented by a labor union. In other words, in contrast to the baseline model the surplus of the firm $\Pi(n)$ can now be extracted by both the entrepreneur and workers who thus share the same interests. In this context, instruments such as co-determination, whereby the employees play a role in the management of a company as provided by law, enable them to participate in the extraction of rents B .²¹ Thus, in systems with high worker rights, unions can take on managerial positions allowing them to extract rents for themselves in the same way entrepreneurs do. It follows that privileged workers - i.e. workers organized in unions - and entrepreneurs share the same preferences and objectives. Thus, it is evident that a political system dominated by privileged workers ("insiders") can have the very same effect on the choice of investor and creditor rights as a system dominated by a wealthy elite. Again, the willingness of claimholders to finance an entrepreneur is a decreasing function of pro labor rights. Therefore, labor-friendly laws like co-determination affect the potential entrant's ability to get funding and generates a crowding-out effect. Intuitively, stronger labor rights cause labor to crowd out external finance. The same mechanisms of our baseline model are at work and the economic outcome is again a monopolized market structure.

Hence, the model can be used to analyze other forms of policy interventions that aim to redistribute rents to some stakeholders of incumbent firms. Most importantly, these rules induce uncertainty for claimholders and discourage equity market development such that banking becomes attractive.

One implication of the model setting is related to the role of corporate law in creating a growth-promoting financial system. The quality of legal protection improves the efficient allocation of resources by reducing hold-up costs and hence enhances output and economic growth. This finding is consistent with empirical studies that demonstrate that the component of financial development explained by the quality and efficiency of investor protection imbedded in legal systems is strongly and positively linked with long-run growth (Levine 2002). However, implicitly bank finance appears to be inferior and only emerges due to weak protection of claimholders. Financial intermediaries endogenously arise to ameliorate (sufficiently severe) market imperfections by providing

²¹In systems with co-determination the employees are given seats in a board of directors in one-tier management systems or seats in a supervisory board and management board in two-tier management systems. The first serious co-determination law began in Germany. At first there was only worker participation in management in the coal and steel industries (see the next section for a case study of Germany).

financial and most importantly monitoring services. With respect to the "varieties of capitalism" view, this approach has some shortcomings. Because of the static nature of our model, beneficial aspects of banking that arise over time such as managing cross-sectional, intertemporal, and liquidity risk and thereby enhancing investment efficiency are neglected (Allen and Gale 2001). Other proponents of bank-oriented systems argue that banks have social benefits because they exploit scale economies in information processing, form long-run relationships with firms to ease asymmetric information distortions and consequently boost economic growth in the long run (Boot and Thakor 1997). While these beneficial effects on firm financing and economic performance emerge with repeated interactions, the main focus of this model is to analyze under which conditions market failures in the financial sector are either solved by corporate law or by private arrangements offered by banks. In a one-transaction game, the business model of a bank is only competitive if banks are compensated by the limitations of direct finance due to sufficiently high hold-up risk generated by inadequate state protection. Banking services are only feasible if the private (one-period) value-added of monitoring is sufficiently high.

Although the model economy analyzed in this chapter is highly abstract, it can shed some light on interesting questions. The first is the implication that societies in which stakeholder dominate the political arena produce regulatory structures that restrict the role for market investors and thereby enhance the banks' relative power. An interesting knock-on effect is that co-determination and a high risk of rent extraction may also make concentrated ownership and the formation of blockholders more attractive. Consistent with this insight, La Porta et al. (1998) find that ownership concentration is extremely high in jurisdictions with weak legal protection. Intuitively, ownership concentration becomes a substitute for legal protection, because only large shareholders can expect to receive a return. This is in line with empirical findings, whereby corporatist societies appear to discourage entry and favor interests of producers and thus stakeholder rents over those of consumers.

Complementary to these findings, De Fiore and Uhlig (2011) show that bank loans account for a much larger fraction of debt finance in the euro area than in the United States. The ratio of bank loans to debt securities is approximately eight times larger in the euro-area (5.48) than in the United States (0.66). Second, the debt to equity ratio is higher in the euro area (0.64) than in the United States (0.43), reflecting a larger reliance of firms in the latter on financing through equity rather than debt.

Furthermore, the model predictions are consistent with the following general observations: (1) in countries with stronger legal regime of investor protection there is less expropriation risk of the firm's resources and a higher probability of investments in

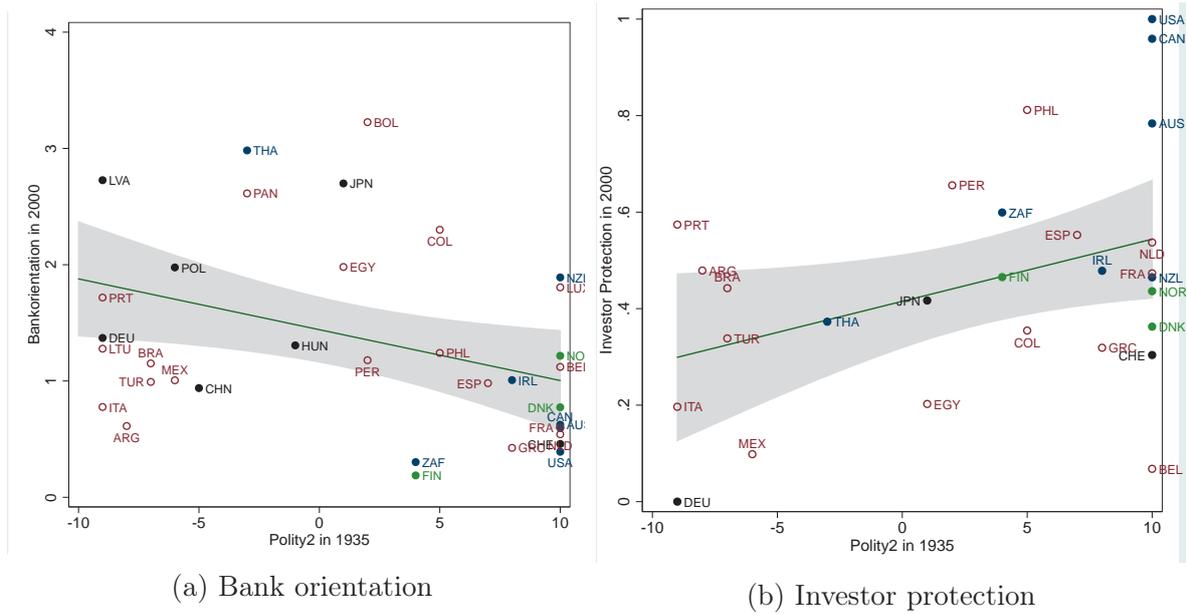


Figure 2.8: The impact of the political system of the 1930s

This figure shows the negative correlation between today's level of bank orientation and the initial political institutions in 1935 (measured by Polity2) as well as the positive correlation between the level of investor protection in 2000 and the political institutions in 1935; Own calculations; Source: Bank orientation: Beck et al. (2010); Rajan and Zingales (2003); Investor protection: La Porta et al. (2006).

value-enhancing projects that benefit shareholders (La Porta et al. 2006; Shleifer and Wolfenzon 2002); (2) the composition of bank finance and direct finance varies across firms with bank financing predominantly found in new firms whereas incumbent firms can finance themselves via retained earnings (Aghion et al. 2007) so that better protection of property rights increase external financing of small firms significantly than it does for large firms (Beck et al. 2008); and (3) countries in which the same companies maintain a dominant position over time have lower growth and less developed capital markets (De Serres et al. 2006; Fogel et al. 2008).

2.3 Empirical discussion

The key argument developed in this chapter is that the structure of financial systems around the world reflects the political balance of power and the respective setup of political institutions through the channel of legal protection. The theoretic model offers an explanation for the presented empirical finding in Figure 2.2. In countries with a lack of legal protection, the share of bank-funded firms rises due to the development of substitute mechanisms of corporate governance (e.g. monitoring banks).

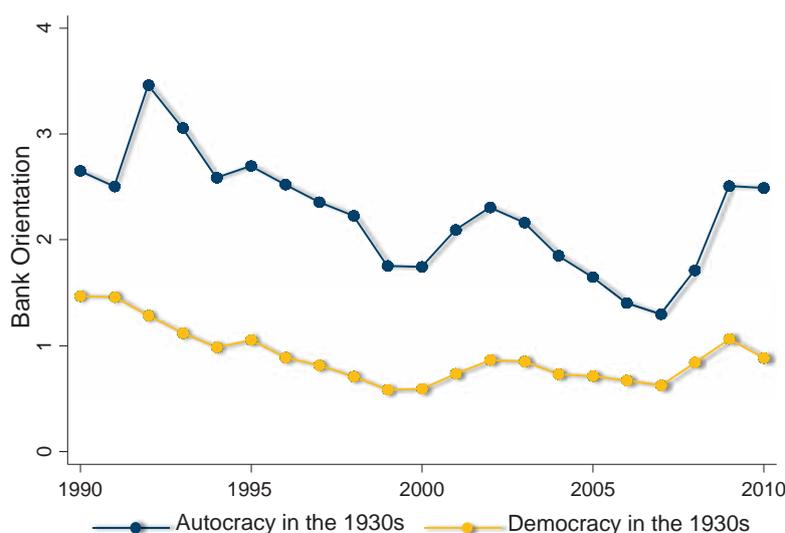


Figure 2.9: Trends in the share of financial intermediation (1990 - 2010)

This figure plots the bank orientation between historically autocracies and democracies (measured by Polity2 and referred to as Democracy if the Polity2 index exceeds the value of 7 in 1935) between 1990 and 2010.

Listed autocracies in ISO 3166 country codes are: AR, AT, BT, BO, BR, BG, CL, CN, CO, EC, EG, EE, FI, DE, GT, HN, HU, IR, IT, JP, LV, LT, MX, MN, NP, OM, PA, PX, PE, PH, PL, PT, SA, ZA, ES, TH, TR, UY, VE. Listed democracies are: AU, BE, CA, CR, DK, FR, GR, IE, LU, NL, NZ, NO, SE, CH, US; Source: Beck et al. (2010); Own calculations.

In this section, we discuss the evidence related to the development of bank and stock market-oriented financial systems. Studies suggest that the institutional and economic development during the 19th century can be important for understanding the current legal framework across countries. Much of the current structure of financial institutions originates in the institutions and systems of the late-19th and early-20th century (Grossman 2010).

Figure 2.8 demonstrates the correlation between bank orientation and investor protection with initial political institutions during the time of the Great Depression in the 1930s. In some countries such as Germany Italy or Japan, the Depression brought extremist political movements.

To measure the extent of democracy of a specific country at a specific time, we use the commonly used "Polity2" indicator from the Polity IV database. Specifically, Polity2 in 1935 can be interpreted as a measure of the relevant political institutions.²² In the con-

²²Polity2 contains coded annual information on the level of democracy for states with a population greater than 500,000, ranging from -10 to +10, with -10 to -6 corresponding to autocracies, -5 to 5 to anocracies, and 6 to 10 to democracies according to the Center for Systemic Peace. Criteria of Polity2 are the competitiveness of elections, openness and the participation ratio.

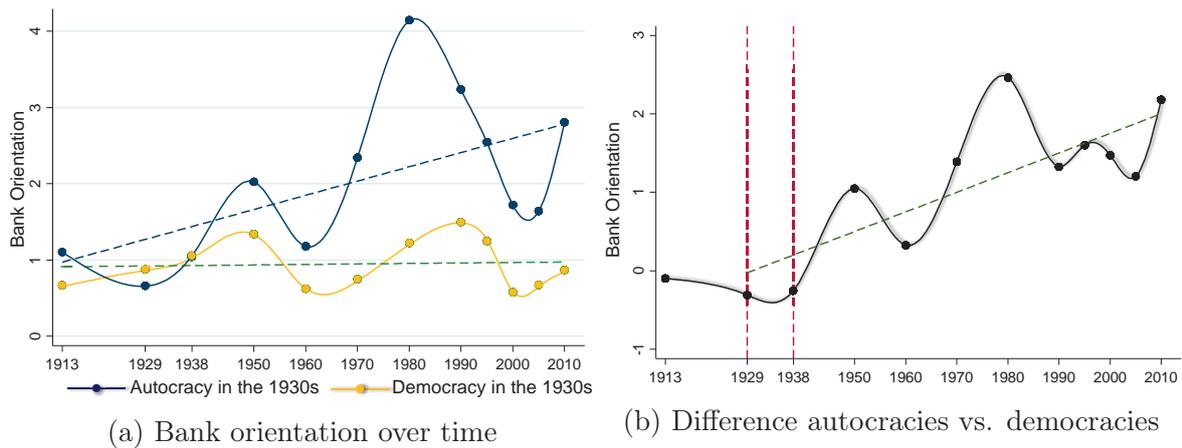


Figure 2.10: Divergence in bank orientation (1913 - 2010)

This figure shows the structural differences in financial systems between autocracies and democracies between 1913 and 2010 (measured by Polity2 and referred to as Democracy if the Polity2 index exceeds the value of 7 in 1935). Source: Rajan and Zingales (2003); Own calculations.

text of our model, Polity IV is a useful dataset, since it effectively measures limitations on the political power of a ruling elite. The heterogeneity of political systems in the 1930s was immense, reaching from democracies with universal suffrage like Switzerland to autocracies such as Germany or Italy.

Figure 2.9 suggests that countries that had a more democratic political setup like the United Kingdom, the United States or Switzerland have produced market-oriented financial systems, while originally autocratic countries such as Germany or Italy tended to develop a bank-oriented financial system. The political system can also explain the variation within civil law countries and within corporatist countries: those countries that have been autocracies have a significant larger degree of bank orientation independently of the political legacy or legal origin. A possible explanation for this pattern is offered by this chapter, namely that autocratic societies tend to be dominated by a small, wealthy upper-class concentrating political and economic power in its hands and voting for poor legal protection that ultimately gives rise to forms of informed lending offered by banks. Once established, institutions persist over time due to lock-in effects and path dependence in the political balance of power. The autocratic experience seems to make a difference and the gap between democracies and autocracies in the financial structure is stable over time. If we classify countries into autocracies and democracies during the Great Depression the negative correlation of bank-orientation and the degree of democracy is confirmed. Figure 2.9 highlights that the 39 countries that have been autocracies in 1935 such as Italy, Germany or Japan) have 2.5 times larger banking sectors relative to democracies such as the US or Switzerland in 2010.

Thereby Figure 2.10 indicates that the difference in bank orientation is persistent and has evolved in the end of the 1930s. In other words, the descriptive analysis suggests that major changes in the financial structures must have taken place as a response to the experience of the Great Depression in the 1930s.

The remainder of this chapter is as follows. First, the next section discusses the validity of the model's channel by investigating the correlation of bank orientation and investor protection as the main driver of the model results with a simple OLS regression. Second, the chapter compares the historical development and the different ways in which countries dealt with the problems of the Great Depression by presenting the case studies of the US, Japan and in particular of Germany. In each country we see that market failures have shaped the evolution of financial systems. In some cases (US), the response has been to regulate financial markets by improving legal and accounting standards environments, in other cases (Japan and Germany) the response was to rely on banks at the expense of markets.

Data

To proxy the degree of availability of bank finance in relation to stock finance, two main indicators are used for the OLS regression. To measure bank orientation, we rely on the dataset provided by Rajan and Zingales (2003) for 14 countries from 1913 - 1999, and second, on annual data provided by Beck et al. (2010) for a much broader subset of 70 countries from 1988 - 2013.

We use stock market capitalization to GDP to measure the availability of equity, and bank deposits to GDP to measure the importance of bank finance in a given country for a given year. Bank deposits to GDP is defined as the ratio of commercial and savings deposits to GDP. Although this indicator does not provide clear information about the amount of private credit granted by the banking sector, it is the only measure that has been compiled in a standardized manner for a long time-series and a large cross-section of countries.

In order to be able to compare the size of the banking sector with the size of the stock market in a given country, we define bank orientation as the ratio of bank deposits to GDP and stock market capitalization to GDP. If the bank orientation-index is lower than one, the size of the banking sector is smaller than the size of the stock market. We define such a financial system as being market-oriented.

The evaluation of current legal frameworks regarding the protection of investors is heavily influenced by the seminal works of La Porta et al. (1998; 2006). We use the investor protection index provided by La Porta et al. (2006), scaling from zero (low

protection) to one (high protection). This index essentially measures the ease with which investors and creditors can exercise their powers against management. It has been subsequently used by more than one hundred published studies. However, how best to measure the extent to which a particular country's legal system protects the rights of investors is still an active area of research.²³

2.3.1 Results from ordinary least-squares regressions

To get a first rough idea whether low investor protection is associated with a high share of banking finance, cross-sectional data of 39 countries for 2000 is used. This is the most recent year for which we have all the required information.

The linear regressions are estimated for the following equation:

$$y_i = \mu_i + \alpha z_i + \mathbf{X}'_i \beta + \epsilon_i, \quad (2.9)$$

where y_i is bank orientation in country i , z_i is the investor protection against expropriation by entrepreneurs measured according to La Porta et al. (2006) and \mathbf{X}_i is a vector of other covariates including "GDP per capita" to control for the economic performance, "Common Law" to control for the legal origin of the country, "Deposit insurance" to control for subsidizing bank finance and finally "Corruption" and "Rule of law" to control for other institutional and cultural factors (as suggested by Demirgüç-Kunt and Levine 1999). ϵ_i is a random error term. The coefficient of interest is α , which measures the impact of legal institutions on the structure of the financial system.

Although the number of observations in the dataset is very small with 39 countries, the regression results support our main mechanism for the explanation of bank-oriented systems. The regression results of bank orientation against the current level of investor protection are reported in Table 2.1.

The first estimation (Column 1) shows a strong negative correlation between investor protection and the importance of banks. Note that the size of the coefficient (-1.34) suggests that a change of one unit of measurement increases bank orientation by 134 percentage points. According to Castro et al. (2004) a country's economic performance is positively correlated with its level of investor protection (our model also predicts

²³The index by La Porta et al. (1998; 2006) is not undisputed because of its simplicity of judgements. The index measures the compliance with seven, ex-ante determined criteria (one share - one vote principle; proxy by mail allowed; shares not blocked before meeting; cumulative voting; oppressed minority; preemptive right to new issues; percentage of share capital to call an extraordinary meeting less or equal to 10 percent). Thereby the restriction "zero - one" is problematic, as well as the ignorance of different board systems around the world. For example, Spamann (2010) argues that the original anti-director rights index is measured incorrectly and develops a new version.

Dependent variable: bank orientation					
	(1)	(2)	(3)	(4)	(5)
Investor Protection	-1.3469***	-1.2587***	-0.8599***	-0.8979***	-1.2700**
2000	(0.4419)	(0.3921)	(0.2985)	(0.3036)	(0.5690)
ln GDP per capita		-0.1502*	-0.1707*	-0.1164	-0.0213
2000		(0.0830)	(0.8842)	(0.1377)	(0.1131)
Common Law					0.4052
					(0.3988)
Corruption				0.3868	0.5628
2000				(0.3680)	(0.3663)
Deposit Insurance			-0.043	-0.0406	-0.0154
2000			(0.045)	(0.0458)	(0.0464)
Rule of Law				-0.4967	-0.7637*
2000				(0.3095)	(0.3684)
R^2	0.1425	0.2247	0.2886	0.3300	0.3757
Observations	39	39	22	22	22

Table 2.1: Bank orientation and investor protection

This table reports results relating bank orientation to investor protection. Depending on the specifications, the seemingly unrelated regressions control for economic performance, legal origin, pervasiveness of corruption, deposit insurance coverage and public confidence into the legal system. Numbers in parentheses are standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

a correlation between a country's financial structure and its economic performance). Hence, the exclusion of the measure of economic performance could result in omitted variable bias. Therefore, we added the logarithm of GDP per capita in the second estimation.

The results (Column 2) show that the relationship between investor protection and the importance of banks persists even when differences in countries' economic performance is accounted for. To gain a sense of the magnitude of the association of legal protection with the financial structure, let us compare the two extreme countries, Germany and the United States. According to La Porta et al. (2006) Germany has an investor protection of 0 compared to an American investor protection of 1. Considering additional differences in GDP per capita, column (2) predicts that the difference between Germany's - and the United States' bank orientation amounts to 1.3076 percentage points. Therefore, the OLS-estimates predict that the German banking sector com-

pared to the German stock-market has more than twice the size, than the American banking sector compared to the American stock-market. In our example more than 95% of the predicted variation is explained by diverging investor protection, suggesting that differences in investor protection matter much more than differences in economic performance.

Among others, Demirgüç-Kunt and Levine (1999) mention the emergence of deposit insurance as a main driver for the development of bank finance, giving banks a competitive edge compared to market finance. Using their data, deposit insurance coverage to GDP per capita indicates the extent with which the savings are secured via the deposit insurance system. Somewhat surprisingly the impact of deposit insurance is insignificant, although, the number of observations drop from 39 to 22 because of data limitations. It seems that the impact of bank insurance depends more on depositor's confidence than official statements and written laws. The third estimation (Column 3) indicates that even with the inclusion of deposit insurance as another variable, the level of investor rights stays significant at the 1% level.

A possible explanation for the negative association of bank orientation and investor protection might be that institutional and cultural factors play an important role. Therefore, we included two proxies for culture and social institutions: First we use the level of corruption, capturing aspects ranging from the frequency of additional payments to get things done to the effects of corruption on the business environment from Kaufmann et al (2003). Likewise, we use their rule of law - index from measuring the extent to which agents have confidence in and abide by the rules of society in 2000. Indeed, both these indices were also used by La Porta et al. (2006).

We include them in the fourth estimation (Column 4 and Column 5). As expected, the level of corruption has a positive, yet insignificant impact on bank orientation, while the rule of law index has a negative impact on bank orientation. This is in accord with our model's predictions, as banks can provide better substitute mechanisms than competing means of finance in a climate of low public confidence. Even when correcting for a generally low level of public confidence we still see a high significance for investor protection.

Finally, we test the legal origin of a given country as a cultural and institutional factor by the variable "Common Law" (fifth regression). According to La Porta et al. (2006) the common law dummy is equal to one, if the country has a common law tradition; the dummy is zero with a civil law tradition.

Summarizing the results from the OLS, we can conclude that there is a negative correlation between bank orientation and investor protection that has the potential to

explain the observed puzzle why some countries are more dependent on bank finance today. However, the results should be interpreted carefully, as the sample by its very nature is small. Nonetheless, it emerges that differences in investor protection play a role in determining the degree of bank orientation today.

2.3.2 The historical perspective

The last subsection has demonstrated that the financial structure differs markedly across democracies, only in part explained by legal origin or cultural factors. Structural differences actually broadened in the early 20th century, when the distinction between market- and bank-oriented systems emerged, leading to the "Varieties of Capitalism" view in political science (Hall and Soskice 2001). Figure 2.10 suggests that there is a historical legacy for the countries in our dataset. Bank orientation today seems to be linked to the political system at the outbreak of the Great Depression in the 1930s. Those countries that had democratic societies before WWII developed to market-oriented financial systems, whereas more autocratic countries developed to bank-oriented systems. Morck and Steier (2005), p. 39, support this view by stating:

"responses of the Dutch, Italian, Japanese, and Swedish governments to the financial crisis of the 1920s and 1930s were to substitute various mechanisms of state-controlled capital allocation for their stock markets. (...) A similar succession of financial manias, panics, and crises in Britain, Canada and the USA ultimately strengthened shareholder rights".

The history of Japan confirms the main argument of this chapter whereby the late 1930s was the time when bank finance became the dominant funding structure. Hoshi and Kashyap (2004) document that a structural change in the financial structure occurred after the Great Depression. The combination of strong state favoritism of bank financing and the suppression of stock markets led to a bank-oriented financial system.

The origins of the main banks in Japan

Japan began its industrialization with a "mixture of family and state capitalism" (Morck and Nakamura 1999). The *Meiji* government initiated a wave of mass privatization during which most of the firms were sold to a few family-controlled business groups, called *zaibatsu*. According to Hoshi and Kashyap (2004) this era was characterized by relatively low importance of banks in the financing of firms. Instead, stock markets were active whereby new shares were routinely issued by the leading corporations and shares were traded actively on stock exchanges and over the counter. These patterns changed significantly in the late 1930s.

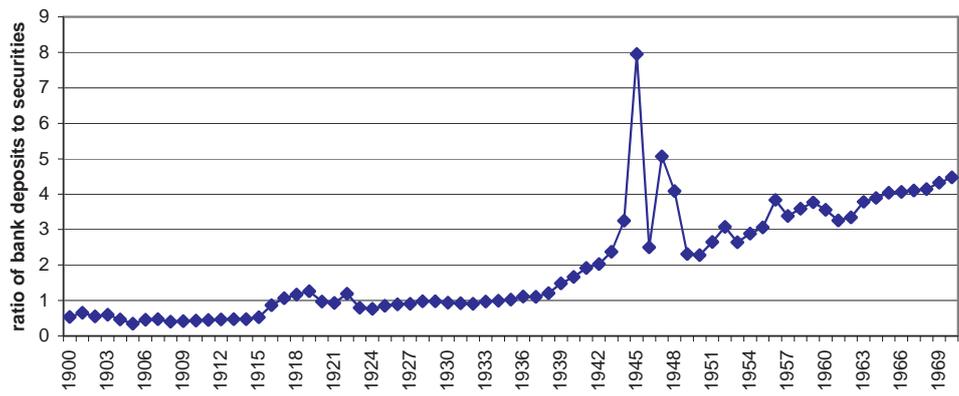


Figure 2.11: Allocation of private sector assets in Japan (1900 - 1970)

This figure illustrates the structural break in the financing structure of Japanese firms after WWII. The ratio of bank deposits to securities, being constant before 1939, more than doubled after WWII, setting the ground of the persisting bank orientation of Japan. Source: Carney (2001).

A deep recession exposed the weakness of the pyramidal structures of Japanese firms leading to a series of bankruptcies and export trade fell by 27 percent from 1929 to 1930. The economic effects on workers and farmers were severe such that the political regime became the victim of the public's anger. The murder of prime minister Tsuyoshi Inukai in 1932 marked the end of the party-led government. During the war with China and WWII Japan adopted an authoritarian regime that catered to rural elite interests. The new regime freed corporate boards of their duty to shareholders and limited dividends. Military representatives were on all major boards. When the war with China began, a series of laws were passed to put the allocation and control of finance firmly under the regime's control (Temporary Funds Adjustment Act). Many devices steered savings towards the banks, alternative financing mechanisms were largely repressed, i.e. by limiting the rights of shareholders. The Munitions Companies Act allowed managers substantial autonomy as long as they were acting in the interest of the nation.²⁴ Thus, the control rights of corporations were largely transferred from shareholders to managers. At the same time, the 424 ordinary banks at the end of 1936 were reduced to 186 in 1941, and further consolidated to 61 in 1945. As a consequence, the depth of the ties between specific firms and banks rose. Under the National General Mobilization Act in 1938, lending corporations that had previously characterized bank relations were re-

²⁴Hoshi and Kashyap (2004), p. 61, quote Suzuki, a government official in 1938, to illustrate the government's view on shareholders: "The majority of shareholders take profits by selling appreciated stocks, sell in times when the price is expected to fall, and often seek dividend increases without doing anything to deserve them. If these shareholders control the directors of companies, influence strategies, and seize a substantial amount of profits, then the system of joint stock corporations has serious flaws".

placed by one-on-one lending that were politically directed. This system is often called "main bank" relationship where a more or less informal set of regular practices constitute a system of corporate finance and governance. The main bank not only provides loans, she holds seats on the boards of directors of their main clients, is expected to supervise the firm and intervenes when things go wrong. Figure 2.11 highlights that this was the starting point of a long-term trend where the ratio of bank deposits to securities significantly increased.

Carney (2001) shows that the post-war reliance on banks correlates with a higher level of rural political power. He demonstrates that agrarian voting power comprised nearly half of the electorate in 1950 as a result of the land reform measures introduced during the post-war occupation. The elite controlled policy in the postwar period and successfully blocked hostile takeovers of family-owned corporations. According to Morck and Nakamura (1999) an effective takeover defense (the *keiretsu*) was established where a group of firms run by mutually friendly managers exchange small blocks of stocks with each other.²⁵ Every firm in the *keiretsu* group is thus controlled collectively by all other firms in the group. The *keiretsu* system, undermining the power of outside investors and having an anti-competitive tendency, proved out to be persistent and remains in place today.

Improving market discipline in the US

Whereas in Japan the overwhelming majority of directors in the boards comes from inside the company, the corporate governance structures of the US at that time were designed to permit outside shareholders greater influence. The Great Depression marked the starting point for the implementation of several laws to restore investor confidence in stock markets by providing them with more reliable information and clear rules of honest dealing. The crisis activated political forces to break up great pyramidal groups in the US. To reduce inefficiencies of collective monitoring by (dispersed) investors, regulation tried to shift monitoring cost away from shareholders to firms (financial reports) and implemented reporting standards. The market for corporate governance made sure that more efficient managers replace inefficient ones (shareholder capitalism). Since then, the US has the highest index of investor protection measured by La Porta et al. (2006).

As a regulatory response to the financial crisis, the Securities Act of 1933 and the Securities Exchange Act of 1934 protected US investors by prohibiting fraud and es-

²⁵In line with the model predictions, Berglöf and Perotti (1994) rationalize cross-holding of debt and equity in the *keiretsu* system as a contingent governance mechanism through which internal control is sustained over time.

establishing severe penalties for those who defraud investors as well as those who engage in some trading practices that take advantage of information most investors do not have. Minimum information requirements for prospectuses and the Securities and Exchange Commission (SEC) to oversee securities markets were introduced. Moreover, under the Exchange Act companies with registered publicly held securities that were of a certain size are "reporting companies", meaning that they must disclose continuously by filing quarterly reports and additional reports when certain events occur. Moreover, branch banking restrictions and the Glass Steagall Act of 1933 kept US commercial banks to a minimal role in funding large firms.

In contrast, in autocratic regimes such as Japan or Germany, banks eagerly financed industrial development. In this era, a significant weakening of the position of shareholders in favor of the management board and the state arose in Germany. If the legal protection index is an adequate measure of investor protection, the rights of minority shareholders in Germany today are largely a product of rules enacted in the early-20th century. Most importantly, labor is involved in the control of German corporations through the legal regime of co-determination, but it does not have such direct influence in corporations in other countries. Initially introduced in the 1920s, co-determination appears to have significant persistence power (Bebchuk and Roe 1999).

Thus, it might be worth exploring in detail why Germany has such a small stock market yet also maintains so many powerful banks in a labor-friendly environment. As we will see in the next subsection, the public choice model based upon elite domination can rationalize why the elite in Germany has created a corporate governance system with poor legal protection in the 20th century providing the ground for a bank-oriented financial system.

The German way to bank orientation

Corporate governance institutions remained quite underdeveloped in Germany until the last quarter of the 19th century. Many early firms had no supervisory board, and the rights of shareholders as well as the responsibilities of entrepreneurs were poorly defined. However, owing to severe financial crises, there have been two major reforms on corporate governance: first, the introduction and modification of Corporate Law in 1870 and 1884 in the German Empire as the starting point for legal protection; and second, the principle of co-determination (plus its re-implementation after WWII) and the Fuehrer principle with the Stock Corporate Act of 1937 that significantly weakened the position of shareholders in favor of the management and the state. Interestingly, the first reform took place during times of elite domination, whereby the elite corresponds

Year	Rule	Description	Political System
1870	Free incorporation	<ul style="list-style-type: none"> Termination of the state concession system Corporations required to have executive (Vorstand) and supervisory board (Aufsichtsrat) 	Elite domination under German Bicameralism
1884	Modification of Corporate Law	<ul style="list-style-type: none"> Duty of oversight by the supervisory board Legal liability for fraud High minimum nominal value of bearer shares Codification of proxy voting by banks 	
1896	Stock Exchange Act	<ul style="list-style-type: none"> Prospectus filing Company must have incorporated at least one year prior to IPO and published its balance sheet and P&L account 	
1920	Co-determination	<ul style="list-style-type: none"> Companies with supervisory had to admit members of the Workers' Council with equal voting rights. 	Democracy (left-wing majority)
1937	Fuehrer Principle	<ul style="list-style-type: none"> Protection of the public interest. 	Dictatorship
1952	Co-determination	<ul style="list-style-type: none"> Re-introduction and extension of co-determination 	Democracy

Table 2.2: Main legislative changes relating to German joint-stock corporations

to the coalition of "iron and rye", the second reform during times of autocracy with a political deal between the industry and the state.

The political system in the late-19th century (Bicameralism in the German Empire) was dominated by the industrial and agrarian elite. The so-called "Konservative Wende" after the election of 1878 proved to be a watershed moment for domestic policy where the initially liberal country was monopolized by a conservative-nationalist alliance of heavy industry and agrarians. The political agenda of the coalition mostly focused on protecting their rents as is evidenced by the coalition's most important project: the tariff law of 1879 introduced protective tariffs on wheat and iron products. Although all adults above the age of 25 had the right to vote, voting was controlled in rural areas by the coalition; or in the words of Abrams (2006), p. 10, "the German Empire was in theory a constitutional monarchy, yet in practice it was governed by Prussian oligarchy." The three-class franchise allowed the elite huge de facto political power that is also manifested in corporate law.²⁶

The first wave of corporate rules was an era of fast innovation and upsurges in productivity during the industrialization in the 1870s. The elite needed finance to satisfy the growing needs of manufacturing. In other words, financial development responded

²⁶There is a division of men by their direct tax revenue into three classes, each of which accounts for one-third of the electoral delegates. The first class ranges from the highest taxpayer until one-third of total tax revenues was reached (this was 3 - 4 percent of the male population), with the same principle applied in the second class. For illustration, in 1888 in 2.283 out of 22.749 districts there was only one man in the first class, controlling one-third of all votes. As a result, the relationship between the industrial elite and the government was close. For example, the Krupp family, Germany's leading arms manufacturer, kept in close contact with the Hohenzollern and government officials (Boelcke 1970).

to massive industrial boom and institutions evolved providing credit mainly to the industry (Fohlin 2007). However, the industrial elite had an interest in blocking new entrants and shaping regulation to increase entry costs by reducing corporate control to a minimum that guarantees their own access to finance.

Table 2.2 provides an overview of the development of joint-stock company legislation in Germany (1870 - 1954). With the introduction of the Corporate Law in 1870, the concession system for firms was removed and free incorporation was permitted such that joint-stock corporations took off (the "Founder's Boom" of 1871-73). The number of joint-stock companies rose from around 200 before 1870 to more than 1,000 shortly thereafter. Thereby, a two-tier board structure with separate supervisory ("Aufsichtsrat") and management boards ("Vorstand") was made mandatory. Consistent with our theory, elite domination led to almost no investor protection in the beginning, e.g. no strict listing rules for entry into stock exchanges (firms frequently sold their stock directly to the public without publishing a prospectus). Owing to the lack of corporate control, there was widespread fraud. The "Founders' Scam" (1873) mirrored the structural weakness of corporate law through a wave of bankruptcies that led to calls for corporate law reform.²⁷ Contemporary commentators demanded clearer and stronger rights of representation and protection. For example, Tellkamp (1876), p. 5-14, German economist and member of the Reichstag, argued that the lax regulation of corporate governance is

*"(...) extremely harmful, first, for the shareholders who lend their money without any legal control against the entrepreneurs, (...) and second, for the society and creditors who do not have a personally liable debtor (...)
If the government abolishes state control of corporations via the concession system, then she has to create legal requirements for the incorporation and the management of firms in order to protect the public interest".*

Largely due to the huge number of outside shareholders and the threat of a social turmoil, the political elite agreed on a modification of Corporate Law in 1884 - after a 11-year ongoing debate. Most importantly, the second joint-stock modification (Zweite Aktiennovelle) increased the financial entry barrier to found a joint-stock corporation and replaced large parts of the Commercial Code ("Handelsgesetzbuch") focusing on the incorporation process, establishing legal liability for fraud, strengthening the supervisory board and requiring firms to publish annual balance sheet statements under the conservative lower-of-cost-or-market principle. With those changes the German system was overregulated compared to other industrialized countries such as France or

²⁷See *Der Aktionär* (1874), "Börsen-Gesetzgebung, Beilage des Aktionärs Nr. 1091" (22. November 1874).

the UK (Klein 1904). The Act is widely regarded as the foundation of modern German corporation law and it remained largely unchanged until 1937. However, access to the legal status of a joint-stock company (AG) was restricted to a small "trustworthy" elite. The minimum capital to found an AG, was increased from 30 to 1000 Marks, effectively excluding most firms from access to capital markets (Bayer and Habersack 2007). Complementarily, the conservative elite succeeded to increase the statutory minimum par value for shares from 150 to 1000 Marks, in the words of Sattler (1890) "to stabilize the current status of stockholders". Thus, despite the protection of claimholders rising during this era, entry deterrence occurred such that the new legal framework froze the social order. Contemporaries like Tellkamp (1876) consequently warned against a monopoly position of the legal structure of AGs which was indeed the privilege of the elite.²⁸

What was the induced implication of this legal development on the financial structure in Germany? As a by-product of this pattern of institutional evolution, the regulation encouraged the dependence on and the expansion of forms of informed lending performed by universal banks.²⁹ Historically, it is evident that the loosening regulation on corporations provided the necessary impetus for the rapid growth of joint-stock universal banking. Total banking assets almost tripled between 1860-80 and 80-1913 and universal banks evolved into their full-fledged form during the German Empire (Fohlin 2007). Proxy voting proved to be the most prominent monitoring device in this context.³⁰ The rationale is straight forward, namely private arrangements substituted the lack of corporate control, in line with our model predictions. Owing to poor control rights, dispersed shareholders had a systematic incentive to give their voting rights to banks. Banks themselves placed representatives on firm's boards and gained direct control on firm's operations and top-level decision-making. James (1992) points out that the involvement of banks in the management of multiple companies in the same industry lead to a cartelization. Thereby the influence of the largest banks was confined primarily to the heavy and electro-chemical industries where they promote mergers. Oscar Schlitter, director of the Deutsche Bank, argued that banks were to create a "bank-bloc", whose power would control the German market (Born 1983, p. 81). This was the starting point of the bank-oriented system that still characterizes

²⁸See Schubert and Hommelhoff (1985), p. 44-9, for a summary of criticism by contemporaries that anticipated a paralysis of entrepreneurship.

²⁹Fohlin (2002) identifies 11 laws passed between 1870 and 1908 which caused expansion of universal banking systems or encouraged the use of banks over securities exchange (see also Rosenberg 1967).

³⁰Proxy voting ("Depotstimmrecht") was commonplace in Germany. The first documented use is the case of Deutsche Edison Gesellschaft, which re-incorporated as Allgemeine Electricitaets-Gesellschaft (AEG) in 1887. Emil Ratenau, the founder of AEG, asked the banks to agree to represent, at no cost, those shareholders who intended to vote in favor of the agenda. This practice was widely used by the end of the century. Large banks began to incorporate statements about deposited shares voting rights in their general terms of business.

Germany today - which went hand-in-hand with a process of industrial concentration.³¹ The German development contrasts with the Sherman Act of 1890 in the US that defined cartels and monopolies as a conspiracy against the public and a criminal act that obstructs commerce.

WWI, along with the abdication of the Kaiser, represented a structural break that left Germany in political and social chaos. The result was a political vacuum that was filled in 1919 by the newly-formed Weimarer Republic with universal suffrage. The surrounding turmoil comprised a deep recession, political in-fighting and attempted coups such that the elite that had formerly controlled policy during the German Empire needed to find a political coalition to maintain the social order. The political debate in the 1920s was strongly dominated by left-wing coalitions adopting a focus on labor rights, where the social-democratic party provided most of the German chancellors.

Consequently, the German model of co-determination was introduced in 1920, whereby employees had a role in management of a company.³² Economically, the new corporate law weakened the position of the shareholder in favor of the management board since the entrepreneur was no longer responsible specifically for the shareholders' interests but for all groups having a stake in the company. At the same time, the trend of bank orientation and cartelization of industry took on new vigor. With the upswing in corporations at the end of WWI and during inflation, banks significantly increased their proxy holdings as well as their presence in the supervisory boards of these firms. Therefore, by 1927, representatives of the large banks held 2,514 seats in non-financial firms' supervisory boards, 1,785 (70 percent) of which were in industry and infrastructure. Industry concentration also continued, as well; individual firms such as Siemens and AEG in the electrical industry building up enormous concerns, while about 2,500 cartels came into existence (Hardach 1987, p. 39).

There was little change in joint stock company legislation until there was the regime change in the 1930s, with Hitler coming to power. As a consequence of the banking crisis of 1931, a number of regulatory reforms and emergency decrees transformed the nature of capital markets, rendering stock markets unattractive capital relative to bank loans. During the 1920s the principle of the "company in itself" first formulated by Walter Rathenau already began to appear. According to this concept, the company had a broad social obligation to preserve jobs and serve the needs of the state. This

³¹In the remainder, the German Exchange Act of 1896 catalyzed the control of the banks over German securities markets, because companies became dependent on banks for access to securities markets. Since banks acted as custodians of minority investor shares, they could also in principle encourage firms to uphold minority shareholder as well as their own interests.

³²Some companies also issued shares to unions to represent their members at the general meetings. For example, Krupp AG decided in 1921 to issue new shares especially designed for workers. These shares were distributed in the workers' name to the "Krupp'sche Treuhand" (Fohlin 2007).

principle was adopted by the National Socialist regime and codified in the "Fuehrer Principle" (§ 70 I Akt.G 37) of the Stock Corporation Act of 1937 as a response to the experience of the Great Depression: "The managing board is responsible for directing the company as its well-being and that of the nation and state demand". No reference was made to the interests of shareholders and the Act stated that

"in the execution of its tasks, the management board must not be as dependent as it has been in the past on the mass of irresponsible shareholders, who do not in general have the necessary appreciation of the business situation".

The political climate had significantly changed against the interests of the individual investor. In addition, under the shareholder law of 1937 votes could not be cast by mail. This law made it even more likely that shareholders, especially small stakeholders, would be unable to exercise their ownership rights directly. As accommodation, the pre-WWI phenomenon of bank proxy voting remained strong.

After WWII, the 1965 reform bill abolished the Fuehrerprinzip and imposed a majority rule for that body. The new law tightened accounting standards and rules for accumulating reserves, targeted greater dispersion of share ownership and improved access to company information, but core principles of regulation such as co-determination were quickly re-implemented. In terms of proxy voting, banks were allowed to cast votes as a proxy only when they received a written authorization. However, the 1965 reform left the banks with widespread easy access to corporate control rights.

Thus, the emergence of the bank oriented German financial market in the 20th century illustrates a basic pattern of this chapter's theory. The historical episode suggests that the bank bias is a heritage of fundamental reforms in corporate law passed by a conservative elite for protective reasons. The very first corporate law was formulated due to the "Founders' Scam" and the Stock Corporate Act was incorporated after the Great Depression. Thereby, the elite had an incentive to create a regulatory environment of poor state protection for investors to preserve monopoly rents by increasing financial entry costs. The regulatory rent created was later shared with the workers; for example, by re-establishing the principle of co-determination. However, as a by-product and perhaps unintentionally from the perspective of the elite, the provision of funding shifted from equity to debt, as well as a predominance of banks as informed lenders. The reason was that banks succeeded in developing substitute mechanisms of corporate governance, most importantly proxy voting and monitoring via taking positions on the supervisory boards of corporate firms. With the gained expertise on their borrowers, this can be seen as the advent of the *hausbank system* in Germany which stabilized the market power of universal banks over time.

The historical episodes of Germany and Japan compared to the US show that legal institutions formulated as a response to market failures have triggered path dependence and are a possible explanation for why certain countries are bank-oriented today.

2.4 Concluding remarks

This chapter has studied the effect of the allocation of political power to explain the persistent structure of financial systems around the world. The simple microfounded model rationalizes the stylized fact why those countries that have been autocracies at the watershed moment for corporate law during the Great Depression have developed to bank-oriented financial systems compared to early democracies. The key idea is that low state protection against entrepreneurial hold-up creates a financial entry barrier for entrepreneurship that is translated into low levels of competition in the product market. Entry is simply monopolized by a social group, namely the existing elite to preserve their rents. *Vis-a-vis* this ultimately gives room for a bank-oriented system since private arrangements substitute the lack of state control (delegated monitoring). Forms of informed lending endogenously emerge as a private solution to overcome the negative effects of poor legal protection. The model thus predicts that the share of bank-financed firms increases with lower investor and creditor rights. In other words, a lack of legal rights in corporate law preserves market frictions and explains banking rents.

The central lesson of the presented public choice model is that the elite attempts to capture a regulatory rent by reducing competition via the clever design of corporate law, thereby inducing a bank bias of the financial system. If suffrage is restricted to the elite, society thus shapes institutions with low levels of state control and more reliance on informed lending performed by banks. These predictions are consistent with the emergence and evolution of the structure of financial systems. Cross-sectional data and historical case studies point to the direction that political majorities played a crucial role for the initial bank bias in some countries, suggesting that a conservative elite tried to frustrate laws that provide for strong corporate governance because of anti-competitive motives. However, as the following chapter will show, once established, banking activity rises over time and the sector can occupy a powerful position in the economy.

3 The growth of banking*

The relationship between banks and the state is a symbiotic one. On the one hand, the state needs banks because they finance public expenditures and promote economic growth by funding the private sector, while on the other hand, the banking sector needs the state to establish rules that make financial intermediation possible and trustworthy. The purpose of this chapter is to explore the long-run dynamics the banking sector has experienced in the last century. The main argument developed is that its influence continuously rose so that the balance of power between state and banks successively shifted towards the banking sector. Banks became Leviathans due to modern crisis management.

3.1 Why did banks become so powerful?

Figure 3.1 documents the astonishing rise of commercial banks' balance sheet assets against GDP since 1870 for 14 developed countries. According to the concept of a rent discussed in chapter 1, the relative size of bank assets can be interpreted as a proxy for the relative value of financial intermediation. The countries covered in Figure 3.1 are Australia, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom (UK) and the United States (US). The important insight of this figure is that we can identify two distinct phases.

The first phase lasted from 1870 to the Great Depression in the 1930s. Over this period, commercial bank assets grew slightly faster than GDP in the first decades of the gold standard era, with a moderate growth rate relative to GDP until the credit boom of the 1920s, at around 70 percent of GDP. In this era, assets of banks grew in line with money spending (Schularick and Taylor 2012).

However, this pattern changed dramatically following the experience of the Great Depression and WWII. The Great Depression marked a structural change, initiating an unprecedented expansion of financial intermediation. By about 1970, after a long post-war recovery, bank assets surpassed their pre-WWII ratio, in a massive upward trend that has continued to the present. The ratio of bank assets-to-GDP has more than doubled over the last 40 years rising to over 200 percent. Financial deepening has oc-

*Parts of this chapter are published and base on Buck (2013).

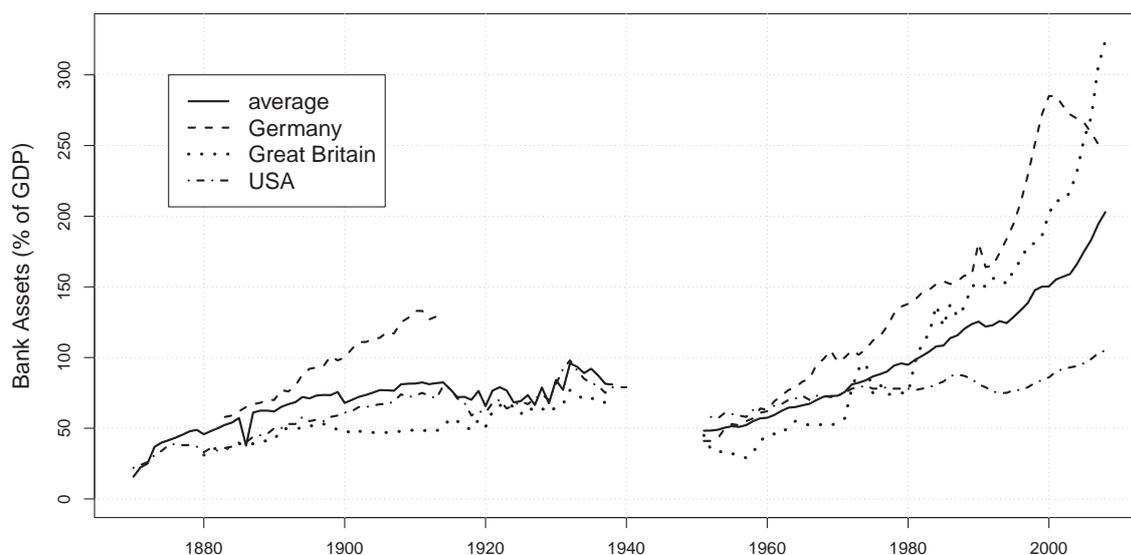


Figure 3.1: Development of bank assets-to-GDP (1870 - 2008)

Bank assets are defined as the year-end sum of all balance sheet assets with national residency, including all monetary financial institutions such as savings banks, postal banks, credit unions mortgage associations, and building societies. Own calculations. Source: Schularick and Taylor (2012).

curred five times faster than in the last century. Interestingly, assets grew strongly not only relative to GDP, but also relative to broad money due to a combination of increased leverage and the use of new sources of funding, mainly debt securities. Schularick and Taylor (2012) compare loan-money and asset-money ratios of these countries and find that the increase in the credit-to-money ratio from WWII onwards has been a common phenomenon in all 14 developed countries. As a result, a country's bank balance sheet at present is on average more than two times as large as annual GDP.³³ Consequently, the real effects of a financial crisis could imply larger output losses to GDP compared to the pre-WWII era. Given this historical development, Figure 3.1 strongly supports the view that banks have occupied a powerful position in the economy.

From a public choice perspective, this economic power provides banks with a considerable potential to shape the outcomes of the public policy process to remain the current structure. However, when I use the term "potential", there is nothing automatic about the translation of economic power into political power.

The expansion of balance sheets that is observed does not necessarily imply an increase of political influence. A central prerequisite for influence is preference aggregation - for

³³In line with this overall trend, Philippon and Reshef (2013) document that the income share coming from the financial sector rises since WWII, from about 2 percent of the total in the 1940s to close to 8 percent at the time of the financial crisis in most industrialized countries.

example by building pressure groups to articulate the interests of the financial sector. In fact, national banker's associations were founded in most industrialized countries before the turn of the 19th century to articulate the economic interests of the financial industry including the Chartered Institute of Bankers in Scotland (1875), the Chartered Institute of Bankers in Great Britain (1879), the American Bankers Association (1875), the Canadian Bankers Association (1891) and the German Zentralverband des deutschen Bank- und Bankiergewerbes (1901).

By contrast to then, the lobby power of the financial industry currently exceeds that of any other sector. The US is one example, whereby according to the Center for Economic Responsive Politics, the financial industry is the largest source of campaign contributions to federal candidates and parties, with insurance companies, securities and investment firms, real estate interests and commercial banks. The total lobbying spending of the financial sector increased from 208.6 million US-Dollar in 1998 to 484.7 million in 2013 with a peak in 2010. At the same time, the financial industry became the sector with the highest government subsidies. With respect to corporate taxes, between 2008 and 2010 the financial industry was on the top of the list of tax subsidies by industry with a share of 16.8 percent (followed by utilities, telecommunications, and oil, gas and pipelines; McIntyre et al. 2011). In addition to the explicit subsidies, the ten largest US banks by assets benefit from artificially low funding costs due to their "too big to fail" (TBTF) status. Estimates suggest that this implicit subsidy amounts to 83 billion US-Dollars a year, with the top five banks accounting for 64 billion of this total - a sum roughly equal to their typical annual profits (Bloomberg View 2013).³⁴

The US are not an outlier. With an implicit funding subsidy of 70 billion US-Dollars per year, Haldane (2014) reports comparable deposit rate advantages of the 29 world's largest banks (as defined by the Financial Stability Board) for the period 2002 - 2007. Figure 3.2 highlights that although implicit subsidies have declined from their peak during the financial crisis in 2009, they remain large and much higher than before the crisis. This suggests almost unchanged expectations about the likelihood of government support for distressed banks and exposes the banking arena as an artificial environment.

Given the static nature of financial intermediation, this chapter addresses the question of what explains the expansion of banks' assets after the Great Depression relative to money growth? Why is banking subsidized compared to other forms of direct finance? How can we account for the remarkable growth in both economic power (banking rents) and political importance over the last century, or might one have led to the other?

³⁴Following the methodology introduced by Ueda and Weder di Mauro (2013), the authors quantify structural subsidy values for systemically important institutions by estimating the funding cost advantages arising from government support which are reflected in their long-term ratings (see Box 3.1 for a discussion of the methodology).

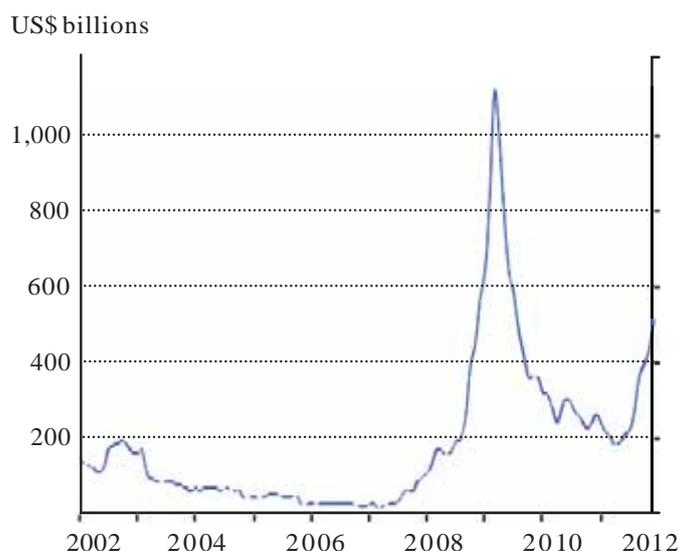


Figure 3.2: Implicit bank subsidies for systemic institutions (2002 - 2012)

Note: Bank subsidies defined as funding advantages due to an implicit state guarantee for the 29 systemically important institutions announced by the Financial Stability Board. The estimation is carried out by comparing the "stand-alone rating" and a higher "support rating" from credit rating agencies. Source: Haldane (2014).

3.1.1 The argument: The hysteresis of the safety net

Both the reason for and the concrete manifestation of the disproportional growth of the banking sector after the Great Depression can be attributed to regulation, and specifically the establishment of the so-called banking safety net. By definition, a safety net is characterized by institutions that are authorized to exercise a loss-shifting, which converts most of the losses incurred by creditors of insolvent banks into taxpayers' debt. As a consequence of this development, today banking is widely perceived to be a risk-free form of wealth accumulation.

This loss-shifting originated in reforms in the 19th century that were aimed at lowering the cost of capital for understandable reasons. The interventions in the liability regime have been enlarged in several stages since the Great Depression and today offers protection to different parts of a bank's capital structure, including owners, wholesale depositors and retail depositors. Over the last 100 years, there is evidence of a ratchet effect in the magnitude of state support for modern banking systems, culminating in the support measures during the 2008 financial crisis. Indeed, this chapter shows that state insurance has grown in waves. Whenever banking crises emerged, the safety net has grown. Therefore, we can observe a historical hysteresis. The most important state insurance devices for the banking system are liquidity insurance in the form of a lender

of last resort policy and deposit insurance. In effect, both elements of the safety net can be interpreted as insurance against adverse shocks on the solvency of a bank financed by taxpayers' money. In economic terms, government insurance is a silent form of public expenditures with redistributive character within a society. Although their precise incidence is not specified in advance, private benefits are skewed towards those with large stakes in protected institutions. In effect, this inherent rent for banking as a form of external finance increases the net present value of the protected bank and consequently distorts business decisions taken by profit-maximizing institutions over time, most importantly to expand balance sheets and take excessive risk.

This chapter argues that one central engine for banking growth has been the loss allocation policy of governments by the establishment of a distended safety net. Interestingly, once a safety net is created, competition between countries offers the government an incentive to increase its scope to protect the domestic banking system from the destabilizing impact of potential capital flight. Thus, the main contribution of this chapter is to rationalize the long-term rise in banking rents with a public choice motive: sufficiently low political cost for creating a safety net and regulatory competition for enlarging its scope. However, this development comes at a cost. From the banks' perspective, domestic safety nets mark out a protected domain in which they can profitably operate to extract the subsidies culminating in mega-banks with systemic power and risk.

3.1.2 The economics of loss-shifting

Historically, the very origin of loss-shifting has been the emergence of limited liability in the 19th century when countries needed capital to finance infrastructure, especially railways. However, limited liability has consequences on the distribution of gains and losses. When banks enjoy limited liability, their expected profit distribution is truncated regarding possible losses where the bank's equity defines the maximum cost in case of bankruptcy. Downside risks were capped by limited liability. In other words, for the banker, the share of non-covered deposits represents a negative externality that can be shifted to lenders and thus captures an implicit rent for the limited liability bank owner (see Sinn 1980 and Sinn 1982).

This regulatory privilege has the potential to become an explicit subsidy for banks if citizens are willing to lend their money at better terms. In the absence of a system of state intervention into bank loss-sharing, the combination of the first-come, first-serve rule and the laws governing suspension of bank operations for failed banks determines the allocation of losses for depositors. Given that their savings are at risk, these rules discipline banks by withdrawing their savings when the bank jeopardizes them.

The citizens' rights to withdraw their deposits and the transfer of control rights over banks in liquidation induce banks to behave efficiently in managing their risk and in determining the optimal size of the institution (Calomiris and Kahn 1991). However, the disciplining device will be undermined if depositors and other stakeholders also have the possibility to externalize their losses to others parties.

This is precisely what happened with the establishment of the safety net. The disciplining role of liability structures was progressively relaxed, setting the ground for a moral hazard machinery. The first part of this chapter reviews the development of safety net production for the banking sector from a public choice perspective. Ironically, the main components of the safety net were originally implemented to stabilize the economy, although they often reflect the interplay of political forces at that time. The second part of the chapter subsequently highlights that value-maximizing banks have expanded their access to the safety net subsidies by exploiting new business strategies which catalyzed the growth of banking. Consequently, underpriced safety nets are very likely to trigger instability in the present day.

3.2 Building the safety net

3.2.1 Lender of last resort

The element of the safety net with the longest tradition is liquidity insurance, which is typically provided by the central bank in the form of last resort lending (LLR) supplying support to illiquid but solvent banks at a penalty rate. Indeed, this is one of the main tasks of a central bank at present. The Bank of England was the first institution to develop into a consistent lender of last resort, as elaborated in the 19th century by Thornton (1802) and later Bagehot (1906). If we follow the public choice theory, the delegation to the central bank can be interpreted as a political deal of the government that strategically shifted the burden of a bailout to private institutions.

The rationale of the political deal was simple. Historically, the state selectively chartered private banks to use them as a source of funding. In fact, the governments restricted entry into the domestic banking business and rewarded early banks with a monopoly position as the regulatory rent. For example, the Bank of England was chartered in 1694 in return for a large loan, which helped the government wage war with France.³⁵ In other words, it was founded as banker to the government. As a prize for maintaining its special privileges, in the 19th century the Bank of England received a political

³⁵Shortly afterwards, the Parliament considered founding a second bank. However, in return for a second loan, the Bank of England could keep its monopoly on joint-stock banking in England and Wales, persisting for more than a century (Grossman 2010).

mandate to provide liquidity to other banks in times of panic. Several severe banking panics had shown that any solution via private arrangements had to cope with enormous coordination problems preventing an efficient management of the crisis. The market mechanism could simply not insure against liquidity shocks and the state had to intervene or potentially jeopardize social instability. One idea of the 1884 Peel Act was the delegation of responsibility for insolvencies of financial institutions to a central bank that should help banks to avoid value-destroying fire sales of assets by providing them with direct funding, thereby containing a financial crisis. The role as a LLR included maintaining the liquidity of the money market, and with the bailout of Baring Brothers in 1890 it organized lifeboat funds, subscribed by commercial banks and other London firms. For the government the delegation of risky regulatory and supervisory tasks is an attractive solution since the task has negative political net rents (it does not bring about sufficient campaign contributions from special interests compared to purely redistributive tasks), but offers the possibility to deflect political pressure and to use the central bank as a scapegoat when things do not turn out as well as hoped (Alesina and Tabellini 2008).³⁶ With the LLR, central bank's liquidity became a substitute for bank capital and the central bank began to screen financial institutions to follow Bagehot's doctrine that the LLR should provide liquidity assistance only to illiquid but solvent banks.

While this was the theory, in reality, it is difficult for supervisors to distinguish between illiquidity and insolvency. Morgan (2002) empirically supports this view, showing that banks are more opaque than ordinary firms by comparing discrepancies between rating agencies' assessments at the time of the issue of a new bond. Accordingly, Goodhart (1995) argues that a clear-cut distinction between insolvency and illiquidity is illusory because any bank that needs the support of the LLR is already under suspicion of being insolvent. The threat of contagion on other parts of the economy is the second welfare argument that may lead to the systematic rescue of influential banks. Notwithstanding, when a central bank commits itself to lend money to the market, such a commitment can encourage banks to take risks as they feel protected by the option of selling assets to the central bank. In fact, with LLR facilities the bank's risk-taking might be linked to the central bank's discretion or its ability to absorb losses.

Parliamentary documents in 1858 reflect this thinking, articulating the fear of moral hazard by banks by acknowledging that the existing accommodation policy was not a prudent policy (Calomiris and Haber 2014, p. 122). With the official establishment

³⁶The politician's incentive for rational delegation because of political net rents is a counterexample to standard "policy for sale" tasks like the credit allocation policy where the government auctions policies to special interest groups (see Grossman and Helpman 1994 and the probabilistic electoral support model of banking regulation developed in chapter 4).

of a LLR facility, the allocation of losses in a bailout were no longer determined by law for the first time, but rather by the discretion of a private resolution authority closely operating with policy-makers under circumstances that are not transparent to taxpayers. One may argue that opaqueness in the policy will generate more market discipline, although the effect of opaqueness in this context is very likely to be an intra-sectoral transfer of wealth from small to large banks, because in practise there is no doubt that this policy is equivalent to repaying all large banks' liabilities and "rescuing only the solvent among the small banks (if they are able to prove that they are solvent)" (Freixas and Rochet 2008, p. 244). Thus, the inherent opaqueness in the central bank's "solvency vs. illiquidity dilemma" implicitly has created (1) incentives for lobbyism, as well as (2) risk-taking incentives for large banks that feel protected and are more likely to rely on state relief than their minor competitors.³⁷

The empirical analysis of LLR measures confirms the idea that LLR lending is often directed to bail out banks. Goodhart and Schoenmaker (1995) provide evidence that out of a sample of 104 failing banks across countries, 73 ended up being rescued, while the remaining 31 were liquidated. This suggests that the central bank, being in charge of an orderly liquidation in the absence of institutional structures, seems to have a strong tendency to bail out rather than risking a contagion effect.

As a mean of stopping traditional banking panics, the LLR policy was quite successful.³⁸ White (2011) shows that the Banque de France used a similar two-tiered risk-sharing technique in its coordination of support for the Paris Bourse in 1882. Thus, comparable policy instruments were quickly established in Europe by the end of the 19th century. In the US, the Federal Reserve System was created in 1914 to serve as a LLR - and, besides agricultural-distress-related banking troubles, the US did not experience a banking panic until 1930.

Over the years, there has been a dramatic expansion in both the scale and the scope of liquidity insurance of modern banking systems. According to Alessandri and Haldane (2009) this pattern has been repeated in the most of the recent systemic banking crises. Elections certainly influence regulatory decisions, with Brown and Dinc (2005)

³⁷Furthermore, Hakenes and Schnabel (2010) and Gropp et al. (2011) show that bailouts also lead to higher risk-taking among the protected bank's competitors. The reason is that the prospect of a bailout induces the protected bank to expand, which intensifies competition in the deposit market, depresses other banks' margins, and thereby increases risk-taking incentives.

³⁸Bordo (1990) examines the changes that occurred in the UK and US before and after the creation of a LLR system. Before 1866, the Bank of England tended to react by protecting its gold reserves, which could even make panics worse. After 1866, the central bank adopted a LLR policy and thus prevented incipient crises in 1878, 1890 and 1914 from developing into panics by timely announcements and liquidity provisions. Bordo (1990) compares the two countries during the 1870-1913 periods and discovers strong similarities in their business cycles, including similar declines in output, price reversals, and decline in money growth. Nonetheless, the US had four panics during the period, while the UK, having a LLR regime, had none.

demonstrating that policy-makers exercised forbearance prior to elections, with the payoff coming afterwards.

To summarize, the fact that LLR lending tends to bail out large banks or helps it forbear under non-transparent circumstances is the first and ultimate difference between the early-19th century practices and those used today making financial intermediation attractive as a form of wealth holding.

3.2.2 Deposit insurance

The second and most important element that constitutes the safety net was the introduction of the federal deposit insurance offering risk-free deposits for all citizens irrespective of the size of their bank, which was first established in the US by the Banking Act of 1933 in an attempt to prevent bank runs. The welfare argument behind such an intervention is that deposit contracts with a sequential service constraint introduce a payoff externality (Diamond and Dybvig 1983). If you expect that others will run, it is rational that you will also run. Therefore, bank runs can be the result of self-fulfilling expectations even when the fundamentals are sound. The prevention of such a panic-based bank run equilibrium can rationalize a deposit insurance scheme from a public interest perspective (see the global game approach introduced by Goldstein and Pauzner 2005).

Politically, bank runs generate externalities that threaten the stability of the political order, something about which the government is concerned. Since bank deposits are the major form of wealth holding, policies aimed at preventing instability can bring electoral gains for politicians who enact such rules. Since this kind of intervention is funded as a contingent liability, politicians do not feel an immediate fiscal repercussion. Insurance is a popular instrument for them, because the increase in potential liabilities is not passed through official budgets. The stated purpose was to protect small depositors, but as a side effect it also transformed the private cost of bankruptcy into social costs, irrespective of the size or risk-profile of the bank. According to Friedman and Schwartz (1963), p. 434, "federal insurance of bank deposits was the most important structural change in the banking system to result from the 1933 panic ... and the structural change most conducive to monetary stability".³⁹

The underlying conflict of private interest can easily be described. In theory, a federal deposit insurance implies a cross-subsidization of risk across federal states. Accordingly, states with banks that suffered higher risks of failure would gain at the expense of other

³⁹Another side effect of the Glass-Steagel Act was the fragmentation of the banking sector by separating commercial and investment banks, thereby preventing the early creation of mega-banks in the US. Given their different agendas, this also reduced the political power of the banking sector.

states' banks, as well as possibly the rest of the nation's taxpayers. In the US, a federal deposit insurance was preferred by unit bankers located in the more risky rural states since it offered high protection at lower cost (see Calomiris 1989). However, the lobby for the introduction of a deposit insurance only succeeded against the pressure of the politically powerful urban branching banks in the wake of the Great Depression, which eroded public confidence in the banking system as a whole. Henry Steagall and other politicians with populist constituencies focused the public's attention on the issue of banking reform and offered supporters of deposit insurance the opportunity to wage a campaign by convincing them that a federal deposit insurance was the best way to combat the financial crisis. According to Calomiris and White (1994), p. 177,

"(...) in the case of federal deposit insurance, entrepreneurial politicians defined an issue they thought would be beneficial to their constituents, structured the forum in which it would be debated to serve their purposes, and organized constituent support for their proposals - including political logrolling in Congress and other transient influences".

Depositors of small, less stable rural banks were clear winners of this political deal, while depositors of relatively stable urban banks were the losers. Unlike most types of private insurance, federal deposit insurance did not distinguish between institutions that engaged in especially risky activities and those that did not, with all paying the same premium per deposit.⁴⁰ Thus, a risk-insensitive deposit insurance scheme increases competition in the deposit market and reduces the advantage of large banks, since small rivals can now also offer risk-free deposits.

Laeven (2004) finds support for this redistribution mechanism across banks by providing evidence that deposit insurance coverage is higher in countries where poorly capitalized banks dominate the market. Risky and small banks simply lobby for extensive coverage and the government agrees.

On balance, US banking was relatively stable from the establishment of federal deposit insurance until the early-1980s. Kroszner and Strahan (2013), argue that stability occurred despite the incentives towards moral hazard embedded in subsidized deposit insurance only because regulatory constraints to competition such as interest rate regulation fostered high monopoly rents in the industry. With limits on both price competition and entry, US banks had access to high rents and low failure probabilities. However, the landscape changed during the 1980s when many small banks lost capital

⁴⁰Lobbying can also rationalize why deposit insurance is underpriced in most countries, i.e. the insurer charges less for its service than the expected opportunity cost. Under flat-rate deposit insurance premium rates will often be set such that they are affordable for the smaller banks and acceptable for the larger banks. As a result, deposit insurance premiums will be set below the actuarially "fair" value of deposit insurance (Laeven 2004).

in the face of macro instability, whereas large banks began to use new technologies such as ATMs to compete in new markets. These developments tipped to the balance of power towards supporters of regulatory openness (Kroszner and Strahan 1999). With deposit insurance still firmly in place, but eroding margins (for both technological and regulatory reasons), many banks "gambled for resurrection" by raising insured deposits and investing in risky projects, ending in the Savings and Loans crisis in the 1980s. The banking sector was in such distress that it could not bear the costs of the crisis, whereby the Federal Savings and Loans Insurance Corporation (FSLIC) became insolvent and was merged with the FDIC. Out of 153 billion US-Dollar of losses, banks ultimately paid 29 billion and taxpayers 124 billion (Curry and Shibut 2000).

Therefore the experience of the US deposit insurance shows that support of banking regulation also depends on the balance of power within a country's banking industry. Following the adoption of the insurance system in the US, a growing number of countries copied the feature of US deposit insurance legislation so that an insurance scheme for domestic banks became a common feature of banking sectors in industrialized countries (Barth et al. 2006). In fact, there is almost no country without an explicit or implicit deposit insurance scheme at present.

Race to the top in coverage limits

Figure 3.3 illustrates the steady rise in the number of adopting countries of deposit insurance. 112 countries had explicit deposit insurance by year-end 2013, having increased from 84 countries in 2003. During the 2008 crisis, 14 countries introduced deposit insurance schemes and almost all countries with explicit insurance that experienced a banking crisis increased the statutory coverage limit. Australia and New Zealand, both formerly supporters of implicit deposit insurance, are notable examples.

Typically, the introduction and extension of deposit insurance coverage has been a response to banking crises. Laeven and Valencia (2013) find that coverage limits for deposit insurance schemes increase on average fourfold in relation to GDP after systemic crises. In other words, as with liquidity insurance, there has been a secular expansion in the scope and scale of deposit insurance, with the 2008 crisis being no exception. What is the reason for the unbroken growth dynamic?

In Europe almost all countries have deposit insurance - with Israel and San Marino being the only exemption. Before the outbreak of the crisis, most of the EU countries had set their actual deposit insurance coverage close to 20,000 euros (Demirgüç-Kunt et al. 2008).⁴¹ However, in response to panic withdrawals in the periphery, EU countries

⁴¹Since 1994 European countries have common standards for deposit insurance to manage the flow

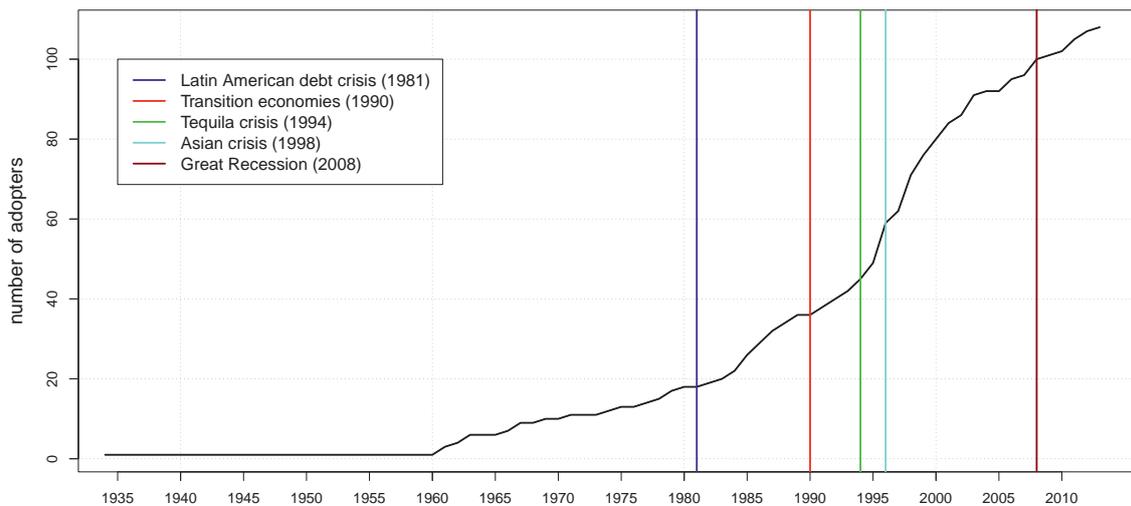


Figure 3.3: Number of countries with explicit deposit insurance (1933 - 2013)

The dashed lines capture the clusters of systemic banking crises following the IMF definition by Laeven and Valencia (2013). Own calculations.

have increased coverage to 100,000 euros per depositor per bank and reduced payout delay to 20 days by end-2010.

The process started in September 2008 with the issuance of blanket guarantees by the Irish authorities that were fighting against a national banking panic triggered by a housing bubble. The government of Ireland announced to insure covered bonds, senior debt and subordinated debt at the six largest banks for two years. This forced other European countries such as the UK to enhance their deposit protection system and ultimately transformed Ireland's banking panic to a European one. By announcing an increase in their deposit guarantee limit from 35,000 pounds to 50,000 pounds, the UK responded to the subsequent flood of British cash into the guaranteed Irish banks. According to the British Bankers Association, UK banks in Northern Ireland were disadvantaged by Ireland's guarantee. As a next step, on Sunday, October 5th, the German government announced that it would fully guarantee all private savings accounts in Germany, in an effort to reinforce increasingly shaky confidence in the German banking sector. "The Economist" (October 9, 2008) reported that Germany's move "may have been prompted by large numbers of electronic withdrawals of deposits at the weekend". The Austrian government followed: according to Reuters, it sought to ensure that Austrian savings were not withdrawn and transferred to Germany. Finally, on October 7th, the EU finance ministers agreed to raise the union-wide deposit

of capital. But Directive 94/19/EC, requiring protection of deposits of at least 20,000 euros per individual, did not set an upper limit for the coverage of deposit guarantees, or harmonize other features of the schemes, thus leaving scope for competition among member states.

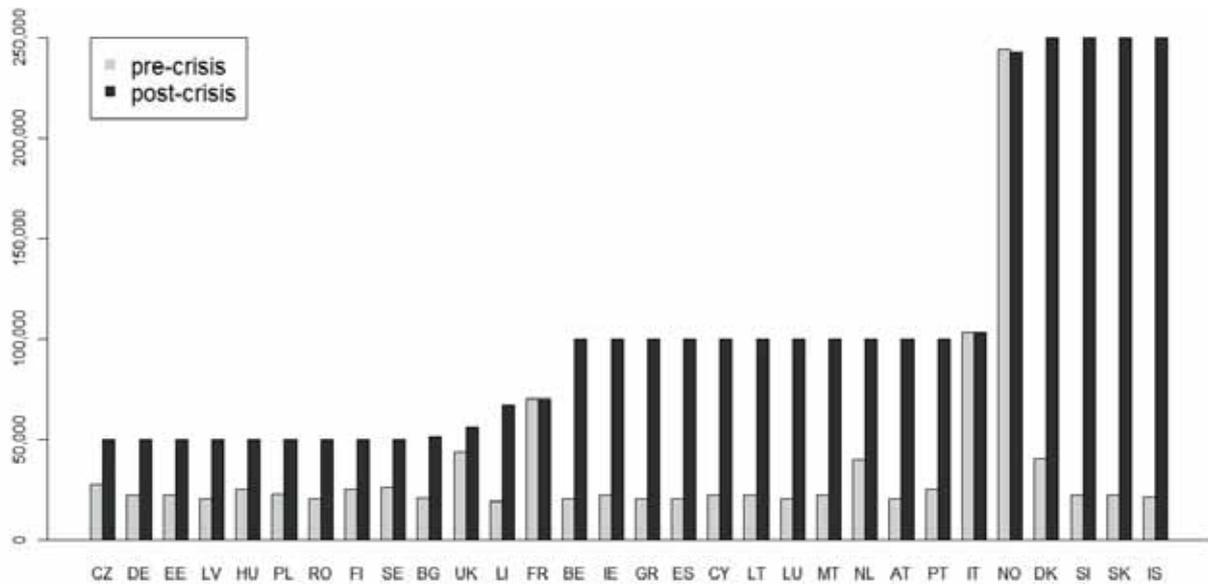


Figure 3.4: The race to the top in deposit insurance coverage

Note: Pre-crisis situation (left bar): as of September 2008; post-crisis situation (right bar): as of January 2010. For scaling purposes, the coverage level for Member States with unlimited coverage is shown as 250,000 euros. Own calculations. Source: European Commission (2010).

insurance minimum from 20,000 euros to 50,000 euros for an initial period of at least one year. In the words of the European Commission (2010), p. 9,

“in order to avoid competitive disadvantages and prevent the outflow of deposits, other Member States were also forced to increase radically their coverage (...) Those actions were undertaken unilaterally in an uncoordinated way, and - as they were followed by other Member States - contributed to serious competitive distortions between Member States, undermining depositors confidence and threatening the overall stability of the EU financial market”.

Figure 3.4 summarizes the sequence of events in 2008, thereby supporting a political economy story for the observed *race to the top* in domestic safety net contributions in the height of a crisis, namely regulatory competition across countries because of expected guarantee shopping by depositors.

Uncoordinated competition between states for international deposit flows determines the scope of the safety net. A regulator trades off the costs of providing deposit insurance against the benefit of preventing a capital flight, which could destabilize the domestic banking system. If a foreign country establishes deposit insurance (or any other measure of the safety net), depositors might shift funds in favor of the most

generous guarantees. The regulator anticipates that a loss in deposits would place stress on domestic banks, thus increasing the probability of a breakdown. When this probability is sufficiently high, the optimal response is to raise the insurance guarantee to retain all local deposits. States increase their deposit insurance coverage purely as a measure to ensure that citizens continue to deposit domestically. However, if the expansion of deposit insurance triggers moral hazard incentives and the insurance funding involves a deadweight loss, it is collectively irrational for a country to ratchet up deposit insurance levels. Accordingly, a country is faced with a Prisoners Dilemma.⁴²

From a public choice perspective, the broadening of deposit insurance coverage in the name of financial stability can be performed even more easily and quickly than its introduction. The increase does not pass through official government budgets and since it is not accompanied by an increase in deposit insurance premiums, the banking sector supports such a policy. The evidence indicates that post-crisis premiums are below actual fair levels and the contingent liabilities imbedded in banking safety nets have been gradually increased (Demirgüç-Kunt et al. 2008).

To summarize, based upon regulatory competition, a progressive widening of the safety net can be observed. Engineer et al. (2013) point out that "by December 2010 more than 200 banks in 16 advanced economies had issued close to 1 trillion euros equivalent of guaranteed bonds." These measures generally seem to have the intended beneficial short-run effect in preventing large-scale depositor runs, albeit concerns raise about moral hazard and the ability to pay.

As in the case of an anticipated bailout, the *race to the top* in the coverage ratios of deposit insurance facilitates risk-taking to the extent that it encourages depositors to relax their monitoring efforts (measured by the reduction in risk premia in their cost of funding). Demirgüç-Kunt and Detragiache (1998) and Barth et al. (2006) document that explicit deposit insurance is strongly and negatively associated with banking sector stability. Although during global distress stability is larger in countries with explicit deposit insurance, the moral hazard effect of insurance provision always dominates the stabilizing effect of a prevented panic in the long-run (Anginer et al. 2014). Moreover, an additional complication comes into play when a country is faced with a troubled economy such that imbalances between the ability to pay and potential liabilities from deposit insurance arise. Then the ability of states to backstop the safety net becomes questionable and can generate a new form of panic.

⁴²Engineer et al. (2013) develop such a model where depositors maximize expected returns of their deposits and hence react to cross-country differences in the deposit insurance rate which lead to both defensive and beggar-thy-neighbor policies by the competing jurisdictions. They conclude that policies are chosen to attract depositors who optimally respond to the expected return to deposits, which depends on deposit insurance levels, systemic risk and transaction cost.

In effect, as a second component of the safety net, insurance for depositors and bondholders has replaced the pre-existing dynamics of debt discipline for regulatory oversight. Debt discipline has shrunk to a minimum, namely the threat of a bail-in when the coverage of the domestic safety net is no longer credible. Ultimately, the state's "ability to pay" constrains the credibility of deposit insurance and hence the *race to the top* in safety net provision. By definition, if insolvent, only a bail-in scheme would force claimholders to bear some of the burden by having part of their debt owed written off. Bail-in fear and the prevention of possible runs brings us to the next element of the current loss-absorbing safety net. With spillovers to other countries, systemic banking crises can justify international interventions and "rescue operations".

3.2.3 Multinational resolution facilities

The examination of internationally integrated failing banks during the Euro crisis has highlighted the last stage of the historical process, which determines the loss allocation of insolvent institutions today. Loss-sharing has become a geo-political issue. The fundamental difference on the multinational level is that the decision process about loss-sharing and multinational rescue funds involves much more coordination in the absence of a single authority with supranational enforcement power. Dealing with a crisis always entails shifting resources from one state to another, thus creating winners and losers. Therefore, at the heart of the balance of burden shifting on an international level stands the political process of decision-making and the inherent incentives for countries to create and abuse a multinational safety net to protect the interests of domestic voters. In economic theory, this is known as the tragedy of the commons.

Within a monetary union, the European Central Bank (ECB) became both a European bank regulator under the Single Supervisory Mechanism (SSM) and LLR for distressed institutions. At the height of the crisis, in June 2012, the European summit agreed on the option for direct recapitalization of banks in crisis, for all practical purposes through the ESM. As a consequence, national rescue funds that protect domestic banks have been extended by ECB funding. Since then, the ECB has been the largest provider of funds to European banks in distress, by a wide margin. Silently, the loss-shifting has risen to a higher level, now affecting taxpayers of the euro area. This can be interpreted as a widening of the bank creditor subsidization described above to a multinational safety net.

As a result, this allows national policy-makers to pass (a fraction of) the losses to foreign taxpayers. Thereby, they do not internalize the complete cost the state support imposes on European taxpayers. The temptation to play this beggar-thy-neighbor-

strategy raises inverse to the fiscal importance of the domestic country, since all national central banks have one vote within the Governing Council of the ECB, irrespective of the national fiscal burden. As Sinn (2014) points out, this structure deviates strongly from the way private corporations or even the IMF are run where countries' voting rights are proportional to their paid-in capital and liability. Hence, if national interests prevail over euro area-wide considerations to a certain degree, national policy-makers have a systematic incentive to preserve the size and the competitive position of the domestic banking sector they regulate.⁴³ They vote for liquidity support, if, and only if, stakeholders of their banking industry benefit from such a policy. The voting on "Emergency Liquidity Assistance" (ELA) credit to crisis countries with a qualified majority of only one-third in the ECB Governing Council illustrates the relevance of this argument (Sinn 2014, p. 169). Such forms of quantitative easing for selective countries can be rationalized with political arguments. Intuitively, uninsured counterparties would make the domestic regulatory authorities responsible for the losses of insolvent banks and would object to any restructuring plan that deprives them from their nominal rights. The resulting political costs of a formal declaration of bankruptcy might be prohibitive high for domestic politicians, suggesting that the threat of losing their job increases the likelihood of a rescue. Such an incentive-structure can be seen as a second layer of moral hazard, now at the level of policy-makers. Domestic politicians are incentivized to procrastinate to induce a depletion process of bail-inable debt of domestic bondholders. An expansive lending policy via ELA credits (without demanding earlier sufficient capitalization) can be a way of inducing a restructuring delay of own insolvent banks fueling the loss of creditor participation potential. Subsequently, domestic creditors have the possibility to minimize their losses by escaping the consequences of their failed investments. The liability can migrate to the hands of the official sector ultimately becoming a geo-political problem.

In fact, there has been an immense procrastination in the eurozone. For example, after sovereign bond losses in Greece became evident by June 2011, full restructuring measures were delayed until spring 2013. From the burst of the US housing bubble in mid-2007, it took Spain five years to materially recognize real estate losses and comprehensively restructure banks by late-2012. Dübél (2013) extensively documented that these delays permitted investors in bail-inable bank liability classes (especially subordinated debt and hybrid capital) to recover part or all of their investment. These recoveries had to be implicitly paid for during the restructurings by the ECB network

⁴³Badinger and Nitsch (2014) find empirical evidence from the European Central Bank that nationality is relevant for both hiring and decision-making. Specifically, examining a sample of 27 European countries over the period from 1999 to 2008, their results indicate that weights based upon national representation in the mid-level management of the ECB's core business areas best describe the central bank's interest-rate setting behavior.

to provide full substitute funding. In the banks under review, the ECB ended up funding 30 percent of total assets in 2012 (Dübel 2013).

Moreover, in this institutional environment the banks in distress are incentivized to develop new business strategies to exploit the moral hazard of policy-makers. Drechsler et al. (2013) find a strong divergence among banks' take-up of LLR assistance during the financial crisis in the euro area, since banks that borrowed heavily also used increasingly risky collateral. Their results support the loss-shifting argument on the common central bank as *de facto* provider of capital. Complementary, Acharya and Steffen (2014) provide evidence that banks in PIIGS countries have significantly increased domestic government bond holdings. The reason for the increase in the home bias - which goes hand-in-hand with a higher leverage (due to zero risk weights for government bonds) - might be to create a correlation of the bank's and the state's solvency. By holding sovereign bonds strategically, it makes it politically harder to default on these bonds, since this will hurt domestic savers and taxpayers. Such a portfolio composition might serve as a commitment device for the government in trouble. The home bias is the outcome of the crisis, since a bank's chances of gaining state support or access to the multinational safety net are improved. This strategy was in place at the Monte dei Paschi di Siena, one of the oldest European banks that was hit by heavy losses on its 24 billion euros portfolio of Italian sovereign bonds.⁴⁴

Hence, the recent episode of multinational resolution can be seen as the end-game revealing significant loss-shifting effects among the international community, ultimately exposing the artificial and highly subsidized environment of the current banking system.

Figure 3.5 summarizes the main findings in this section by illustrating the development of the banking safety net. The opportunity for bank shareholders and stakeholders to shift uncompensated risk onto unwary counterparties increased over time, starting with the regulatory privilege of owners via limited liabilities in the 19th century. Despite a LLR-regime in some countries, until the 1930s a lax regulated banking sector led to many bank runs, in particular the Great Depression. This experience marked a regime shift where limits on competition and deposit insurance schemes were introduced. The establishment of risk-free deposits can be seen as the central element of the safety net setting the ground for a moral hazard machinery. Subsequently, three additional moral hazard channels can be observed: interventions for enhancing a troubled bank's liquidity (bailouts), delaying the recognition and resolution of insolvencies (procrastination) and bringing additional parties into the loss-absorbing process (internationalization).

⁴⁴Uhlig (2014) develops a model where banks in risky countries may be allowed by their regulator to gamble, given that bankruptcy happens when the country is in default itself and thus no longer can pay for their share of the bank losses. Accordingly, governments in risky countries shift some of the possible sovereign default losses onto the common central bank.



	First introduction	Element of the safety net	Who benefits?
	19 th century	Limited liability	Bank owners
	1890	Lender of Last Resort (liquidity insurance)	Large banks
	1933	Deposit insurance	Small banks, depositors
	2008	Multinational resolution facilities (capital insurance)	Domestic taxpayers, junior and senior debt holders

Figure 3.5: The emergence of the safety net

The creation of safety nets goes beyond pure insurance provision. The protection of the banking system adopts the flavor of being a public good, since losses are born by the state or the international community, in the form of liquidity support to wholesale funders (liquidity insurance), payouts to depositors (deposit insurance) or equity injections (capital insurance). There is a redistribution of this downside risk to international taxpayers, whereby the returns are privatized. This development has increased the potential of moral hazard at an individual bank as the next section will show.

3.3 Consequences

Institutionalized loss-shifting will change the optimal business models taken by insured financial institutions. A bank is likely to adapt her strategies to maximize expected profits. The most important consequence of the establishment of the safety net is for the distribution of risks and losses. In the following, I will identify four business strategies that increase the value of the safety net protection. All of them have a common feature, namely the opportunistic behavior of bank owners at the potential expense of the majority of taxpayers.

To show the bank shareholder's incentives, a model of safety net guarantee in the spirit of Freixas and Rochet (2008), p. 313-5, and Sinn (2003), p. 150-77, is adapted. The model focuses on opportunistic behavior by the bank and abstracts from such behavior by the bank's borrowers. Consider a bank that has access to a safety net by enjoying a guarantee without uncertainty about the obligations of the guarantee being met.

The bank invests the collected bonds B and all its equity E in a portfolio consisting of loans of a volume of L . For simplicity, the deposit rate is normalized to zero. The terms of the safety net are that if the bank cannot make the promised payment to the bondholders, the bank will be liquidated and the state will meet these payments. In effect, the state has committed to compensate all bondholders.

The stylized balance sheet of the bank reads:

Assets	Liabilities
Loans L	Bonds B
	Equity E

Invested loans are at risk. \tilde{L} denotes the actual number of loan repayments available for the bank; in other words a fraction of loans $L - \tilde{L}$ fails. Then the payment received from the safety net can be expressed as $\tilde{S} = \max(0, B - \tilde{L})$. If the loan repayments exceed the repayment obligation to bondholders, $\tilde{L} > B$, there are no payments by the safety net; however, if the repayment is insufficient to satisfy the obligation, a positive payment by the state emerges.

Subsequently, the (private) value of the insured bank \tilde{V} consists of two terms, the value of the loan portfolio net of repayment obligations, and the expected payment of the safety net insurance, given by $\tilde{V} = (\tilde{L} - B) + \tilde{S}$. Substituting \tilde{S} as well as the balance sheet constraint $B = L - E$, I obtain:

$$\tilde{V} = E + (\tilde{L} - L) + \left(\max(0, B - \tilde{L}) \right). \tag{3.1}$$

Intuitively, the shareholder value of the bank \tilde{V} equals the sum of its initial investment of equity E , the net present value of loans, and the net subsidy received from the safety net.

Profit-maximizing strategies can be easily captured from this equation by analyzing how a bank can maximize the shareholder's expected gains. For this purpose, she can follow different strategies. First, consider the change in the subsidy with respect to the chosen level of risk X for a given balance sheet. Suppose that \tilde{L} can take only two values that are positively correlated to the riskiness of the loan portfolio. Assume the following two-point distribution of loan repayments:

$$\tilde{L} = \begin{cases} X & \text{with probability } \theta(X) \\ 0 & \text{with probability } 1 - \theta(X). \end{cases}$$

The probability of success is described by the function $\theta(X)$, where $\theta'(X) < 0$ and $\theta''(X) \leq 0$ in order to avoid corner solutions with infinite risk. These assumptions imply that the expected return $E[\tilde{L}] = \theta(X) \cdot X$ is strictly concave. The risk in the portfolio is perfectly correlated.

Before analyzing the bank's choice of risk, I derive the normative optimum which a risk-neutral social planner would implement. In the absence of a safety net he chooses

the level of risk that maximizes expected returns, that is $\theta(X) \cdot X$. The optimal risk allocation therefore satisfies the following condition, implying that the marginal return on risk must be zero in optimum: $X^{Soc} \equiv \theta'(X) \cdot X + \theta(X) = 0$.

Now, consider the expected private gain for the bank from the safety net:

$$\Pi \equiv E[\tilde{V}] - E = \underbrace{(\theta(X) \cdot X - L)}_{\tilde{L}-L} + \underbrace{(1 - \theta(X)) \cdot B}_{\tilde{S}>0}. \quad (3.2)$$

Again, the first term captures the net present value of the loans and the second term is the net subsidy from the safety net. An implicit rent of the safety net arises, because in the case of failure $(1 - \theta(X))$ the bank can shift the disbursement obligation (B) to the state.⁴⁵ Then, within a class of assets with the same net present value, $\theta(X) \cdot X - L =$ constant, the bank can optimally determine the risk-profile (the return-probability tuple $\theta(X), X$) of the assets in her balance sheet.

In order to determine the impact of the safety net provision on the risk-taking behavior, I derive the first-order condition from (3.2):

$$\frac{\partial \Pi}{\partial X} : \underbrace{\theta(X) + \theta'(X)}_{X^{Soc}} - \underbrace{(\theta'(X) \cdot B)}_{>0} = 0. \quad (3.3)$$

The moral hazard problem is captured from this condition. The risk taken by an insured bank is artificially high compared to the social optimum, $X > X^{Soc}$. Hence, the safety net subsidies are an increasing function of the chosen level of risk. The value of the subsidy is enhanced by rising the risk-profile of the bank's assets. Why? Because risk increases the upside returns without affecting the downside risk.

Next, consider the change in the gain of the bank in (3.2) with respect to an increase in the insured bonds. For a given risk-profile, it emerges that

$$\frac{\partial \Pi}{\partial B} = 1 - \theta(X) > 0. \quad (3.4)$$

The expected subsidy is increasing in the volume of bonds. In other words, because of the safety net, a bank will, secondly, try to attract as many insured bonds as possible. If a bank seeks to maximize her value she will seek to expand her balance sheets. Thus, the asymmetric payoff schedule of the safety net generates incentives for a bank to grow with debt.

⁴⁵From a normative perspective, policy-makers as safety net managers should internalize the externality generated by the provision of the safety net. If the safety net is fairly priced, the state should charge a fair premium P . With $P^* = (1 - \theta(X))B$, we obtain the Modigliani-Miller result and the total value of the bank, $E[\tilde{V}] + B$ is independent of its liability structure.

Third, by analogy and using the bank's balance sheet condition $B = L - E$ in (3.2), I can analyze the impact of the safety net on the optimal amount of equity. Maximization with respect to the equity yields

$$\frac{\partial \Pi}{\partial E} = -(1 - \theta(X)) < 0. \quad (3.5)$$

Intuitively, a rational banker develops strategies to minimize the amount of her liable equity. Thus, higher leverage, i.e. a lower capital-to-asset ratio, increases the value of the subsidy that is inherent in the domestic safety net.

Fourth, I can extend the analysis by introducing a foreign bank that is not insured by a domestic safety net. Moreover, the creation of an interbank network is possible where the foreign bank has the option to lend funds in a circular way to other banks before investing in a project. If the project fails, there is no domestic foreign safety net and creditors might default. However, it emerges that the uninsured creditors receive a positive repayment as soon as at least one of the banks involved in the interbank network is part of a safety net. Every bank can considerably increase the expected repayment of its uninsured creditors by first channeling funds through the interbank market and subsequently investing them into loans. This incentive for interconnectedness is the fourth strategy resulting from the establishment of the domestic safety net.⁴⁶

In the following this chapter examines whether each of these four strategies generated by the model has been realized with the establishment of the safety net.

3.3.1 Minimize equity capital

The simplest way of exploiting the asymmetry of payoffs arising from the safety net is to increase leverage. The less capital stock holders have invested, the more valuable safety net support becomes to them and their counterparties.

There is clear evidence of this strategy having been pursued over long episodes of history. Figure 3.6 shows the dynamics of capital-to-asset ratios of ten developed countries (Australia, Belgium, Canada, Denmark, Finland, Germany, Italy, the UK, the US and Sweden).

Equity ratios have fallen secularly for over a century, from 25 percent in 1880 falling by a factor of four in all countries since the start of the 20th century. Today, ownership for banks is vested in agents comprising 5-8 percent of the balance sheet.

⁴⁶A similar mechanism is formalized by Buck and Jus (2009) identifying a risk-export effect due to differences in liability regimes among countries that can be exploited by banks.

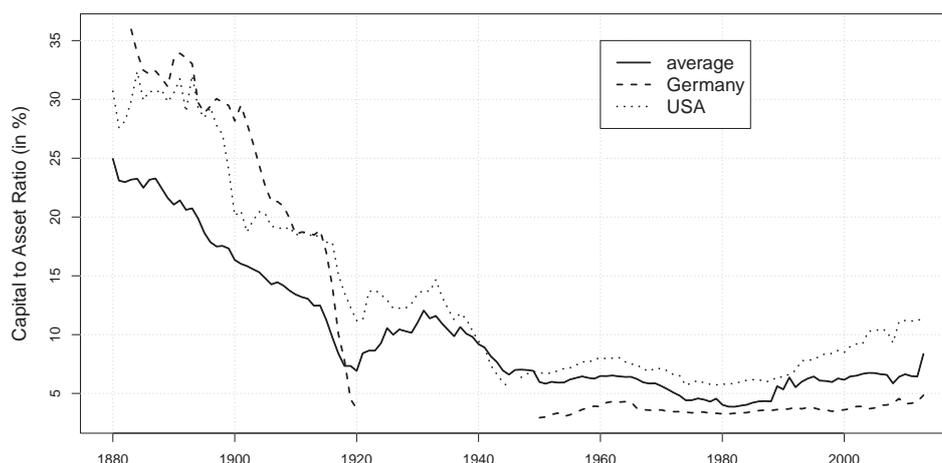


Figure 3.6: Development of the capital-to-asset ratio (1880 - 2012)

Countries and sources: National Banks and *data.worldbank.org*; Sweden: Sveriges Riksbank (1931), League of Nations (1934), Hortlund (2005); Denmark: Danmarks Statistik (1969), Johansen (1985); Finland: Suomen Tilastoekkus (various); USA: US Department of Commerce (1989); Canada: Curtis et al. (1931), League of Nations (1934); Belgium: *Moniteur des Intérêts Matériels* (various); Germany: Deutsche Bundesbank (1975); UK: Sheppard (1971); Italy: Cotula et al. (1996); Australia: Butlin et al. (1971). Author's calculations.

Empirical studies (Saunders and Wilson 1999) find support for the view that historical roles of high bank capital levels have largely been supplanted by increased safety-net provision and bank consolidation. The decline of equity ratios arises for two reasons, both of which relate to the increased confidence in the probability of repayment and hence in the alleviation of market discipline.

The first reason refers to delegated monitoring to the state or central bank where measures are taken to build expectations that once the money is lent, bondholders can be sure of repayment (representation hypothesis, North and Weingast 1989; Dewatripont and Tirole 1994). As the perceived risk of bank failures declines, market capital requirements will fall. When information about financial institutions becomes more widely available through the publication of balance sheets, screening by the supervisors (e.g. central banks) and as reputations become established, bondholders will require banks to hold less equity on average. In other words, since banks hold equity in part to mitigate the information asymmetry, as information flow improves, less equity is necessary.⁴⁷

Second, with increasing public confidence in the safety net, the expected private costs of failure decreases so that depositors accept substantially lower levels of equity cap-

⁴⁷Bank consolidation and branching can also reduce the required capital, because banks can diversify depositors' risk (Calomiris and Wilson 1998; Gorton and Pennacchi 1990).

ital.⁴⁸ The intuition is straightforward: whereas limited liability constrains the losses of shareholders to zero, losses beyond that point are born by other parts of bank's capital structure - wholesale and retail depositors. Consequently, when creditors entrust their money to a bank, they try to protect themselves in advance by charging higher interest rates or by attaching conditions called "covenants" to their lenders, which can make borrowing less attractive. Without a safety net, costs associated with default are thus reflected in interest rates.

Before the establishment of the safety net, debt appears to have played this disciplining role. Depositors voted by feet and bank runs came fast, being an disciplining device on banks. This signaling role of interest rates among banks persisted until the Great Depression. Calomiris and Mason (1997) show that market prices did a good job in distinguishing good and bad banks during the Chicago banking panic of 1932. They signaled distress six months prior to a bank's failure. However, as the 20th century progressed, dilution of market disciplining became evident due to the safety net.

With deposit insurance or bailout expectations, the burden of debt becomes easier, since creditors expect that their debt will most likely be paid back. For banks, the costs of added debt are thus much lower with the safety net. Acharya et al. (2013a), using data for the period 1990 - 2010, find that bond holders expect public support for major financial institutions in the US. They show that TBTF institutions have lower and more risk-insensitive spreads than other institutions. The annual funding cost advantage embedded in the credit spreads on bonds issued by these institutions is of 20 basis points, representing approximately 20 billion US-Dollars per year (see Box 3.1 for a discussion of the different approaches how to measure the private benefits of the safety net).

Accordingly, the subsidy is also a measure of the risk-mispricing by bank debtors. The cost of a bank's funds no longer depends upon the risk they take. Subsidized funding through the safety net has made growth easy and building empires more profitable by increasing the bank's capacity to risk-up. This brings us to the next value-maximizing strategy that the safety net model has suggested.

⁴⁸For example, Berger et al. (1995) and Herring (2011) relate the decline of the US capital-to-asset ratio to the moral-hazard incentives put in place with the implementation of deposit insurance and the Banking Acts of 1933 and 1935 (see Figure 3.6). Before 1863, no federal banking regulation existed and banks did not enjoy access to any of the described elements of a safety net. The equity-to-asset ratios by banks (55 percent) declined markedly to 30 percent with the enactment of the National Banking Act of 1863, since depositors delegated monitoring to the state. Subsequently, the introduction of explicit deposit insurance in 1933 led to the next sharp reduction in equity with ratios falling to the 5 percent to 10 percent range where they remained until the introduction of the Basel requirements in 1988.

Box 3.1 Approaches to quantify the implicit banking subsidy

Implicit banking subsidies arise when bondholders have factored a bailout policy into their pricing of risk related to banks. The estimated quasi-rents for protected banks are large. In terms of the funding cost advantage in 2013, these subsidies are at least 15 basis points in the US, 20-60 basis points in the UK, 25-60 basis points in Japan and 60-90 basis points in the euro area (International Monetary Fund 2014).

Existing approaches to quantify the implicit subsidy can be divided into two classes. First, "funding advantage" models measure the subsidy as the aggregate reduction in the funding cost due to an implicit state guarantee. Second, "contingent claims" models measure the subsidy as the expected payment from the government to the banking sector necessary to prevent default.

Funding advantage models estimate the implicit subsidy by comparing the bank's cost in issuing its debt with a higher counterfactual cost that it would face in the absence of the guarantee. To measure the counterfactual, models either follow a size-based approach by assuming that only large banks would be supported by the state (Acharya et al. 2013a; Jacewitz and Pogach 2013), or they follow a ratings-based approach by comparing information from credit rating agencies that usually issue a "stand-alone rating" and a higher "support rating", reflecting support in times of stress (Bloomberg View 2013; Ueda and Weder di Mauro 2013; Haldane 2014, see Figure 3.2).

The second class of models, contingent claims models, calculates the implicit subsidy as the expected payment from the state to subsidize banks in exactly the amount that is necessary to prevent their default. The value of the support is the liquidity needed to restore the value of assets to its minimum amount, weighted by the probability of their falling below it. This is similar to pricing an option, since the value of state support is captured as a claim that banks have on the state, contingent on their failure. If the value

of a bank falls below a certain trigger point, the option is exercised. This type, thus, crucially requires modeling the dynamics of banks future asset values and their statistical distribution, for example by using the model of Black and Scholes (1973). Most recently, the International Monetary Fund (2014) uses a contingent claims model to show that subsidies during the crisis rose and remain more elevated in the euro area than in the US, reflecting differences in the policy response to the problems in the banking sector.

The two classes of models differ with respect to their underlying assumptions and therefore can produce divergent results. The funding advantage approach relies on subjective rating agency judgment to determine the likelihood of a bank's insolvency and the probability of state support, whereas the contingent claims approach bases on information from financial market prices. These results are therefore sensitive to the specific modelling assumptions like the choice of the discount rate. However, the contingent claims approach has the advantage of taking into account possible spillover effects of risk among banks. This is the case because state support is assumed to be granted if the total assets of all banks fall below a certain threshold. This aspect is ignored in funding advantage models yielding an underestimation of the subsidy, since the effect of support of one bank in avoiding the failure of another is not captured.

Most importantly, the issue of moral hazard is not adequately addressed in both classes of models. Expected state support may induce banks to take on more risk which is not reflected in the measures provided by the literature, unless changes in risk-taking are recognized by rating agencies or market prices. Recognition and response lags generated by accounting frameworks used by banks are also unavoidable. Market failures and opaqueness therefore are the main areas of concern in quantifying the implicit banking subsidies.

3.3.2 Expanding the balance sheet

As we have seen, increased leverage will boost safety net subsidies. Leverage allows owners to profit more significantly when the market turns up, while still avoiding the downside when it turns down. In recent years, there has been a structural shift in the industrial organization of banking. We have seen the emergence of mega-banks. For illustration, consider the UK: at the start of the 20th century, the largest three banks' assets accounted for 7 percent of GDP (Haldane 2014). Table 3.1 illustrates that the top three in 1960 accounted for 42 percent of the total banking sector assets, increasing to 71 percent by the century's end.

		1960	2010
UK	assets of top three banks	6.3	4,685
	as % of total banking assets	42%	71%
US	assets of top three banks	27.8	6,315.6
	as % of total banking assets	10.9%	52.7%

Table 3.1: Market power of the top three banks 1960 vs. 2010

Note: The top three headquartered commercial banks in 1960 are: Barclays Bank Ltd, Midland Bank Ltd, Lloyds Bank Ltd (UK), Bank of America, Chase Manhattan Bank, First National City Bank of New York (US); in 2010: Royal Bank of Scotland, Barclays Group, HSBC Holdings Group (UK), Bank of America, JP Morgan, Citigroup (US).

Other countries tell a similar story. In the US, the share of the top three headquartered commercial banks increased significantly from 10.9 percent in 1960 to 52.7 percent in 2010. The process of consolidation in the US culminated in 1999 with a passage of the Gramm-Leach-Bliley Act, which removed the separation between commercial and investment banks. Given that both banking groups previously had different agendas, their lobby pressures tended to neutralize one another. However, after Gramm-Leach-Bliley, the interests coincided, which provided the US banking industry with disproportional political power.

Can size-related factors, independent of perceptions of government support, i.e. economies of scale, explain the emergence of Leviathan institutions in recent years? Empirical research finds little evidence of scale economies beyond a relatively small bank size. Hughes et al. (1996) analyze data from before the full implementation of intra-state and inter-state branching deregulation in the 1980s and 1990s indicating that, in the absence of a safety net, increasing returns are only obtained for relatively small banks, while large ones exhibit constant returns to scale. Accordingly, there is always a

cost minimum in banking. Their analysis imply that fundamental advantages run out at small scale, suggesting that the size advantage of large banks are political. Critically, expected safety net subsidies in the form of cheaper funding increase in size and can account for the growth in the average size of banks in recent years (Davies and Tracey 2014).

Empirical studies tend to support the hypothesis of safety net created programs of mergers and acquisition. Based upon data from the merger boom of 1991–2004, Brewer and Jagtiani (2013) find that banking organizations were willing to pay an added premium for mergers that would put them over the asset sizes that are commonly viewed as the thresholds for being TBTF. They estimate at least 15 billion in added premiums for the eight merger deals that brought the organizations to over 100 billion in assets. Complementarily, Carbo-Valverde et al. (2009) confirm that EU banks undertook cross-border merger activities during 1993 - 2004 not for increasing their operating efficiency, but rather to shift risk into EU safety nets. According to their study, the differences in the character of safety net benefits that are available to banks in individual EU countries help to explain the nature of cross-border merger activity (regulatory arbitrage). In a broader context, Penas and Unal (2004) demonstrate that mergers that involve TBTF institutions have increased the capitalized value of the implicit government credit enhancements imbedded in their capital structure. This makes a large institution even more systemic and more politically influential.

3.3.3 Increase volatility

Banks are in the business of taking calculated risks. The third safety net-induced vehicle through which subsidies to banks are converged is to originate assets which themselves have asymmetric returns. Risk-shifting refers to incentives to shift portfolios towards higher risk higher return assets. Because losses are bunched in the tail, more of the gain is privatized and more of the losses are socialized.

Historically, there is evidence on the excessive risk strategy having been deployed to increase returns.

Figure 3.7 shows the historical distribution of returns on UK commercial banks' assets, broken down by three subsamples (1921 - 49; 1950 - 79; 1980 - 2010). Haldane (2014) argues that the mean return on bank assets lies in a range of 0.5 - 1 percent per year, although the variation in returns has risen dramatically over time. For example, assets returns were two and a half times more volatile at the end of the 20th century than in the first half. Banking has become more fragile.

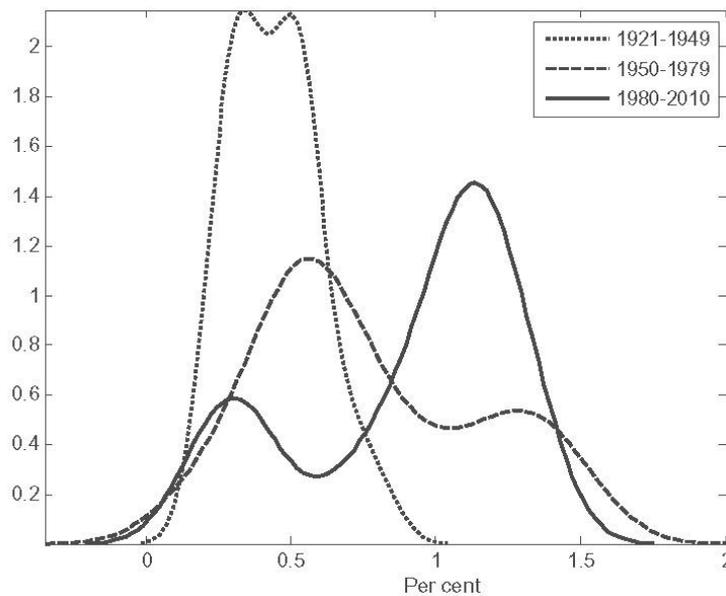


Figure 3.7: Historical distribution of UK bank asset returns

This figure is taken from Haldane (2014).

3.3.4 Getting interconnected

Fourth, theory suggests that national safety nets provide an incentive for banks to invest in highly correlated portfolios, since the interbank network serves as an insurance mechanism for bank creditors. Intuitively, if a bank failure is associated with a positive bailout probability, connections to other banks increase the expected repayment of uninsured creditors. The pattern is striking. Banks can optimally exploit these transfers by getting systemic, creating high interbank exposure, and maximizing the safety net subsidy per invested unit of capital. Leitner (2005) and Eisert and Eufinger (2013) show that interbank linkages can be optimal ex-ante because they act as a commitment device to facilitate mutual private sector bailouts. In such a situation, politicians seem incapable of credibly committing not to intervene to support troubled banks. Thus, virtually the entire financial system is protected by government insurance and other assistance nowadays.

Time-inconsistency of rescuing banks and the resulting moral hazard problem in a multi-bank context have been recently emphasized by several authors. Acharya and Yorulmazer (2007) study the incentives of two banks to correlate the risk that is inherent in their investment portfolio. They demonstrate that banks take actions, such as maximizing their correlation and lending to similar industries, that then make the regulator to bail them out as a group. Due to the strategic complementarity of asset prices (resulting in fire sales prices in recessions), the liquidation value of these

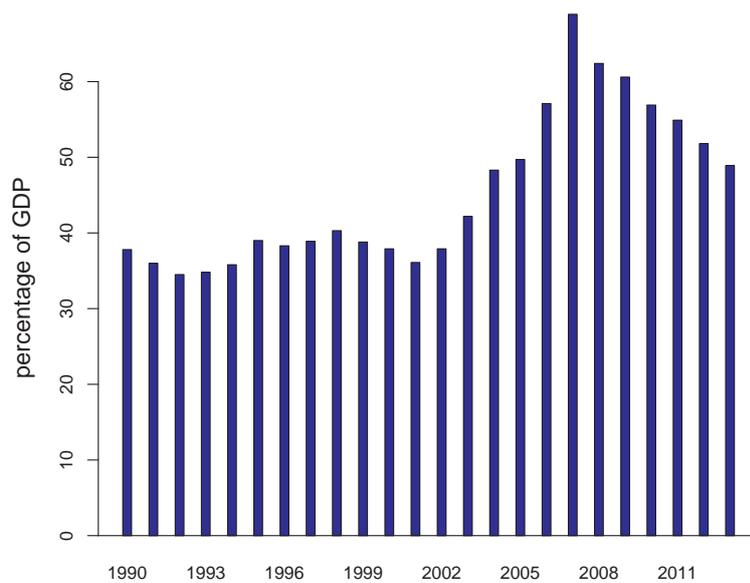


Figure 3.8: Cross-border banking linkages (1990 - 2013)

Note: Linkages as percent of global GDP are measured via BIS locational banking statistics by residence, capturing the activities of all international active offices in the reporting country. Own calculations. Source: BIS and International Monetary Fund (2014).

institutions is less than the rescue costs, i.e. a bailout. This is why herding becomes a simultaneous ex-ante decision of banks to coordinate correlated investments and to bring about a "too-many to fail" outcome. Complementary, Farhi and Tirole (2012) argue that the government's inability to commit not to bailout banks during a systemic crisis generates an incentive for banks to excessively invest in assets that decline during systemic crises.

Empirically, Kubelec and Sá (2010) show that the interconnectedness of the global financial network significantly increased between 1980 to 2005. Financial links have become larger and more frequent. Trade networks exhibits strong links within continents, with a European cluster, centered around Germany, an Asian cluster around China and an American cluster, centered around the US. Figure 3.8 shows the development of cross-border banking claims, measured by the Bank for International Settlements (BIS) locational banking statistics. Cross-border linkages have increased sharply until the financial crisis, reaching more than half of global GDP in 2007.

This evolution has systemically dangerous consequences. By increasing the similarity of banks' asset portfolios, it increases the system's sensitivity to aggregate fluctuations. Although diversification may purge an idiosyncratic risk, it simultaneously reduces diversity and thereby generates systemic risk.

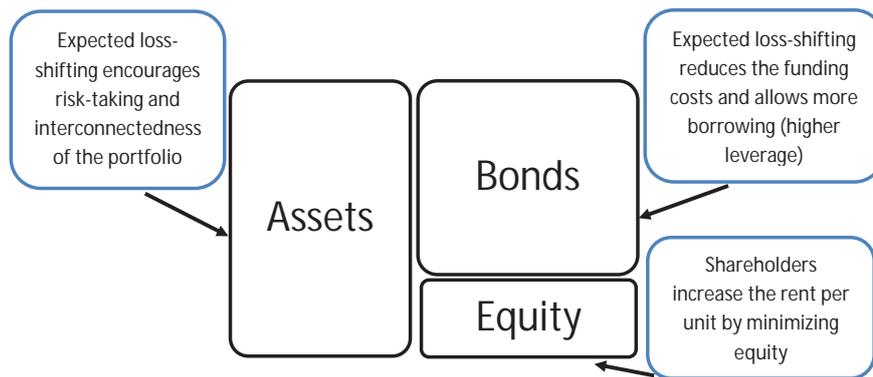


Figure 3.9: Effects of the safety net on a bank's balance sheet

To summarize, subsidies that banks extract from the safety net encourage banks to make their institutions larger, riskier, and politically more difficult to fail. The provision of the safety net makes deposits risk-free, facilitates borrowing and catalyzes the emergence of mega-banks with the potential to create huge risk-externalities for the society (see Figure 3.9).

3.3.5 Path dependency and political influence

For the safety net manager, this poses a dilemma since policy choices are constrained by past decisions and political majorities. The established institutions not only persist over time because lock-in effects are at work; moreover, there is also a form of path dependence in the political balance of power. Once established, the political *status quo* determines the future regulatory outcome. As Kane (1989) has argued, when the stakes are high enough, banks cajole regulators to assist them in abusing the safety net at the taxpayers' expense. In other words, there are concentrated and well-funded interests who are willing to fight hard to maintain their access to the subsidized global safety net and block any reform.⁴⁹

Along with the four rent-maximizing strategies employed by banks, the establishment of the safety net has amplified the political power of banks. This is due to two key factors, the first of which is that the concentration trend of the banking sector gives them power in shaping the political agenda. The reason is that coordination cost and incentives to free-ride on the efforts of other institutions are lower (Olson 1965). Prior to the establishment of the safety net, domestic banks seldom lobbied on a large scale because they often had distinct interests. In the past, different ends of lending

⁴⁹Padovani and Gibson (2011) provide evidence that the announcement of the Dodd-Frank bill in 2010 was followed by significantly higher lobbying intensity by banks; most importantly by banks that are larger, have more vulnerable balance sheets and more diversified business profiles.

were often carried out by different types of institutions. However, after cross-border mergers and increased interconnectedness that took place in the banking industry, a smaller number of similar structured institutions performed all of these functions, and for them consensus is easy. After WWII there have been an excessive correlation of business models of multinational banks around the world.

Founded in 1983, the Institute of International Finance (IIF) - the world's only global association of financial institutions with membership encompassing most of the world's largest commercial and investment banks, along with sovereign wealth funds, insurance companies, development banks, credit rating agencies and multinational firms - can be seen as the manifestation of this process. According to the IIF, its "main activities include providing impartial analysis and research to its members in order to shape regulatory, financial and economic policy influence the public debate on particular policy proponents (and work) with policy-makers, regulators and multilateral organizations with an emphasis on voluntary market-based approaches to crisis prevention and management." A basic principle of public choice is that powerful minorities (in our case the IIF) will be generally successful in obtaining politics, especially when regulation is technically complex and asymmetric information for outsiders is pervasive (Laffont and Tirole 1991).

The second important reason for the increased political influence is that the bank's failure can create even larger catastrophic disruptions in the economy today. Recall the fact that the average banking sector assets in developed countries continuously rose since the Great Depression and now amounts to more than twice annual GDP (Figure 3.1). Indeed, default can be painful in terms of output losses so that economic power has catalyzed political power. The bargaining position of the banking sector, i.e. the threat point, has grown hand-in-hand with the safety net. In the light of the recent financial crisis, the IIF has argued that the planned Basel III reform - aimed at substantially increasing capital-to-asset ratios for banks - would raise interest rates on bank loans in the US and Europe thus implying lower real growth for the economies, at roughly 0.6 percentage points of GDP for an increase of one percentage point.⁵⁰

Hence, we observe that much lobby effort is not aimed at erecting new regulation, but rather at reducing regulatory requirements. In this context there are some other topics on the reform agenda, e.g. a subsidy in the form of zero risk weights for government debt, where the interests of banks and the state coincide so that finding an agreement is easy (see chapter 4).

⁵⁰For European banks, McKinsey estimates that the costs of implementing Basel III are at over 70,000 jobs per year (Härle et al. 2010). For US banks the costs of the Dodd-Frank Act are estimated to be tens of thousands of jobs.

Some policy-makers are aware of this problem. As safety net managers, ideally they safeguard taxpayers' interests by making banks operate more prudently than their shareholders might prefer. In the last decades many proposed remedies to minimize the social costs of the safety net have been considered, which can be divided into two groups: those that intend to limit bank risk taken by the implementation of minimum capital regulation etc., and those that would charge banks varying fees depending on the risks they undertake.⁵¹ Moreover recent studies (Anginer et al. 2014) highlight the role of bank supervision that can alleviate the adverse consequences of safety net insurance on systemic risk (see chapter 5 for a framework for ensuring financial stability). However, given the influence of a few very large banks, many of the recent policy instruments ultimately proved to be Potemkin villages; or in the words of Admati and Hellwig (2013), p. 180, "requirements reflect the political impact that these banks have had on the policy debate and the flawed and misleading claims that are made in the discussion".

For example, consider the capital regulation of banks. With the so-called Basel approach, capital requirements became the central tool in international banking regulation to strengthen the financial architecture. The safety net model of this chapter unambiguously claims that the bank should pay a fair premium for the provision of the safety net, which is an increasing function of the deposit-to-asset ratio. However, when banks are forced to hold more equity capital and deviate from their preferred level, they naturally view these requirements as a form of "regulatory taxation" and have successfully lobbied for deregulation. Intuitively, for banks with sizeable asset bases, a very small percentage of reduction in capital requirements can represent a windfall of billions of euros.

In a recent case study, Lall (2012) shows that the implementation of the model-based approach in the Basel capital requirement framework, itself a lifting of equity constraints on large banks, was the regulatory outcome of lobbying by the IIF. Not just the IIF's contact with regulators per se has led to a regulatory capture, but more importantly its timing at an early stage in an opaque policy-making process; long before other groups like regional banks had a chance to intervene. Derived from its personal links with the Basel Committee, from the very beginning the IIF had information about the regulatory agenda in Basel unavailable to others and thus gained a first-mover advantage in the regulatory process. The longest-serving Chairman of the Committee, the Bank of England's Peter Cooke (1977-88), was in fact one of the co-founders of the IIF. As a result, the IIF was able to use its position as the well-connected, peak

⁵¹Brunnermeier et al. (2009) and Acharya et al. (2010) propose a "Pigouvian tax" on institutions posing systemic risk externalities. This tax should be set at levels which offset the effects of the bank's actions on wider society. However, see Chan et al. (1992) and Acharya and Dreyfus (1989) for early contributions on the problems of establishing risk-adjusted insurance premia in the banking sector.

association to interact with the Committee participants on a regular basis, working within the same "cultural bubble". Informational campaigns and closed meetings with private sector groups followed, so that the Basel Committee and its "model task force" (a subgroup working on the structure of risk modeling) used these discussions and data from the IIF as part of their overall research. Since policy decisions made at this early stage tend to be self-reinforcing, Lall (2012) concludes that the IIF exerts disproportionate influence over the content of the Basel II rules. As the Vice-President of a leading association of American community banks puts it, "we did not get involved until what turned out to be a late stage and when we did, the modeling approach was already set in stone. The Basel Committee had been convinced by the large banks".

Similar political deals can be observed when the regulator imposes bank levies as a financial stability contribution aimed to correct the adverse effects of high leverage. 14 European countries imposed variants of these taxes between 2008 and 2013, but revenues vary between 0.7 percent of GDP (Hungary) and 0.02 percent of GDP (Germany). In other words, revenues are consistently below the estimated cost of banking crises relative to GDP (according to the IIF calculations). Interestingly, in the case of Germany, the majority of banks (77 percent) were exempted from the tax due to their small size. Furthermore, the largest banks benefitted from upper bounds on the contributions a bank must pay ("Zumutbarkeitsgrenze"). Buch et al. (2014) show that the lion's share of tax payments came from commercial banks and head institutions of savings banks and Credit Unions, whereas the reform had no effects on the business strategies or risk-taking of banks.

3.4 Concluding remarks

This chapter has shown that the scope of financial intermediation, i.e. the rents of banking, continuously rose over the last century. The provision of a multinational safety net can be seen as the key driver for this process. Thereby, the Great Depression marked a policy turnaround in the regulatory response to bank panics. The establishment of state support to the banking system, consisting of privileged bankruptcy laws, deposit insurance systems and supranational intervention procedures, subsequently have led to the unbroken trend of an expansion of banks' assets making financial intermediation an attractive form of investment.

Whereas the costs of distress tended to be borne by the bank stakeholders themselves until the Great Depression, downside costs are nowadays shifted to the taxpayers. As a result, the international community has become the last-resort financier of banks. Debtor-oriented laws allow bank owners to reduce the cost that they pay for taking

risks and bailouts, deposit insurance and multinational resolution facilities help them to raise funds and formalize the process of how losses are covered. Neither debt nor equity holders have an incentive to constrain bank risk-taking. These measures, originally established to prevent banking panic and limit their socially costly impact, are collectively described as the safety net for financial institutions that most industrialized countries have introduced.

The key question for economists is to what extent does the safety net work under the guise of seeking financial stability. One reason for concern is the fact that co-evolving, the financial sector is incentivized to gamble, to grow and interconnect itself to a point where it now dominates an economy and is able to influence regulation to retain the banks' subsidy that is manifested in today's financial safety nets. The problem with this development is that the size of contingent liabilities imbedded in safety nets and the probability of these liabilities materializing have both increased with each financial crisis.

The next chapter will introduce an analytical framework to help understand why citizens in a democracy tolerate such a policy.

4 The persistence of bank rents

Despite an expansion of the subsidies in bank safety nets in recent years, regulatory rules for banks to offset the created moral hazard effects have been dismantled. This chapter provides a framework for understanding why particular banking regulations arise. For this purpose, a model of electoral competition with lobbying is developed to illustrate how policy-makers are incentivized to intervene in a bank's credit allocation policy. By subsidizing specific forms of investments, the regulator can preserve rents for a subgroup of citizens that constitute electoral support. Using the example of financial repression, this chapter offers a political rationale for the preferential treatment of sovereign bonds in the banking sector.

4.1 What explains the pervasive policy influence of the banking industry?

Today, virtually all democracies provide generous support for banks through domestic safety nets to combat banking panics. A lesson from chapter 3 is that government guarantees are a hidden form of tax expenditures, since the market understands the safety net as a government-enforced obligation for taxpayers to rescue large and politically powerful institutions. This means that domestic safety nets are programs of redistributive fiscal policy that subsidize risk-taking by these institutions. Thinking of taxpayers as *de facto* equity investors in these banks in times of trouble, policy-makers should control the safety net in a way that moral hazard incentives are minimized. In other words, to safeguard the taxpayers' interests, welfare-enhancing reforms require that policy-makers as safety net managers neutralize the inherent implicit subsidy to the extent possible. For this reason, the safety net model in chapter 3 suggests that banks ought to pay a fair premium for the provision of the safety net. A Pigouvian premium should force banks to internalize the externalities shifted to the society and thus is contingent on a bank's deposit-to-asset ratio.

In fact, a growing number of instruments have been implemented in recent decades to address the moral hazard incentives by banks induced by the safety net. The foundations for today's regulatory framework were laid with the Basel Accord of 1988 which became the first international prudential regulatory agreement. The brief - scarcely

30 pages - Accord specified a minimum capital requirement standard of 8 percent of risk-weighted assets with very broad risk categories. However, the target bank capital ratio had no scientific basis whatsoever (Goodhart 2011), but merely reflected the status quo at that time, given that eight percent had been the prevailing capital ratio among US banks. With Basel I being perceived as lacking risk sensitivity, the revision in Basel II allowed banks to soften the strict capital ratios by using internal risk models to calculate regulatory capital against market risk. In doing so, the Basel II regime - now 347 pages - became increasingly sophisticated, setting the ground for a process of regulatory arbitrage to circumvent holdings of costly capital. In the light of the financial crisis, again there were large revisions to the detailed calibration of the Basel framework in 2010 - now numbering 616 pages. Despite the growing complexity of regulatory intervention, it emerges that neither the bank's capital-to-asset ratio nor the size and systemic power of financial institutions have significantly changed in the years since the Accords were adopted. Instead, it is argued that the risk-based Basel framework offers a catalogue of loopholes, is manipulable, distortive and creates opacity, which has benefited the major financial institutions (see Claessens et al. 2008; Sinn 2014, p. 78; Admati and Hellwig 2013). There is thus a broad consensus that structural reforms are needed.

This phenomenon is hard to understand from a welfare-maximizing perspective. The modest reforms in banking regulation seem to conflict with the theory of democratic control since electoral competition between politicians who care about winning the next election should force them to unburden society from the cost of the safety net - especially in crisis times when implicit insurance becomes explicit debt. Accordingly, the question arises: Why do politicians who are subject to electoral discipline refuse to internalize the interests of the broad electorate?

Public choice theory might give an answer to this paradox, arguing that politics is more than simple vote counting. To understand the determinants of political decisions, several explanations have been suggested for the phenomenon of persisting subsidies for one specific industry sector.

The most prominent one is the pressure group idea, which originated from the economic theory of regulation by Stigler (1971), who shows how the political process favors organized groups or industries over unorganized ones. Members of an interest group decide on resources devoted to lobbying to maximize their rent net of lobbying expenditures and the politician supplies regulation to maximize his votes. At the margin, the votes gained through lobbying are balanced by those lost from supplying regulation. The root insight of Stigler's approach is that, due to their higher stakes, industry-specific beneficiaries are more likely to get politically organized. They can

influence the policy outcomes whereas the interests of the unorganized general public are neglected (Schattschneider 1935; Tullock 1959; Olson 1965). Whenever regulation favors narrowly defined special interests, the incentives to capture the design of such policies are much stronger for the beneficiaries than for the majority bearing the diffused cost. Accordingly, banks have more homogenous economic interests than other groups and thus find it easier to get organized.

Peltzman (1976) formalizes the Stigler model and analyzes the determinants of supply of regulation. He argues that the size of the benefits to organized interest groups is limited by the fact that the government is also concerned about the interests of the rest of the population. Complementary, Hillman (1989) develops the political support approach where the objective function of the politician includes preferential treatment of an organized industry as well as the cost of subsidies given by the excess burden to society.⁵² Becker (1983) defines this excess burden - or in his words the "deadweight loss" - as the difference between the industry-specific gain and the loser's cost from changes in output induced by regulation. If the deadweight loss grows, the losers are losing more for each unit of the winning industry. When this spread increases, losers are more incentivized to fight against each unit of the winner's gain. In other words, with increasing excess burden the industry faces greater opposition to its protective regulation and on the margin rent seeking for subsidies is less likely to be successful. Thus, rational politicians balance the private benefits to the industry with the social costs.

Turning now to the arena of banking regulation and the estimated deadweight loss generated by the safety net, the above considerations suggest that there is a natural limit to the gains that the banking lobby can extract. At some point, industry-specific rent creation comes to an end. However, given the evidence on the rising excess burden of the society documented in chapter 3, traditional pressure group models cannot rationalize the unbroken upward trend of subsidies for a handful of financial conglomerates. Thus, in the light of the recent financial crisis the main puzzle remains unanswered: what mechanism can explain the persisting avoidance of stricter regulation of the financial industry? Why do not citizens punish policy-makers who implement friendly policies for one specific industry sector? What makes banking special in the political arena and explains the protection of the hegemony of the banking industry in the policy process from majoritarian attack?

⁵²The "policy for sale" approach introduced by Grossman and Helpman (1994) provide a microfounded multisectoral model of organized lobbies that make contributions to get trade policies in their favor against the unorganized population.

4.1.1 The argument: Interest group coalitions

This chapter highlights an aspect that has often been overlooked in the economic literature, namely banks' capacity to amplify their influence over the regulatory policy-making process by forming strategic coalitions with other organizations outside the banking sector. A coalition is defined as a purposive group of organizations united behind a common set of regulatory goals. The rationale for coalition formation is to offer a block of organized votes or sizeable contributions (becoming politically more effective) and to allow the banking industry to open new channels of access to policy-makers to increase the credibility of their claims.

Banking is ideally suited for coalition-building, owing to the uniqueness of the banking industry, which is linked to the rest of the economy. As a consequence, regulation of banks concerns the allocation of a resource with a high impact on growth and rent accumulation, namely credit. The distributional repercussion of finance to the real economy implies that regulatory decisions often have significant spillovers to other social groups, such as private end-users of financial services or industries that depend on access to credit. A complex web of relations linking the banking community with a large plurality of interests represents a unique feature that distinguishes the politics of financial regulation from any other sector that is subject to industry group pressure.

Therefore, there are many reasons to expect coalitional dynamics of the banking industry to shape regulatory outcomes. First, coalitions provide a low-cost way to intensify their lobbying efforts by sharing advocacy resources, both financial resources directed towards lobbying contributions as well as non-tangible resources. While banking groups have an advantage in their use of technical expertise, they might be dis-advantaged in terms of mass-membership that business associations and activist groups can mobilize (Pagliari and Young 2014). The ability to form a coalition with groups that have complementary skills not only increases the legitimacy of a claim sponsored by the banking lobby (demonstrating diversity of support for their position), but also raises attention of re-election minded politicians.

The policy-making process of banking regulation highlights the central importance of interest group coalitions. In fact, policy-makers explicitly strengthen group formation by organizing roundtables or public consultations. Responses to such consultations provide valuable feedback on private sector sentiment about the possible impact of policies over different groups. Indeed, politicians thereby help interest groups to solve the free-rider problem through a form that actively involves the interest group in the design of the policy process.⁵³

⁵³Kroszner and Stratmann (1998) portray policy-makers as self-interested and argue that legislators

Interestingly, Pagliari and Young (2014) show that respondents to banking consultations are more dominated by business coalitions than other sectors. When the financial sector is regulated, there is a significantly higher probability of sectoral "co-habitants" and "outsiders" responding than it is the case when a "non-financial group" is targeted. In the case of Basel II, the authors report that half of the groups who were mobilized were not banks at all, but rather groups concerned about downstream costs of the regulation. Only approximately 51 percent respondents were banks, whereas 30 percent were related financial industries that were not directly affected and 13 percent were outsiders.⁵⁴

The mobilization of a plurality of interest groups within and outside the regulated banking sector is thus a key force in affecting the policy outcome in banking regulation. Accordingly, this chapter analyzes how a subgroup of citizens with shared economic interest evolves when the policy-maker intervenes in a bank's decision concerning the optimal allocation of credits by subsidizing specific forms of investment.

Indeed, much of the recent lobbying effort in the banking arena is carried out to reduce the scope of regulation ("corrosive capture"), whereby a coalition of the banking industry and certain business companies successfully lobbied for exemptions from capital regulation on specific banks investments to ensure access to cheap credit to certain industry sectors. Interest group coalitions are formed to lobby collectively for concessions of banking rules. The capital requirement regulation for mortgage-backed securities, hedge funds or small and medium-sized enterprises (SMEs) are prominent and successful examples for the "policy for sale" phenomenon. In general, the Basel regime tends to favor loans to banks rather than loans to firms. The risk weighting for loans to EU banks is 0.2, while it mostly amounted to around 0.5 for well-managed firms in the real economy, but is scaled according to creditworthiness. Once established, the influence of the lobby coalitions, such as the IIF, tends to persist over time, since representatives of

may have a systematic incentive to create a system of specialized, standing committees to formulate policy, which facilitate repeated interactions and long-term relationships between lobby groups and the members of a committee. According to the authors, this is simply a strategy to maximize contributions by lobby groups.

⁵⁴The same pattern is true in the case of Basel III. During the consultation process of Basel III the "Global Pension Coalition", representing a significant portion of the largest benefit and defined contribution pension plans in the US, Canada and Europe and providing retirement benefits for over a hundred million individuals in more than a dozen countries, wrote a comment letter to the Basel Committee arguing that pension plans present virtually no risk to their counterparties to the financial system and should not be subject to uncleared margin requirements in the Basel framework (<http://www.bis.org/publ/bcbs226/globalpensionco.pdf>). Similar claims aiming at exemptions from initial margin requirements (for non-centrally-cleared derivatives) or bank securitization facilities were made by Shell International Trading and Shipping Company (<https://www.bis.org/publ/bcbs242/shell.pdf>) and a huge number of finance companies of the major automobile, truck, motorcycle, agricultural, construction and commercial equipment manufacturers and other major independent vehicle leasing and finance companies (<http://www.bis.org/publ/bcbs236/viwig.pdf>).

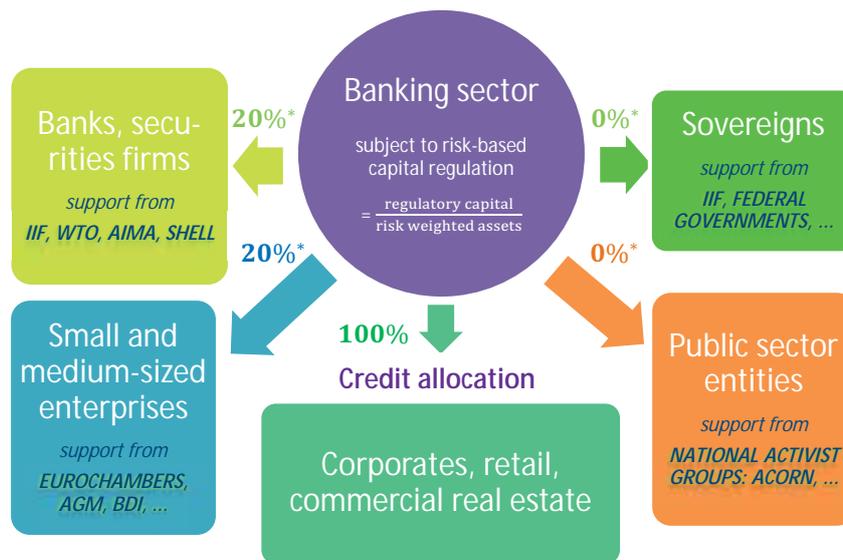


Figure 4.1: Regulatory discrimination via risk weights in the Basel framework

Note: * = the numbers represent the most favorable risk weight for each asset class. For example, the risk weights for sovereigns depend on their credit assessment; however within the euro zone a zero risk weight for all member states is imposed; similarly, lending to banks incorporated in a given country can be assigned a risk weight one category less favorable than that assigned to claims on the sovereign (= 20 %).

each lobby group have the systematic incentive to incorporate special arrangements for their clientel on a regular basis to maintain their own privileged positions. Moreover, the cases in Box 4.1 suggest that politicians carry out redistribution indirectly through the use of banking rules.

Figure 4.1 illustrates the resulting politicization of the credit allocation with favorable regulatory treatment for certain asset classes. The policy framework implicitly rewards banks for making credit available to selected classes of borrowers. The following model focuses on one specific asset class where there has been consensus for such a politically-directed subsidy, disregarding the socially costly expansion of the banking safety net that transfers rents to special interests. The basic pattern of banks' coalition building will be conceptualized with the example of zero risk weights for capital requirement regulation for a bank's investment in sovereign bonds, a situation often termed as "financial repression".

The regulatory framework of financial repression comprises all types of financial policies, taxes, qualitative and quantitative restrictions that determine price, quantity and entry conditions in financial markets and affect the allocation of capital. Specifically, the term "financial repression" refers to a situation when the regulator imposes a set of economic policies on the financial system that represses private credits and privileges access to

Box 4.1 Subsidized lending for populist goals

The following cases illustrate how coalitions with interest groups improve the strength of the banking lobby to deregulate specific asset choices.

The prime example is the treatment of government sponsored enterprises (GSEs), primarily Fannie Mae and Freddie Mac in the US, which securitize residential mortgages by providing a guarantee against the credit risk to banks that buy the mortgage-backed securities. With several rules, starting with the Federal Housing Enterprises Financial Safety and Soundness Act of 1992, the capital requirements for GSEs and US banks for holding the GSE-issued mortgage-backed securities are relaxed to a relatively modest level. This was possible due to a coalition of banks with activist groups that promote the expansion of risky mortgage lending to low-income and urban borrowers (Calomiris and Haber 2014, p. 226-55), such as ACORN (or the Association of Community Organizations for Reform Now). Once this powerful coalition was created, Fannie and Freddie dominated the mortgage market and assist their allies with political campaign donations and grants for academic research that support their business model. For politicians, the funding subsidies provide re-election relevant values. Rajan (2011) argues that the jobless recoveries following the recessions in the early-1990s and 2000s have paved the way of expansionary housing policies by the US government, especially through the GSEs. Improving home ownership and home prices is strategically important to achieve redistributive objectives, because homes are by far the largest component of personal wealth for most US households. About two-thirds of the net wealth owned by the lowest 95 percent of the distribution of wealth owners is equity in homes (Kennickell 2006: table 11 a; see also Mian et al. 2013 for implications). Boosting lending against housing as a method of redistribution is also popular in other countries; for instance the treatment of the *Cajas* in Spain, the equivalent of savings and thrift institutions has played a central role in Spanish housing boom. If we turn to Europe, the *de facto* absence of the regulation of hedge funds can be explained by the lobby power of a coalition of banks and

the hedge fund industry with their many clients. On the London Summit in 2009 the G20 leaders agreed on direct regulatory requirements for hedge funds. However, in the following, banks and other groups that were not directly affected became organized, e.g. through national associations of pension funds (as well as the European Federation for Retirement Provision) or charitable foundations (like the Church of England). They highlight the downstream cost that regulation would pose to pension funds or charitable missions, pointing out that "it is Europe's pensioners of both today and tomorrow who will suffer" (AIMA 2009). Owing to the campaigns, several amendments in the European Directive were introduced that had relaxed the requirements.

The most recent example for successful lobbyism by a bilateral coalition is the capital regulation for SMEs. Soon after the release of the draft of the implementation of the Basel III accord into European law (the so-called CRR-CRD IV rules), the German banking community and particularly the peak association composed of the five national banking associations (or Zentraler Kreditausschuss) began an active campaign, raising concerns to the system of risk sensitivity and arguing that lending to the SMEs is less vulnerable to systemic risk to achieve exemptions. However, their demands were not heeded by regulators unless the German business community became actively mobilized. The business enterprises coalesced into a variety of associations such as the AGM (or Arbeitsgemeinschaft Mittelstand, a joint association with large banking groups), the BDI (or Bundesverband der Deutschen Industrie) and the DIHK (or Deutscher Industrie und Handelskammertag). These groups used their well-developed network to communicate the fear that the new rules will hamper the flow of credits to SMEs which is a critical factor for growth. Due to the widespread politicization, the European Commission was effectively compelled to adopt in June 2013 a SME package (CRR: Article 501), which allowed banks to set aside less regulatory capital against loans to SMEs compared with loans to large enterprises.

finance to the state. With zero capital requirements and unlimited exposures, the current and incoming regulatory framework in the euro zone systematically implies various forms of such a preferential treatment of sovereign exposures.

This chapter proposes a political-economy motive for such a policy. The theoretical framework sheds light on the process of how the politician creates rents to a subgroup of citizens by using banking rules - within and outside the banking industry. Beneficiaries form a coalition and influence the outcome of elections through contributions. So far, there exists no formal public choice model that addresses the central role of financial regulation for the market outcome and its distribution in the economy. Essential for the chapter's argument is the question, of who are the key players involved in the development of banking rules and what are the preferences of these actors.

Most importantly, the model shows that changing a bank's asset-specific refinancing costs via discriminating banking rules will change the optimal investment policy of a bank and translates into less lending to other asset classes, and notably the private sector relative to sovereign bonds. In the case of financial repression, the crowding out of private credits to corporates results from the privileged access to sovereign debt. Credit frictions show up as an investment wedge. It follows that redistributive effects arise through the distorted allocation of credits. Similar to the elite model of chapter 2, access to finance proves to be a critical mechanism through which some agents gain rents at the expense of others.

The conflict of interests is as follows. First, preferential regulatory treatment of government bonds improves the profitability of banks that benefit from lower capital requirements. Second, the public sector has a systematic interest to attract funds. By the creation of an artificial demand for sovereign debt, this enlarges the government's budget or fiscal power and offers the possibility of transfers from the state to favored private parties.⁵⁵ Third, established industry interests are willing to support such a policy to undermine newcomers. Intuitively, incumbent firms prefer credit market frictions in their sector, since limited access to finance acts as a barrier to entry for competitors. Financial repression is simply a way of insuring them from competition. In contrast, consumers support lower credit frictions and hence oppose measures of financial repression. Furthermore, the created regulatory burden on private lending distorts expected asset returns and yields an intersectoral misallocation of funds. The volume of issued credit and the output in the economy falls. Given the key role of finance for growth, the regulatory privilege for state financing may subsequently create underdevelopment traps (Roubini and Sala-i Martin 1992).

⁵⁵Despite the bureaucracy being an important player in the political process, the proposed probabilistic model of electoral competition will abstract from a self-interested public sector for the sake of simplicity. The model results are reinforced if we allow for revenue maximizing bureaucrats.

In this context, a reelection-minded politician will support preferential regulatory treatment of government debt, if the political power of the coalition of supporters is sufficiently high. He uses techniques of financial repression as a policy instrument to retain power by creating regulatory rents for a subgroup of citizens who form a political coalition.

The remainder of this chapter is structured as follows. Following the discussion of related literature, section 4.2 introduces the basic model where a change in banking regulation affects the rents of private agents. As in chapter 2 a simple model of credit rationing à la Holmstrom and Tirole (1997) is used as the basic building block for the link between the financial sector and the market structure in the industry sector. As a consequence, changing banking regulation affects the rents of non-financial firms. With lobby contributions we introduce an important aspect of politics into our model of electoral competition in order to demonstrate how a coalition of supporters can protect their rents through the preferential regulatory treatment of government bonds, although this is related to allocation inefficiency. Section 4.3 solves the political choice over regulating a bank's investment policy and section 4.4 discusses the findings and illustrates some evidence supporting the predictions of the model. The main point of this chapter is that redistributive aspects of regulating financial institutions give rise for lobbying and can cause political distortions where financial repression is just one example.

4.1.2 Related literature

The phenomenon of financial repression is not new in the literature; indeed it dates back to Shaw (1973) and McKinnon (1973), who argue that governments in emerging markets employ measures to channel funds to themselves. Among domestic holders, financial institutions are the most important investors in government securities. In 2012, domestic banks held 26.5 per cent of government securities in the euro area (Andritzky 2012). While financial repression was achieved with explicit restrictions on the transfer of assets abroad through the imposition of capital controls or through direct or indirect controls over interest rates (*e.g.* Regulation Q) in previous centuries, implying a burden on specific banking activities, one can nowadays observe more sophisticated techniques of financial repression in the form of exemptions from strict regulation and quasi-subsidies that create a captive domestic market for government debt. Following Tirole (2012) banking regulators have traditionally been "generous" with the regulatory assessment of sovereign risk compared to investments in any other assets, although steering taxes on specific bank activities have transformed into selective subsidies.

In the light of the ongoing financial crisis, most recently Reinhart and Sbrancia (2011) provide evidence on how governments use regulatory tools to issue debt at lower interest rates. Accordingly, one popular way of creating financial repression today is through a regulatory discrimination concerning the investment policy of banks in favor of sovereign bonds. Such a regulatory privilege can be observed in the Basel Accords, *e.g.* by allocating a zero risk weight to AAA - AA- rated governments, while loans assets require a significant higher risk weight.⁵⁶ Moreover, the transposition of the Basel standards into EU banking law gives national regulators the discretion to apply zero risk weight to banks' exposure to EU central government bonds denominated and funded in domestic currency. This implies that capital adequacy rules are misaligned with market-based sovereign credit risk with the potential to encourage banks to hold relatively more sovereign debt. In the light of the European sovereign debt crisis, such a regulation had severe implications on a bank's portfolio choice in the PIIGS countries.

Gros (2013) shows that banks today hold oversized amounts of government debt, which perpetuates negative feedback loops between banks and their domestic sovereigns.⁵⁷ During the recent crisis the share of euro area sovereign bonds in total bank assets in the eurozone increased on average by one-third between 2009–2013 - from 4 percent to 5.3.⁵⁸ Figure 4.2 plots the level in logs of the public debt positions of domestic and foreign banks in the PIIGS countries (Brutti and Sauré 2013). It is evident that, when sovereign risk sets in, there is a trend of domestic levels to increase and of foreign levels to decrease in domestic bank's portfolio. Concerns about the fragility of the banking sector replaced those about the creditworthiness of states.

The model of this chapter rationalizes these empirical facts from a public choice perspective.

First, a regulatory induced overinvestment in sovereign bonds can be politically sustainable, if the electorate ignores parts of the induced distortions due to myopic behavior or due to externalities that can be shifted to other parties. Second, the artificial estab-

⁵⁶In fact, the Capital Requirement Directive of the European Union softened this rule by saying "Exposures to Member States' central governments and central banks denominated and funded in the domestic currency of that central government and central bank shall be assigned a risk weight of zero" (Directive 2006/48/EC), Annex VI, Part 1(4). According to these regulations (*e.g.* German solvency regulation of 14 December 2006) banks are allowed to give sovereign bonds from the euro area a risk weight of zero for an unlimited duration of time by way of derogation from the Basel Agreement and as an exception to the IRB approach (see. § 26 No. 2 b in relation to § 70 Nr. 1 c SolvV and/or § 80 No. 1 in relation to § 89 No. 1 d of Directive 2006/48/ECG; see also Sinn 2010, chapter 7).

⁵⁷Moreover, he argues that unlike to any other borrower there is no limit on the concentration of sovereign debt. The result of this lack of exposure limits has been that banks in the periphery have too much exposure to their own government on their balance sheets, which has greatly contributed to the deadly feedback loop between sovereigns and banks.

⁵⁸Financial Times, 2013, Jens Weidmann: "Stop encouraging banks to buy government debt".

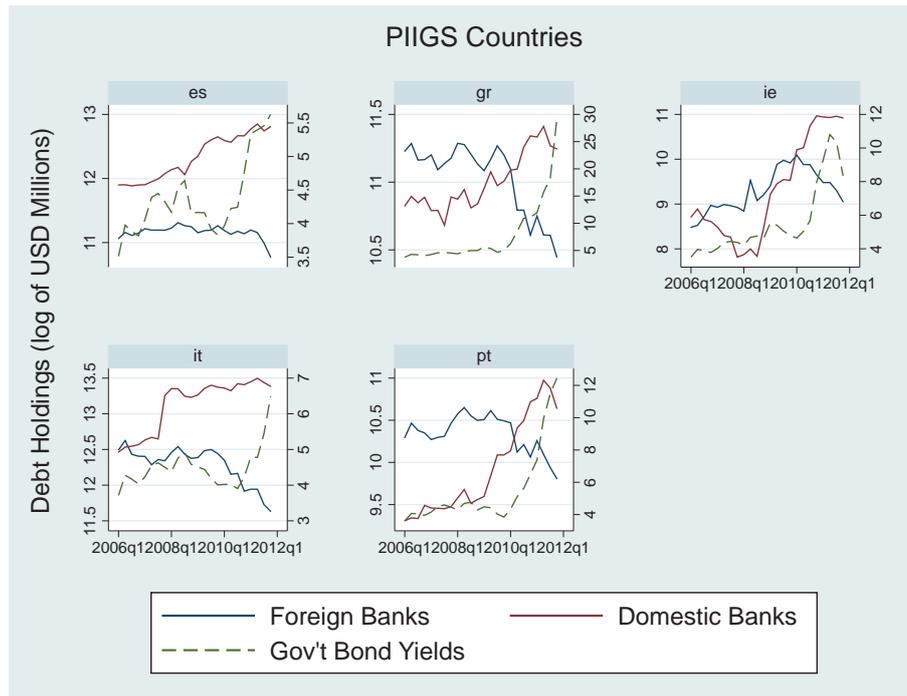


Figure 4.2: Public debt holdings by PIIGS countries (2006 - 2012)

Source: Brutti and Sauré (2013).

ishment of financing constraints in the private sector can create rents for a subgroup of citizens. The underlying idea is a crowding-out mechanism, since financial barriers hinder entrepreneurs overcoming obstacles to entry.⁵⁹ This competitive effect renders finance an important tool in the struggle for real market shares.

It is crucial for this mechanism that access to finance supports the expansion of new firms. In fact, there is clear empirical evidence for this argument: Haber (1997) argues that liberalization of finance in Brazil resulted in a growing textile industry with less concentration compared to the Mexican textile industry. In line with this Aghion et al. (2007) find that access to finance matters most for the entry of small firms and in sectors that are more dependent upon external finance, whereas access to finance has no effect on entry by large firms. Drawing from harmonized firm-level data for 16 industrialized and emerging countries more finance permits small firms to take advantage of growth opportunities, especially in growing sectors where large firms would be predominant otherwise. Using responses to the World Bank Group's World Business Environment Survey (WBES), Bennedsen et al. (2011) highlight the importance of the political

⁵⁹Lloyd-Ellis and Bernhardt (2000) and Evans and Jovanovic (1989) show in a general equilibrium model that credit constraints induce lower entry of potentially good entrepreneurs. Moreover, Clementi and Hopenhayn (2006) and Cabral and Mata (2003) demonstrate that credit constraints arise from asymmetric information between firms and banks or limited enforcement and have strong impact on entry.

channel. They show that firms that are larger and older perceive themselves being more influential on government decisions whereas smaller firms tend to perceive their environment to be more corrupt. The cross-country dataset on bank regulation and supervision in over 150 countries by Barth et al. (2006), p. 310, supports the view that bank regulators often end up serving the private interests. In their words, the statistical analysis "raises a cautionary flag regarding reliance on regulation that restrict bank activities and impede the entry of new domestic and foreign banks".

The main contribution of this chapter to the literature is to provide a microeconomic framework for analyzing the consequences of banking rules on the market outcome and the rents of agents. By formalizing the spillover effect of financial regulation on the real economy, to our knowledge the model is the first that highlights the central role of banking as an instrument for creating rents within a society and thereby electoral support for politicians.

At the heart of the chapter is the finding that financial regulation mirrors redistributive conflicts within the society, where measures of financial repression are just one example. Similar to the outcome in Chapter 2, access to finance is used to protect rents and entrench a dominant position. The economic and the political elite can form an alliance with the goal of creating credit frictions via distortive financial regulation. Thereby this chapter offers a model how the policy of coalition building works.

4.2 The economic model: Financial repression and economic rents

4.2.1 Structure of the model

The argument is developed in a similar model setup as in chapter 2. We consider two periods $t = 1, 2$ and an economy with a continuum of risk-neutral citizens identified with the interval $[0, 1]$.

All citizens are born with some initial wealth w^i which is uniformly distributed in the interval $(0, \bar{w})$ and consume over two periods. Thus, they face an intertemporal savings decision and can invest money in a bank in the first period instead of consuming.

All citizens have the human capital to become an entrepreneur and open a firm. To do this, they need a fixed amount of investment I . Therefore, if $w^i < I$ citizens need external finance that is supplied by a bank. However, asymmetric information between the entrepreneur and the bank forces the bank to ask for collateral. Consequently and in line with chapter 2, firm entry is constrained by the citizen's net wealth.

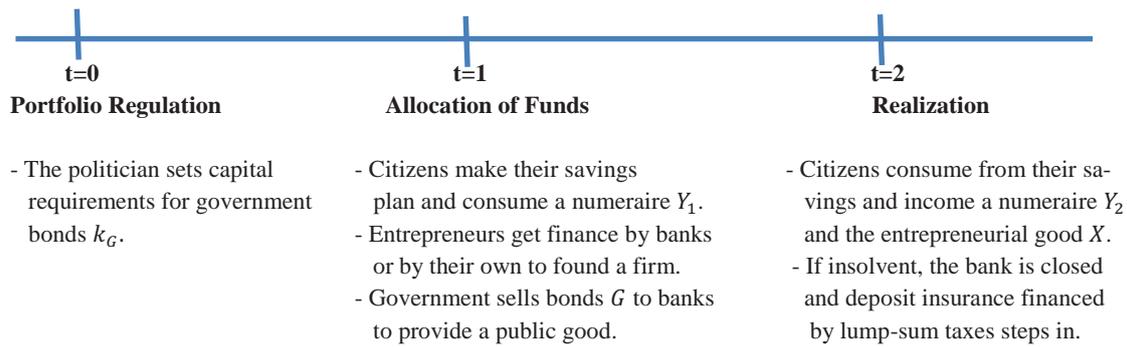


Figure 4.3: The timeline of events

Economic activity encompasses a final good sector that produces the unique entrepreneurial good in $t = 2$, a numeraire good sector producing in both periods, a public sector that provides a public good in $t = 2$, and a banking sector that channels funds from savers to entrepreneurs and to the public sector.

Banks are funded through savings by citizens, which takes the form of (insured) deposits, and by equity provided by bank owners. For simplicity, we have two asset classes in which a bank can invest: government bonds G and loans to the private sector L . As both investments carry risk, capital regulation is necessary to correct for the disincentives caused by deposit insurance.

The sequence of events is illustrated in Figure 4.3.

At the initial date $t = 0$, the policy-maker regulates the banking sector by implementing capital requirement ratios k_G for each unit of investment in government bonds. Since we are interested in the effects of changes in the capital requirement regulation of sovereign bonds, the requirements of loans are assumed to be exogenous.

At $t = 1$, citizens make their consumption and savings decision. Furthermore, citizens are able to set up a firm if they are endowed with sufficient wealth or if they get funding from a bank. For given savings (= bank deposits) by citizens, banks realize their investment plan whereby they can engage in government bonds or loans to entrepreneurs.

At $t = 2$, the entrepreneurial good is sold to citizens. Lump-sum taxes are levied to repay government bonds and, in case of bank default, compensate for the costs of deposit insurance. The residual income is subsequently spent on a numeraire good.

In the next section we derive the allocation of the initial wealth to the entrepreneurial good X , the numeraire good Y_t in both periods t , and the public good financed by sovereign bonds G . We subsequently analyze the effect of capital requirements for sovereign bonds k_G on this allocation.

4.2.2 Allocation of funds

Consumption and savings decision

To derive the allocation of funds, we proceed in three steps: first, we analyze the consumption and savings decision of all citizens for a given rate of return on their savings r_D ; second, we analyze the production of the entrepreneurial good X ; and third, we examine the provision of the public good financed by sovereign bonds G .

All citizens choose their consumption plan over both periods by maximizing their utility subject to their individual budget constraint.

In the first period, citizens can use their initial wealth w^i to consume a numeraire Y_1 , save money S^i or invest in their own firm I^i . In the second period, entrepreneurship emerges endogenously and entrepreneurs and non-entrepreneurs (= called workers) allocate their earnings Π^i (Π^E as an entrepreneur or Π^W otherwise) and their savings S^i net of lump-sum taxes T between another numeraire Y_2 and the entrepreneurial good X .

We simplify the analysis by using the same utility function as in the model used in chapter 2, whereby we obtain similar qualitative results for any quasi-linear utility function in the numeraire:

$$\begin{aligned}
 U^i = & \underbrace{a \cdot Y_1^i - \frac{1}{2}(Y_1^i)^2 + Y_2^i}_{\text{numeraire}} + \underbrace{a \cdot X - \frac{1}{2}(X)^2}_{\text{entrepreneurial good}} + \underbrace{V(G)}_{\text{public good}} & (4.1) \\
 \text{s.t. } & w^i = Y_1^i + S^i + I^i \quad \text{in } t = 1 \\
 & \Pi^i + r_D \cdot S^i = Y_2^i + p \cdot X + T \quad \text{in } t = 2 .
 \end{aligned}$$

The first bracket describes the utility derived from the consumption of the numeraire in the first and second period, where $a > 0$ is a constant; the second bracket measures the utility derived from consumption of X produced by entrepreneurs, and the third term measures the indirect utility from public good provision.

Rearranging the first budget constraint in $t = 1$ for the savings S^i , inserting the term into the budget constraint $t = 2$ and using the resulting Y_2 in (4.1), gives us the objective function of a citizen:

$$\max_{Y_1^i, X^i} U^i = aY_1^i - \frac{(Y_1^i)^2}{2} + aX - \frac{X^2}{2} + \Pi^i + r_D(w^i - Y_1^i - I^i) - pX - T + V(G).$$

We can derive the optimal consumption plan for all citizens conditional on their wealth w^i by determining the first order conditions.

We start with the consumption of Y_1^i : $\frac{\partial U^i}{\partial Y_1^i} = a - Y_1^i - r_D = 0$.

This implies:

$$Y_1^i = \begin{cases} a - r_D & \text{if } w^i > I^i + a - r_D \\ w^i - I^i & \text{if } w^i < I^i + a - r_D \end{cases} \quad (4.2)$$

We obtain that citizens consume an amount of $a - r_D$ of the numeraire good today, if they have sufficient wealth (net of their investment into their own firm I^i), otherwise they consume as much as possible subject to their individual budget.

From the first budget constraint we know that citizens will save the residuum of their wealth, i.e. $S^i = w^i - Y_1^i - I^i$. Hence, only citizens with sufficient wealth ($w^i > I^i + a - r_D$) are able to save part of their income for consumption in $t = 2$. Individual savings (and therefore the amount of savers within the population) are a positive function of the deposit rate r_D offered by banks.

$$S^i = \begin{cases} w^i - (a - r_D) - I^i & \text{if } w^i > I^i + a - r_D \\ 0 & \text{if } w^i < I^i + a - r_D. \end{cases} \quad (4.3)$$

If we take the first order condition with respect to the entrepreneurial good produced in $t = 2$ we get:

$$\frac{\partial U^i}{\partial X} = a - X^i - p = 0 \quad \leftrightarrow \quad X^i = a - p = X \quad (4.4)$$

This indicates that all citizens consume the same amount of the entrepreneurial good X in the second period, irrespective of their wealth. To simplify the analysis, we assume that the group-specific income in the second period net of taxes is sufficiently high.⁶⁰

Before clearing the market, we need to consider the aggregate supply of the consumption good. Suppose an industry in which each of n entrepreneurs produces one unit of the homogenous good X so that aggregate supply is equal to n . With the derived optimal demand $X = a - p$ we can solve for the price in market equilibrium:

$$\underbrace{n}_{\text{supply}} = \underbrace{a - p}_{\text{demand}} \quad \Rightarrow \quad p = a - n. \quad (4.5)$$

⁶⁰Inserting (4.2), (4.3) and (4.4) in (4.1), we can derive the indirect utility function for a citizen. Intuitively, utility is a positive function of individual wealth w^i and a negative function of the price of the entrepreneurial good p that is given by

$$V^i = \begin{cases} (w^i - I^i)(a - \frac{w^i - I^i}{2}) + \frac{(a-p)^2}{2} + \Pi^i - T & \text{if } w^i - I^i \leq a - r_D \\ \frac{(a - r_D)^2}{2} + \frac{(a-p)^2}{2} + \Pi^i + r_D(w^i - I^i) - T & \text{if } w^i - I^i > a - r_D. \end{cases}$$

In other words, the equilibrium price is a decreasing function of the number of firms n , hence, of the output of the consumption good X .

How many entrepreneurs n will now succeed in entering the product market in $t = 1$?

Entrepreneurship

To open a firm and produce one unit of X , citizens have to pay fixed entry costs of I . The investment can be made by self financing I^i and bank financing $1 - I^i$. This implies that all citizens with $w^i > 1$ can easily become an entrepreneur by investing their personal wealth into the firm $I^i = 1$, whereas entrepreneurs with $w^i < 1$ need to raise additional external funds of $1 - I^i$.

For simplicity, we assume that all citizens produce a homogenous good with capital I as the only input. The investment generates a verifiable return only with a specific success probability depending on an unobservable action taken by the entrepreneur. The action represents the entrepreneur's choice of technology usage. The intended purpose is to produce with an efficient technology, which gives a probability of success of 1. However, the entrepreneur also has the option to produce with an gambling technology, which gives a lower probability of success $\theta < 1$, but provides the entrepreneur with a private benefit B . We assume that only production with the efficient technology is economically viable. This asymmetric information structure captures the idea that the bank financial might be unwilling to finance the production of all entrepreneurs.

We are now interested in the conditions under which the investment of the entrepreneur with $w < 1$ can nevertheless go ahead and get $(1 - I^i)$ external funds. Following Holmstrom and Tirole (1997), let the bank be endowed with a monitoring technology so that she can reduce the private benefit of the entrepreneur to $b < B$ for monitoring costs c . Subsequently, for both parties to agree to the financial contract with a specified interest rate r_L , three conditions have to be fulfilled.

First, the entrepreneur must be induced to select the efficient technology (incentive constraint), that is:

$$\underbrace{p - r_L \cdot (1 - I^i)}_{\text{efficient technology}} \geq \underbrace{b + \theta[p - r_L \cdot (1 - I^i)]}_{\text{moral hazard}} \quad (IC), \quad (4.6)$$

where p denotes the price of the consumption good, r_L the loan interest rate charged by the bank and $1 - I^i$ the external funds invested in the firm. The left-hand side (LHS) captures the entrepreneurial rent Π^E in case of the efficient technology, while the right-hand side (RHS) indicates the return from taking external funds to receive private benefits b by selecting the gambling one with the low probability of success

$\theta < 1$ (moral hazard). Rearranging terms, we can solve for the maximum interest rate \tilde{r}_L that the bank can extract from an entrepreneur, endowed with wealth w^i , which is still incentive-compatible to choose the efficient technology:

$$\tilde{r}_L \leq \frac{p - \frac{b}{1-\theta}}{1 - I^i}. \quad (4.7)$$

We see that the critical interest rate \tilde{r}_L decreases with the amount of external funds needed by the entrepreneurs $1 - I^i$. Intuitively, with less wealth, the entrepreneur can lose less of his own money so that the bank responds by decreasing the interest rate to prevent moral hazard behavior of entrepreneurs. Furthermore, for a given level of wealth, the incentive-compatible interest rate increases in the profitability of consumption good production and decreases in the private benefit b . This reflects the fact that the entrepreneur's incentive problem is less severe when the efficient choice becomes more attractive relative to the gambling choice.

Second, the entrepreneur must be willing to become an entrepreneur (participation constraint). The minimum return of an entrepreneur to invest his own initial wealth into his firm must be equal to the returns of savings (at a bank), the indirect utility from consumption in the first period $U(Y_1^i)$ and the opportunity costs of being a worker with Π^W :

$$\underbrace{p - r_L \cdot (1 - I^i)}_{\Pi^E} \geq r_D \cdot S^i + U(Y_1^i) + \Pi^W \quad (PC). \quad (4.8)$$

We make two simplifying assumptions: first, we assume that the participation condition holds in the relevant range of r_L so that citizens are always willing to become an entrepreneur; and second, we assume that entrepreneurs with $w^i < 1$ always invest all their wealth into the own firm such that $I^i = w^i$.⁶¹

Third, we analyze the bank's allocation decision, that is how many loans are offered to entrepreneurs. For the sake of simplicity, in this section we will assume that banks compete in perfect competition such that they will make zero profits and cannot change the deposit rate with their lending decision. The equilibrium loan rate is then given by:

$$r_L = r_D + c$$

It is straightforward that the optimal loan interest rate (LHS) will be equal to the marginal cost of supplying another loan (RHS). Hence, they will charge a competitive interest rate. Inserting the incentive constraint (4.7), rearranging terms and using

⁶¹This can be justified by either the self-interest of the entrepreneur to avoid expensive funds by the bank or the fact that the bank might require the entrepreneur to maximize his collateral.

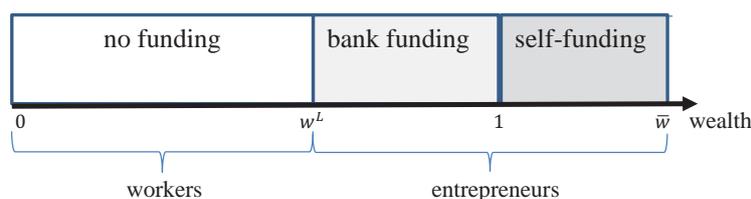


Figure 4.4: The funding structure for citizens

$I^i = w^i$, we can solve for the lower limit of initial wealth of an entrepreneur that induces him to behave efficiently:

$$w^i \geq w^L = 1 - \frac{p - \frac{b}{1-\theta}}{r_D + c}. \quad (4.9)$$

This is a central equation in our model, because it gives us the necessary and sufficient amount of wealth for citizens to raise funds from the bank and hence become an entrepreneur. Citizens with $w^i \geq w^L$ have access to a bank loan. Thus, this equation can be interpreted as an entry barrier for getting bank finance and hence for entrepreneurship. By contrast, citizens with $w^i > 1$ open a firm with their own money, while citizens with less wealth, $w^i < w^L$ become workers. Figure 4.4 illustrates the three types of citizens that evolve at this stage.

It is useful to point out that the banker's willingness to lend a loan changes with her marginal cost. Accordingly, the created entry barrier has two key determinants: first, she is an increasing function of the deposit rate r_D ; and second, the entry barrier increases with the monitoring cost c (see Appendix 4A).⁶²

We can now analyze the equilibrium in the market of the entrepreneurial good X . Using the demand from (4.4) and substituting the entry barrier (4.9) into the supply function $n = \frac{\bar{w} - w^L}{\bar{w}}$, since citizens' wealth is uniformly distributed on the support $[0, \bar{w}]$, we can summarize our findings at this stage:

Lemma 1 (Market Structure): *The total output of the entrepreneurial good X is a decreasing function of the deposit interest rate offered by banks $n(r_D)$.*

Proof: *The equilibrium number of entrepreneurs solves a system of two equations, taking into account the distribution function of wealth among citizens and the entry barrier for entrepreneurship that defines the marginal citizen that is able to get a loan: $n = \frac{\bar{w} - w^L}{\bar{w}}$ and $w^L = 1 - \frac{p - \frac{b}{1-\theta}}{r_D + c}$. Substituting*

⁶²Moreover, if we allow for market power by banks, the entry barrier also increases the more the bank can change the deposit interest rate with her investment decision. Intuitively, the monopoly bank will constrain the supply of loans to optimize its margin. Thus, with market power entry is more costly for entrepreneurs (see section 4.3.2 for the discussion of banking market power).

and using the market equilibrium condition, $p = a - n$, we can then solve for n as a function of the interest rate: $n = \frac{(r_D+c)(\bar{w}-1)+a-\frac{b}{1-\theta}}{1+\bar{w}(r_D+c)}$ with $\frac{\partial n}{\partial r_D} = \frac{\bar{w}-1-\bar{w}\cdot(a-\frac{b}{1-\theta})}{(1+\bar{w}\cdot(r_D+c))^2} < 0$ (see Appendix 4A).

This is an important result, whereby the refinancing conditions of a loan have a direct impact on the degree of competition and the total output in our economy. Specifically, lower marginal cost of a loan allows greater entry and production. As a consequence, the price of the consumption good in $t = 2$ responds to changes in the deposit rate, i.e. $p = a - n$. Hence, we observe at this point that the variation of the refinancing conditions of the bank translates into variations in the lending behavior to the real economy and on the market price. There is a spillover from the investment conditions in the banking sector to the private sector of production.

Government bonds

Now, we turn to the market for sovereign bonds. In order to finance a public good the politician issues a specific volume of government bonds G to the bank at $t = 1$. For simplicity we assume that one unit of the debt-financed public good offers citizens exactly the same utility as one unit of the private good Y_1 .

The expected net utility for citizens from government bonds can be written as:

$$E[U(G)] = \underbrace{a \cdot G - \frac{G^2}{2}}_{\text{gross utility}} - \underbrace{\theta_G \cdot r_G \cdot G}_{\text{expected taxes}} - \underbrace{\gamma((1 - \theta_G)(1 - k_G)r_D \cdot G)}_{\text{perceived deposit insurance costs}}, \quad (4.10)$$

The objective function of a benevolent politician comprises three parts: first, there is the gross citizen's utility from public good provision. Since sovereign debt must be paid back to the banks in $t = 2$ the supply of government bonds also implies costs for the society. Here, we distinguish between two scenarios: with probability θ_G the state is solvent and the burden of debt ($r_G \cdot G$) is financed via lump-sum taxes by citizens (second term); however, with exogenous default probability $1 - \theta_G$ ⁶³ the expected costs are $(1 - k_G) \cdot G \cdot r_D$. This is due to the fact that in the case of default the deposit insurance has to step in and reimburses the protected amount of funds. Critically, only a fraction $\gamma < 1$ of these costs are internalized by citizens and hence appear in the objective function of the domestic government. This externality reflects the fact that domestic citizens might shift part of the insurance coverage to other parties, i.e. if there is a multinational insurance fund, or they might not anticipate the full cost of deposit insurance (fiscal illusion).⁶⁴

⁶³There is huge empirical support for the fact that markets observe heterogeneity in sovereign default (see for example Favero and Missale 2012).

⁶⁴Empirical studies on tax salience indicate that agents ignore utility losses from taxes, despite having

The interest rate for government bonds r_G is determined in the banking sector. Owing to perfect competition the banks must issue enough bonds that the equity owner breaks even. From the non-profit condition we can derive the resulting interest rate, which is equal to:

$$E[\Pi^B] = G \cdot \left(\theta_G \cdot [r_G - r_D \cdot (1 - k_G)] - k_G \cdot r_D \right) = 0.$$

With probability θ_G sovereign bonds are repaid, the bank receives r_G and gives depositors $r_D(1 - k_G)$. However, with probability $(1 - \theta_G)$ sovereign bonds default and the returns are zero. The last term captures the opportunity cost of the bank's equity owners for investing into sovereign bonds, as the fraction k_G of investments into sovereign bonds has to be financed by the capital of bank owners. Rearranging yields:

$$r_G^* = r_D \left[1 + k_G \cdot \left(\frac{1 - \theta_G}{\theta_G} \right) \right]. \quad (4.11)$$

It is easy to see that r_G^* is an increasing function of the capital ratio k_G ; hence, the politician can indirectly lower his debt interest rate by setting $k_G < 1$. Specifically, (4.11) tells us that the marginal interest rate that banks accept to buy bonds, r_G^* decreases, the higher the default risk of government bonds and the lower the capital ratio k_G for holding them. The reason is that the bank can exploit the deposit insurance and limited liability by collecting bonds. In case of default, the society pays out depositors if the bank's equity capital is exhausted. Therefore, the lower the capital ratio k_G , the higher the expected profits the bank can earn from bonds for a given probability of default $1 - \theta_G$.⁶⁵

Finally, to derive the optimal supply of government bonds offered by the politician, we take the first order condition from (4.10), substitute the lending rate r_G from (4.11) and obtain the optimal number of sovereign bonds as a function of the refinancing cost of a bank r_D and its required capital standard k_G :

$$G^* = a - r_D \left[\underbrace{\gamma + (1 - \gamma) \cdot (\theta_G + k_G - \theta_G \cdot k_G)}_{\equiv \chi < 1} \right]. \quad (4.12)$$

The term in brackets measures the distortion of the refinancing costs for the sovereign bond due to the externality: a small χ implies a larger distortion in the sense that there

first order effects on social welfare (Finkelstein 2009; Chetty et al. 2009). There is consensus that politicians who want to maximize their probability of re-election may try to create a wedge between the burden perceived by taxpayers and the actual burden (Krishna and Slemrod 2003).

⁶⁵The literature provides further arguments, suggesting that banks hold sovereign bonds to store liquidity during normal times (Holmstrom and Tirole 1993); by contrast, during sovereign crises, banks instead accumulate sovereign bonds to increase the probability of a bailout (Gennaioli et al. 2014).

is an overprovision of sovereign bonds. Secondly, the combination of (4.11) and (4.12) generates an interesting result, namely that a decrease in k_G improves the profitability of banks and thereby decreases the equilibrium interest rates for bonds r_G^* . Because of limited liability, the lending conditions for the government are artificially low. It follows that the number of bonds supplied by the government, G^* , rises.⁶⁶

In this context, the politician sells more government bonds to banks, the less citizens internalize the cost of deposit insurance, captured by the parameter γ , as $\frac{\partial G^*}{\partial \gamma} < 0$. In case of complete internalization ($\gamma = 1$), we derive the social optimal allocation of government bonds $G^{soc} = a - r_D$.⁶⁷ In contrast, any $\gamma < 1$ implies an overprovision of the public good compared to the social optimum unless $k_G = 1$. The wedge ($G^* - G^{soc}$) strictly rises the lower the capital requirement regulation for sovereign bonds owing to the externality of deposit insurance. With $k_G < 1$ citizens consume a larger volume of public goods at lower perceived funding costs r_G^* . However, the social costs for each unit of government bonds are unaffected by changes in k_G , but remain at r_D .

Lemma 2 (Provision of government bonds): *Lower required minimum capital k_G for sovereign bonds decreases the funding costs for banks when investing into sovereign bonds and results in an expansion of their volume G^* .*

Proof: Taking the derivative of (4.13) with respect to k_G yields $\frac{\partial G^*}{\partial k_G} = -r_D(1 - \gamma)(1 - \theta_G) < 0$.

Anticipating these feedback effects on investment choices in $t = 1$, as a next step, we look at the portfolio regulation of a politician at stage 0.

4.2.3 Portfolio regulation

At $t = 0$ the policy-maker intervenes in the bank's portfolio choice by targeting a specific investment via capital requirement regulation. As previously explained, she can favor her access to finance, i.e. to government bonds, by simply implementing a restrictive policy that prevents the private sectors from absorbing too large share of the funds. According to Hellmann et al. (1997), the policy-maker may subsequently want to express a preference for avoiding certain sectors, rather than directly intervening to allocate funds to a specific sector.

⁶⁶Using (4.12) and (4.10) we obtain the citizen's indirect utility from public good provision that is financed by sovereign bonds, which is given by $V(G^*) = \frac{(a - r_D \chi)^2}{2}$.

⁶⁷Note that the interest rate for savings, r_D , captures the citizens' loss in utility in $t = 1$ to finance the public good, hence r_D reflects the opportunity costs of the investment in sovereign bonds. In other words, for $\gamma = 1$ the Samuelson condition applies where the marginal benefit to each citizen of consuming one more unit of the public good financed by bonds equals the marginal cost of providing that good.

Relative profitability of portfolio investments will be affected by a host of different policies, including reserve requirements, tax incentives, credit controls. We represent such policies by the policy parameter $0 \leq k_G \leq 1$, which captures the minimum capital regulation for an investment in government bonds G . In other words, at this stage the politician now introduces a policy instrument that changes the bank's refinancing costs for an investment in government bonds.

We will see in the following subsection under which conditions the politician can gain the support of a subgroup of citizens who benefits from an artificial expansion of government bonds induced by lowering the capital standard for bonds, $0 \leq k_G < 1$, a situation that we call "financial repression".

The effects of financial repression

Before analyzing the distributional aspects among citizens, it is useful to consider the allocative effects of a decline in the minimum capital regulation of government bonds. The following Proposition establishes some insights into optimal savings and financial investments chosen in $t = 1$ as a response to the selected policy parameter in $t = 0$.

Proposition 1 (Crowding-out): *Lowering the capital ratio for government bonds increases savings by higher equilibrium deposit rates. Furthermore, it induces a shift in a bank's investment policy from loans to government bonds.*

Proof: *in Appendix 4B.*

Proposition 1 tells us that due to the reaction of the bank, changing the capital requirements for government bonds affects investment and interest rates in all parts of the economy. Intuitively, with lower capital requirements k_G , the asset-specific refinancing costs for the bank shrink and investments in government bonds become more attractive. A fall in k_G can thus be interpreted as a positive demand shock for deposits that yields higher equilibrium interest rates r_D .

Looking at the optimal investment policy of the bank, this translates into a shift in the portfolio composition with less private credits for entrepreneurs. The reason is that the entry barrier, *i.e.* the required wealth for the marginal loan w^L , increases due to the rise of r_D (see Lemma 1). Thus, as a consequence of the expansion of government bond holdings, there is less credit available for entrepreneurs and thus less output (crowding out). The regulatory lifting of restrictions on state lending implies a serious barrier to growth for the private sector by stifling private sector competition. In other words, we can show that aggregate welfare is decreasing with financial repression, since policy

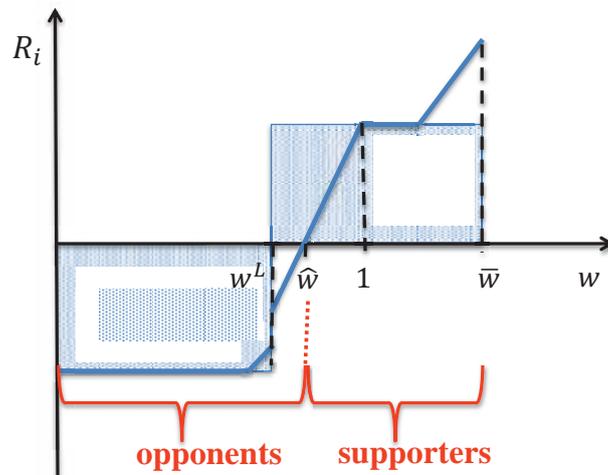


Figure 4.5: Rents and financial repression

The figure depicts the individual rent of a citizen from financial repression measured as the derivation of his indirect utility V with respect to the policy parameter k_G (see Appendix B for the formal derivation). "Supporters" are defined as those citizens that receive a positive regulatory rent from financial repression, the others are labeled as "opponents".

intervention distorts the intersectoral allocation of funds as well as the intertemporal savings decision.⁶⁸

The citizens are affected from changes in k_G in different dimensions. Thereby, we can distinguish between two main channels through which a variation of minimum capital requirements for government bonds has re-distributional effects.⁶⁹

First and most importantly, a regulatory privilege for bonds is reflected in lower production of the consumption good which positively affects the price that firms will charge in $t = 2$ (competitive effect). Therefore, consumption becomes more expensive for all citizens, whereas only entrepreneurs benefit from competitive effects in the form of higher margins. If we allow for market power by banks, the bank will also earn a positive rent from this competitive effect. Hence, financial repression produces a rent-shifting from consumers to producers (and banks).

Figure 4.5 illustrates this channel by plotting the rent from financial repression $R_i = -\frac{\partial V_i}{\partial k_G}$ for citizens as a function of their initial wealth. Citizens with wealth $w_i > w^L$ become entrepreneur and benefit from the competitive effect due to the entrepreneurial

⁶⁸For the formal solution of the social optimal regulation, see Appendix 4C.

⁶⁹The provision of the public good affects citizens, irrespective of their wealth, in the same way. Hence the direct effects of sovereign bonds do not have any rent-shifting effects within the electorate and are thus ignored in this subsection, which highlights the conflict of interests.

rent captured by the blue dotted area, whereas citizens with wealth $w_i < w^L$ are workers and suffer from higher prices for the consumption good. Note that the competitive effect is unaffected by the individual wealth of a citizen within both groups.

Second, with financial repression investments at a bank become more attractive since interest rates for deposits r_D rise as a result of low capital ratios for government bonds. Thereby, the associated gross returns are increasing in a citizen's wealth (savings effect), meaning that subsidizing government bonds improves the financial status of those citizens that save a large amount of their income. Intuitively, the artificial demand for deposits induced by lower capital requirements makes a citizen's wealth more valuable. Hence, workers with wealth above a certain threshold ($w_i > a - r_D$) benefit from increasing deposit rates such that the negative competitive effect of higher consumer prices is mitigated. Note that the net gain from financial repression for workers rises from a specific level of wealth in Figure 4.5, while the same is true for self-financed entrepreneurs with wealth $w_i > 1 + a - r_D$.

However, bank-financed entrepreneurs with $w_i \in [w^L; 1]$ suffer from the savings effect, since their funding costs, $r_D + c$ increase with financial repression. The impact of this negative effect erodes with the initial wealth because less external finance is needed by the citizen. Therefore, we can show that there is a split-off level of wealth \hat{w} where the bank-financed entrepreneur becomes indifferent to the policy of financial repression, because the funding effect is neutralized by the competitive effect. Thus, our results indicate that we can divide the society in two interest groups. Citizens with wealth $w_i > \hat{w}$ benefit from financial repression and have a positive willingness to lobby for such a regulatory intervention. We call this group "supporters". In contrast, citizens with wealth $w_i < \hat{w}$ oppose any measure of financial repression since they lose in utility terms from such a policy.

Taking both dimensions together, we obtain our key result that will drive our political equilibrium:

Proposition 2 (Rent creation): *Financial repression ($k_G < 1$) generates rents R^S for a subgroup of citizens endowed with wealth $w_i > \hat{w}$, we call "supporters". The total rent of "supporters" is an increasing function of the financial entry barrier to entrepreneurship w^L .*

Proof: *in Appendix 4D.*

As we have seen in this section, the creation of financial restraints to private lending not only induces a rent extraction from the private sector to the state, but also a rent-shifting within the private sector. A regulatory privilege for government debt increases

the rent of the economic elite who benefits due to less competition and higher returns on savings. However, this policy depresses production by distorting the allocation of capital between the private and the public sector.

After having analyzed the distributional effects of the portfolio regulation, we now turn to the voting game in the next section, in which the policy-maker sets its optimal k_G anticipating the support of citizens.

4.3 Electoral competition

We have seen in the previous subsection that policy intervention creates both an over-provision of the public good and higher prices for the consumption good. Therefore a decrease in k_G reduces second-period consumption in the numeraire Y_2 ceteris paribus. However, the policy also creates benefits to a coalition of citizens, since its rent R^S is an increasing function in the degree of financial repression (see Proposition 2). Using portfolio regulation reduces the overall surplus but creates a net benefit for the recipients of the rent. This creates a conflict of interest over policy in a very simple way: it is optimal for the group that benefits from the policy to cut k_G , but average utility is higher otherwise. In other words, financial repression distorts the investment decision of citizens (see Appendix 4C for the social optimum).

However, in reality, organized interest groups may influence the policy in a way that a winning party may modify the chosen policy, thereby creating financial frictions and an overinvestment in sovereign bonds.

In the literature there are two interpretations for such a deviation from the social optimum: first, the deviation may reflect dishonesty by the politician (Grossman and Helpman 1994) since the benevolent policy-maker can be bribed; and second, contributions by organized lobby-groups may influence the politician's popularity (Persson and Tabellini 2002). In the following voting game we will focus on the second approach where the regulator's policy is constrained by a retrospective probabilistic voting function.

4.3.1 The political game with lobbying

Assume that at the beginning of period $t = 0$, two office-seeking politicians, A and B , commit to a value of k_G in the course of the political campaign in advance of the election.

In our economy, we can divide the electorate into two groups: $J \in \{S, O\}$. The coalition of beneficiaries comprising entrepreneurs (and banks) support lower capital

requirements ("supporters") since their average utility W^S decreases with k_G , $\frac{\partial W^S}{\partial k_G} < 0$ and the rest prefer higher capital requirements for bonds ("opponents"), $\frac{\partial W^O}{\partial k_G} > 0$. The two groups of voters have the same distribution of ideological preferences for both politicians with uniform density ϕ and mean 0. Let B 's average popularity in the electorate as a whole be given by

$$\delta = \tilde{\delta} + h(C_B - C_A), \quad (4.13)$$

where $\tilde{\delta}$ is a random variable with mean zero, and density ψ and a uniform distribution on $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$. Interestingly, politician B 's average popularity has a second component. Campaign contributions denoted by C_A, C_B increase the overall relative popularity. This means that contributions can convince part of the electorate to vote for the politician receiving more contributions, with $h > 0$ being a parameter capturing the sensitivity to the difference in campaign spending. In other words, money can be converted into expected votes. In this context, the variable C_B might measure advertising expenditures or media exposure in favor of B or against the electoral opponent A .

Let the indifferent voter in both groups J be a citizen with preference parameter

$$\sigma^J = W^J[k_G^A] - W^J[k_G^B] - \delta. \quad (4.14)$$

Therefore, campaign spending affects the identity of the swing voter. All voters in group J with $\sigma^{iJ} > \sigma^J$ prefer party B . Using this parametrization, the probability for an electoral victory of politician A , assuming an interior solution, is

$$p_A = \frac{1}{2} + \psi [W[k_G^A] - W[k_G^B] + h(C_A - C_B)], \quad (4.15)$$

where $W[k_G^A] = \frac{\hat{w}}{\bar{w}} \cdot W^O[k_G^A] + \frac{\bar{w}-\hat{w}}{\bar{w}} \cdot W^S[k_G^A]$ is the welfare function of the electorate. This objective illustrates a general property of probabilistic voting models. The probability of winning becomes a smooth function of the distance between the two electoral platforms. In the unique equilibrium both politicians converge to the same platform.

Following Persson and Tabellini (2002) a subset of the electorate is organized in lobbies. Thereby, a lobby J maximizes the expected utility derived from portfolio regulation, net of the per capita cost of its contributions,

$$\max_{C_A^J, C_B^J} p_A W^J[k_G^A] + (1 - p_A) W^J[k_G^B] - \frac{1}{2} ((C_A^J)^2 + (C_B^J)^2), \quad (4.16)$$

where $C^J = C_B^J + C_A^J$ is the per member campaign contribution by lobby J to both politicians and C_B^J and C_A^J are non-negative. The lobby group thus trades off the positive effect of lobbying on the popularity of the politician with the cost for lobbying which is assumed to be a convex function.

Citizens who benefit from financial repression due to their initial wealth become vested interest and have a strong incentive to get organized in order to protect and create new quasi-rents. On the other side, it is much more difficult to form interest groups among less wealthy citizens before the necessary loan contract has been signed by a bank. Hence, we assume that only the capital-rich "supporters" are organized politically and their encompassing lobby is the only one to collect and promise campaign contributions.

We can now derive the amount of contribution that this lobby group will hand over to the politicians at stage $t = 0$ for given policy platforms by maximizing (4.16) with respect to C_A^S and C_B^S , respectively:

$$\begin{aligned} \frac{\partial}{\partial C_A^S} &= \frac{\partial p_A}{\partial C_A^S} [W^S(k_G^A) - W^S(k_G^B)] - C^S \leq 0, \\ &= h\psi [W^S(k_G^A) - W^S(k_G^B)] - C^S \leq 0. \\ C_A^S &= \max \{0, \psi h (W^S[k_G^A] - W^S[k_G^B])\} \\ C_B^S &= -\min \{0, \psi h (W^S[k_G^A] - W^S[k_G^B])\} \end{aligned} \tag{4.17}$$

The lobby is assumed to only campaign in favor of one politician.

Intuitively, we see that contributions will rise the more citizens are ideologically independent (ψ) and the higher the influence of lobbyism on the party's popularity (h).

Let us now turn to the politician's optimization problem. To characterize the equilibrium portfolio policy, we maximize politician A 's objective function in (4.15) regarding k_G , exploiting (4.13) and (4.16):

$$\frac{\partial p_A}{\partial k_G} = \psi \left(\underbrace{\frac{\partial W}{\partial k_G^A}}_{\text{welfare of the electorate}} + h^2 \underbrace{\frac{\bar{w} - \hat{w}}{\bar{w}} \cdot \frac{\partial C_A^S}{\partial k_G^A}}_{\text{lobby contributions}} \right). \tag{4.18}$$

Since B solves an identical problem, both politicians converge on the same policy.

In this setting, only the distribution of voters preferences, i.e. wealth, determines the unique equilibrium outcome. Intuitively, both politicians compete for the electoral support from the same swing voters in the two groups of the electorate.

First, we analyze the optimal policy of each politician for the case of no lobby. Looking at (4.18), we can see that the politician will maximize the welfare function of the electorate to maximize his probability of election. We derive this welfare function by defining the indirect utility function of the average voter in the economy:⁷⁰

$$W = \frac{1}{\bar{w}} \int_0^{\bar{w}} V^i(w^i) dw^i.$$

By setting an optimal capital requirement for sovereign bonds, the politician trades off the utility from more production in the private sector and higher perceived costs for public good provision, i.e.

$$\frac{\partial W}{\partial k_G^A} = \underbrace{-\frac{\partial w^L}{\partial k_G} \left(p - r_D - \frac{(a - r_D)^2}{2} - \Pi^W \right)}_{\text{more entrepreneurs, less worker}} - \underbrace{(a - r_D \chi) r_D (1 - \gamma) (1 - \theta_G)}_{\text{higher cost for public goods}}.$$

Intuitively, the maximization problem has an interior solution, if the second term is negative, which is the case if the electorate externalizes some cost of deposit insurance ($\gamma \neq 1$). The reason is that the perceived private indirect utility from government bonds decreases with k_G since funding cost are artificially low and can be shifted to other parties or are simply neglected by voters. Thus, we obtain the following result:

Lemma 3 (Externalities and financial repression): *The probability of inefficient low levels of capital requirements for sovereign bonds increases with the potential of externalization $(1 - \gamma)$ and with sovereign risk θ_G .*

If we concentrate on the scenario of lobbying on the part of the group of supporters, politicians are willing to bend their policies in the direction of financial repression when "supporters" are politically influential. According to Persson and Tabellini (2002), p. 381, we can now rewrite the welfare function of each member of the "supporters" W^S as the sum of the average welfare plus the average rent of an individual supporter relative

⁷⁰Integrating the indirect utility functions V^i over all citizens, we have to take into account that the consumption of Y_1 and Y_2 depends on the individual wealth endowment of each citizen, while the consumption of X and G is equal for all citizens. With five types in our economy, we can rewrite the welfare function explicitly as (see Appendix 4E for the derivation):

$$\begin{aligned} W = & \frac{1}{\bar{w}} \left\{ \int_0^{w^S} \left[w_i \left(a - \frac{w_i}{2} \right) + \Pi^W \right] dw^i + \int_{w^S}^{w^L} \left[\frac{(a - r_D)^2}{2} + \Pi^W + r_D w^i \right] dw^i \right. \\ & + \int_{w^L}^1 [p - r_D(1 - w^i)] dw^i + \int_1^{w^S} \left[(w_i - 1) \left(a - \frac{w_i - 1}{2} \right) + p \right] dw^i \\ & \left. + \int_{w^S}^{\bar{w}} \left[\frac{(a - r_D)^2}{2} + p + r_D(w^i - 1) \right] dw^i \right\} + \frac{(a - p)^2}{2} + \frac{a^2 - (r_D \chi)^2}{2}. \end{aligned}$$

to the electorate to capture the intensity of rent creation through financial repression:

$$W^S = W + \underbrace{p(1-n)}_{\text{competitive effect}} + \underbrace{r_D(S^S - S)}_{\text{savings effect}} - \underbrace{r_D(L^S - L)}_{\text{refinancing effect}} = W + R^S.$$

The first term represents the average welfare of the electorate W , whereas the second term measures the competitive effect for the supporters due to higher prices, each producing one unit, relative to the average citizen in the economy, producing n units, multiplied with the price p . The third and fourth terms quantify the impact of the change of the deposit rate on the rent of supporters relative to the average of the electorate (positive savings and negative refinancing effect).

We can now substitute W^S into (4.18) to obtain the optimal lobby contributions C^S as a function of the policy parameter k_G^A . Using this and rewriting (4.19), we can show that the optimal policy with lobbying is characterized by the following expression:

$$\begin{aligned} \frac{\partial p_A}{\partial k_G} &= \frac{\partial W}{\partial k_G} + h^2 \cdot \psi \cdot \frac{\bar{w} - \hat{w}}{\bar{w}} \left(\frac{\partial W}{\partial k_G} + \frac{\partial R^S}{\partial k_G} \right) = 0, \\ \Leftrightarrow \frac{\partial W}{\partial k_G} &= - \frac{h^2 \cdot \psi \cdot \frac{\bar{w} - \hat{w}}{\bar{w}}}{1 + h^2 \cdot \frac{\bar{w} - \hat{w}}{\bar{w}}} \cdot \left(\frac{\partial R^S}{\partial k_G} \right) > 0, \end{aligned} \tag{4.19}$$

where $R^S > 0$ denotes the rent of supporters of financial repression. By definition R^S is a negative function of k_G for the supporters. We can immediately see that in the political equilibrium with lobbying, k_G will be set inefficiently low, since welfare W would increase with higher capital standards $\frac{\partial W}{\partial k_G} > 0$. We summarize this result in the following Proposition:

Proposition 3 (Lobbying and financial repression): *The probability of inefficient low levels of capital requirements for sovereign bonds increases,*

- *the smaller the group of entrepreneurs,*
- *the more concentrated the savings in the group of "supporters" and*
- *the lower the fraction of bank-financed entrepreneurs within the "supporters".*

Proof: *in Appendix 4E.*

Proposition 3 explains the emergence of financial repression via subsidizing sovereign bonds with its redistributive effects within the electorate which create electoral support, thus making the regulation politically sustainable.

In general, rational voters agree that such a subsidy for non-zero sovereign risk is a waste for two reasons. It distorts the allocation of capital between the private and

public sector and depresses production. Although the parameter k_G reduces welfare and makes the politician less popular, voters may allow inefficiency that is associated with $k_G < 1$ if the burden of regulation can be shifted to other parties or if the fraction of wealthy citizens can offer an sufficient amount of compensating contributions. Subsequently, they opportunistically choose low capital ratios for holding government bonds to raise their own rents by forcing the less wealthy citizens to bear the costs of portfolio regulation. Since the wealthy group of "supporters" is politically more influential, both politicians are willing to bend their policy in the desired direction to enhance their probability of winning.

Hence, for our electoral game, the political power of the coalition of supporters becomes critical. The more concentrated is wealth within the electorate, the larger the supporters' stake in the policy and the more they are prepared to lobby in favor of distortionary policy. Thereby, financial repression also proves to be counter-cyclically. When the economy moves from a boom to a recession the rent of the average interest group member becomes larger compared to the loss in social welfare. This is because the cost of monitoring c is higher in bad states of the world, which translates into higher entry barriers imposed by banks (w^L) and a higher competitive effect. In terms of our model, the probability of financial repression jumps in a recession.

The crux of generating distortive regulation in our model is that it can increase the probability of a party winning the election. We argue that financial repression can be a dominant strategy for a policy-maker to get elected.

4.3.2 Extensions

Market power of banks

So far we have assumed that there is perfect competition of banks such that no profits are left at banks in equilibrium. The more relevant case, of course, is that banks enjoy some monopoly power and extract a fraction of the rents created by artificially higher prices of the consumption good. Then the loan and deposit interest rates become strategically variables.

Therefore, this extension will discuss the implications of banking power within our framework of financial repression.

In this case the monopoly bank maximizes its profit function that is given by:

$$\max_{w^L} \Pi^B = \int_{w^L}^1 \underbrace{(1 - w^i)}_{\text{loan per entr.}} \underbrace{\{r_L[w^i] - r_D[w^L] - c\}}_{\text{rent per entr.}} dw_1^i. \quad (4.20)$$

As the monopoly bank can now perfectly discriminate between all borrowers, it will set a wealth-specific interest rate such that the incentive constraint from (4.7) will be binding for each borrower. Maximizing its profit we get the following first-order condition:

$$\frac{\partial \Pi}{\partial w^L} = - \underbrace{\int_{w^L}^1 \left[(1 - w_i) \frac{\partial r_D}{\partial w^L} \right] dw^i}_{\text{marginal return}} - \underbrace{(1 - w^L)[r_L(w^L) - r_D - c]}_{\text{marginal costs}}. \quad (4.21)$$

Thus, the bank trades off lower funding costs (first term) with the foregone revenue of lending (second term) when choosing the optimal amount of loans. Rearranging terms, we can then solve for the optimal interest rate:

$$r_L = r_D + c - \frac{\partial r_D}{\partial w^L} \frac{L}{1 - w^L} \quad (4.22)$$

Comparing (4.22) with the equilibrium loan rate in the case of perfect competition of banks and recognizing that w^L is a negative function of r_L (see 4.9) it becomes clear that the financial entry barrier to become an entrepreneur will increase as the result of monopoly power. A monopoly bank will constrain the supply of loans to maximize its profits and consequently demands higher loan rates than in perfect competition. Inserting (4.22) into the incentive constraint of entrepreneurs to select the efficient technology (4.9) gives us the lending barrier, contingent on the market power of banks:

$$w^L = 1 - \frac{p - \frac{b}{1-\theta}}{r_D + c - \frac{\partial r_D}{\partial w^L} \frac{L}{1-w^L}}. \quad (4.23)$$

This finding implies that less citizens are able to open a firm in $t = 2$ and consequently gain from the competitive effect described above. Credit supply is artificially reduced to enhance the producer surplus for entrepreneurs and banks. Compared to the baseline scenario, market prices for X are rising, since output is a linear function of the number of firms. Hence, self-funded entrepreneurs can capture larger (monopoly) rents, whereas bank-funded entrepreneurs share the rent with their banks. If the additional competition effect exceeds the change in the savings effect, the following Lemma holds:

Lemma 4 (Banking power and financial repression): *The probability of inefficient low levels of capital requirements for sovereign bonds increases with the market power of banks.*

Intuitively, the lobby power of supporters becomes even larger due to the following reason: the regulatory price increases with higher ex-ante entry barriers which makes lobbying more attractive; moreover, the coalition of "supporters" now is built by two

groups, comprising entrepreneurs and bankers who jointly lobby for financial repression.⁷¹ As a consequence, the incentives to lobby will rise the more powerful the banks are.

Financial stability

The second extension focuses on the implications of financial repression on stability issues, i.e. the quality of financial intermediation. Thus far, we have silently assumed that all banks monitor the entrepreneurs inducing them to select the efficient technology, which requires an incentive-compatible interest rate of r_L according to (4.9). However, it might be possible that a bank gambles and does not monitor. Consider a bank with monopoly power where the bank can earn a rent on loans when investing in the monitoring technology that is equal to $\Pi = r_L[(1 + k_L) - \rho k - r_D]$; a bank's own capital per invested loan is denoted by k_L which is expressed as a percentage of the deposits mobilized with opportunity costs of ρ .

If the bank instead decides not to monitor, the entrepreneur will always chose the inefficient technology resulting in a low probability of success of θ . Subsequently, the banker will charge an interest rate on the loan such that the entrepreneur is not better off compared to his outside option. Thus, he will agree to participate as long as his expected rent from opening a firm financed by a non-monitored loan exceeds the returns on savings, i.e. $B + \theta(p - r_L(1 - w_i)) \geq r_D \cdot w_i$. This yields an interest rate of

$$r_L^{ga} = \frac{p + \frac{B}{1-\theta} - \frac{r_D \cdot w_i}{\theta}}{1 - w_i} > r_L. \quad (4.24)$$

Intuitively, the interest rate offered by a non-monitoring bank only compensates the entrepreneur for the opportunity costs of the return on savings, whereas the banker is able to extract the complete rent of the firm.

The expected profits of a gambling bank are given by $E[\Pi^{ga}] = \theta[r_L^{ga}(1 + k_L) - r_D] - \rho k$. The gambling rent depends on whether the gambling is successful. In this case, the bank captures the high return r_L^{ga} and repays depositors. If the gamble fails, the bank is insolvent and the deposit insurance pays out depositors. Because $\frac{\partial E[\Pi^{ga}]}{\partial k_L} < 0$, increasing a bank's capital only reduces the bank's expected profits, and so the banker will choose to minimize its own capital that it invests.

The banker now compares the rent from monitoring Π with the expected rent of gambling $E[\Pi^{ga}]$. It is straightforward that the banker will select the monitoring tech-

⁷¹In fact, the IIF as the most important international financial lobby group comprises both multinational banks and multinational enterprises.

nology if and only if $\Pi > E[\Pi^{ga}]$. From this relationship, we can develop the threshold interest rate r_D at which gambling will occur.

Lemma 5 (Gambling Condition): *The banker will not monitor the loans if $r_D > \hat{r}_D$.*

Once the deposit rate exceeds a critical threshold \hat{r}_D , the bank earns greater expected returns from gambling than from investing in the monitoring technology. Intuitively, the attractiveness of gambling is positively affected by the deposit rate, given that in case of monitoring the bank will always pay r_D to depositors. However, in case of gambling, the banker can externalize these costs with probability $1 - \theta$ due to limited liability. The intuition is that an increase in the borrowing cost leads to higher risk-taking and lowers expected values.

If we now turn to the case of financial repression there is the threat of a banking crisis due to an expansion of government bonds. As shown in Proposition 1 the boom in sovereign lending is associated with higher deposit interest rates r_D . Thus, if the increase in deposit rates induced by regulatory intervention is sufficiently high, $r_D > \hat{r}_D$, gambling becomes profitable and the expected output of X in $t = 2$, which is produced by entrepreneurs, shrinks even more. This is due to a rising probability of a crisis in the real economy since entrepreneurs use the inefficient technology when the bank does not monitor. In such a crisis, the deposit insurance will pay out depositors via lump-sum taxes on income of all citizens in $t = 2$, which implies a cross-subsidy within the economy to wealthy citizens who save more. In other words, the gambling scenario amplifies the rent-shifting effects explained above and increases the incentives to lobby. The adoption of measures of financial repression is thus likely to provide perverse incentives not only to build up exposures to zero risk weight assets, but also to induce a looming threat to financial stability.

4.4 Discussion and implications

The key message of the model is that the design of banking rules is endogenous and related to its rent-enhancing effects in the electorate.

In our example, repressed financial systems not only enable the government to increase their debt capacity, but also distort the allocation of investments which preserves electoral support. The model provides two reasons: first, financial repression in the form of subsidized investments in government bonds becomes political sustainable, if the electorate is less concerned about the induced distortions in the lending market due to externalities or myopic behavior; and second, financial repression has adverse effects on the financing constraints of firms. By increasing the wealth barrier for access to ex-

European regulatory measure	Privileged treatment of sovereigns
<i>Capital requirements and liquidity rules</i>	Central government securities are deemed to be zero-risk, high-quality and liquid assets.
<i>Exposure limits on banks' investment policies</i>	No limit on the concentration of sovereign debt.
<i>Proposal: Common financial transaction tax</i>	Possible exemption or lower tax rate for trade in government securities.
<i>Eligibility of debt instruments</i>	Acceptance of eligible state-guaranteed bank bonds provided the guarantor is a country under an EU/IMF program or whose credit assessment does not meet high credit standards.
<i>EU restrictions on credit rating agencies</i>	Time and scrutiny restrictions on issuing sovereign ratings and rating outlooks.

Table 4.1: European measures to create a captive market for sovereign bonds

ternal finance, credit frictions reduce aggregate supply of the entrepreneurial goods and thus increase the equilibrium price at which all firms sell on the market. The crowding-out effect in private lending can explain the politicians' reluctance to recapitalize the banking sector with higher requirements for holding sovereign bonds. Critically, this measure re-distributes wealth (from consumers to producers). Hence, the creation of repressed private credits as a strategic policy instrument can also base on the idea of a rent-shifting in the private sector rather than rent extraction from the private sector. However, entry barriers erected by subsidizing lending to sovereigns will become increasingly costly to efficiency, the higher the sovereign risk. The experience of the financial crisis in the PIIGS countries where governments and banks have searched for ways to hold down the cost of financing debt has particularly highlighted the importance of analyzing the determinants of repressed financial systems.

4.4.1 Empirical discussion

Table 4.1 highlights the fact that euro area countries have adopted many techniques of financial repression to direct domestic lenders toward their government securities. Besides the discussed zero risk weight and unlimited exposure for sovereign bonds, several euro area countries plan to introduce a common financial transaction tax under the so-called "enhanced cooperation procedure" following a proposal by the European Commission. The declared purpose in the public interest is to curb destabilizing short-term speculative trading in secondary markets to ensure that the financial industry makes a fair contribution to the fiscal costs of the crisis. However, transactions of government securities are excluded from the scope of the tax.⁷² Indeed, this creates

⁷²According to van Riet (2013) the European Parliament favored limiting the tax rate on government bond transactions to only half of the standard rate until 2017, as well as temporarily applying

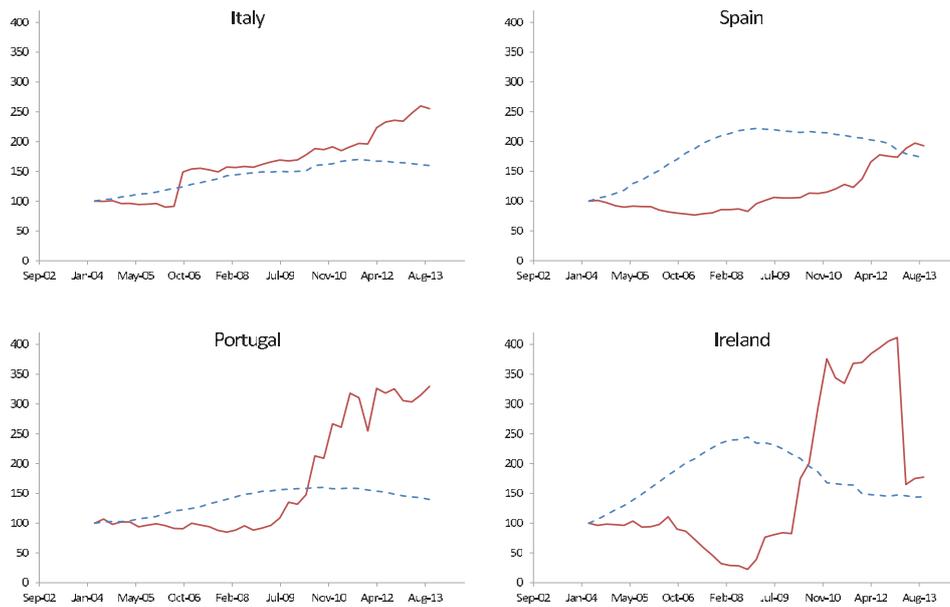


Figure 4.6: Crowding-out private lending (2004 - 2013)

Note: The figure is taken from Crosignani (2014) and shows domestic banks lending to private non-financial sector (dashed line) and government gross debt held by domestic banks (solid line) for Italy, Spain, Portugal, and Ireland. Quantities are normalized to 100 in March 2004. Source: BIS and Arslanalp and Tsuda (2012).

a cost advantage for secondary market purchases of sovereign debt compared with alternative financial instruments.

Second, credit rating agencies have been criticized for downgrading governments. Further legislation will make credit rating agencies subject to civil liability for damages caused intentionally or due to gross negligence set a fixed calendar for issuing sovereign ratings and rating outlooks (van Riet 2013). In addition, governments will be given more time to react to a change in credit ratings before this is made public.

In turn, our model establishes a negative relationship between repressed financial systems and the sectoral output that benefits the rich. The central argument of inefficient allocation of scarce credits is in line with empirical findings in the PIIGS-countries that are evidently affected by financial repression.

For example, Popov and Van Horen (2013) show that bank lending contracted substantially in the PIIGS countries. In the cases of Ireland, Spain, and Portugal the lending volume of newly issued loans fell by 82 percent, 66 percent, and 45 percent, respectively, over the period 2008–2013. Crosignani (2014) provides evidence that peripheral

that reduced tax rate to all financial trades by pension funds, which typically invest a large part of their reserves in government paper.

banks reduced lending to the private sector during the crisis. Figure 4.6 illustrates that domestic banks' lending to private non-financial sector (dashed line) fell significantly compared to sovereigns held by domestic banks (solid line). Recent studies demonstrate that this contraction in the lending volume that occurred during the sovereign debt crisis, has real effects for the borrowing firms, e.g. in the form of lower levels of investment, lower sales growth and lower employment growth (Acharya et al. 2014b). This is why several European industry organizations, such as the BDI, have waged a campaign during the consultation process on the European Commission's proposal for a regulation on banks, arguing that lower risk weightings for government bonds leads to a competitive disadvantage for companies with the consequence that corporate finance becomes more expensive.

The competitive effect of distortive regulation is furthermore supported by empirical results of De Serres et al. (2006). Based upon a sample of OECD countries they find that financial regulation that does not repress private credits has a significant positive impact on sectoral output, as well as the entry of new firms. Consistent with this view, Fogel et al. (2008) provide empirical evidence that countries, where the same companies remain in a dominant position over time, have lower growth. Beck et al. (2007) analyze the distributional effects in a cross-country setting. They show that credit constraints that reduce financial sector deepening intensifies income inequality by impeding the flow of capital to poor. In contrast, countries with higher levels of financial development experience faster reductions in poverty levels.

Sovereign lending as one example

The model's mechanism can be easily translated to other areas of banking regulation. The essence of our mechanism is that the policy-maker generates rent opportunities in the private sector through a set of financial policies. The politician sets capital requirements below the efficient level and thereby shapes the flow of credits. The reason are the inherent rents that are captured by banks and firms. Acharya et al. (2013b) provide evidence that regulatory arbitrage to extract regulatory rents is an important motive in the portfolio decisions of banks. They document that in the early phase of the financial crisis of 2007–2009, commercial banks set up conduits to invest in long-term assets without holding capital against these assets. Their study highlights the impact of regulatory discrimination via capital requirements on a bank's investment policy, resulting in a significant concentration of systemic risk in the financial sector. Mariathasan and Merrouche (2014) find in a cross-sectional panel of 115 banks from 21 OECD countries that the risk weight approach by Basel II introduced an opportunity for banks to under-report the riskiness of their portfolio. The authors provide evidence

for strategic risk-modelling, which is particularly prevalent among weakly capitalized banks and when the legal framework for supervision is weak.

Consistent with these findings Beck and De Jonghe (2014) demonstrate that any sectoral specialization is positively related to higher systemic risk exposures as well as increases in total volatility. Using market-based and annual report-based approaches to measure lending specialization for a broad cross-section of banks over the period 2002–2011, they show that sectoral concentration of bank's investments has negative effects on stability. As the specificity of investments increases, price drops in fire-sales during crises become larger. Each individual bank does not fully take into account that a higher degree of specialization also reduces the ability to absorb possible fire sales from others. Indeed, a Basel Committee study by 2004 points out that credit concentration caused nine of the thirteen major banking system crises around the world in the 20th century.

The most significant danger of such a policy is that financial frictions turn into serious constraints on the growth path of the private sector. According to the model, re-election minded politicians are willing to bear the cost of distortions in the lending market to induce banks to act as buyers of sovereign debt to combat a sovereign debt crisis. In many developing economies, the experiences with financial repression have been disillusioning, leaving the economy in a low state of financial development with poor deposit mobilization. However, the British experience after WWII shows that repressing private credits by creating sorts of taxes on private lending can also occur in highly developed democratic countries.

A *deja-vu* of the British constrained banking era?

In the UK, the so called Clearing Banks traditionally provide short-term credit for industry. However, the period after WWII was characterized by a politically motivated tightly regulated Clearing Banks resulting in a contraction of lending to the private sector. Clearing Banks and finance companies were singled out for special control. Tax policy played a prominent role in favoring the accumulation of some financial assets (national savings, life assurance, pension schemes) over others. Beside these fiscal incentives, an increasing range of quantitative controls over bank lending, interest rates and specific asset ratios were applied to Clearing Banks throughout the 1960s, restricting lending to the industry (see Collins 2012). In this context a part of their required cash holdings were requisitioned by the Bank of England to stem the growth of bank lending. As a consequence, the regulatory policy was very effective, resulting in a substantial crowding out of bank credit. A parliamentary Committee of

Inquiry on small firms in Britain pointed out in 1971 that growth prospects of small firms were disproportionately affected (Collins 2012, p. 446). Ultimately, the British banking system proved redundant to the British economy financing only 19 percent of GDP and the economic collapse followed in the 1970s (Calomiris and Haber 2014, p. 139). The second consequence of this episode, also consistent with our model, was regulatory arbitrage and the emergence of new unregulated financial institutions (the shadow banking system) to provide alternative savings and funding opportunities for entrepreneurs. Merchant banks and foreign banks outside the regulatory structure took over this role (see Calomiris and Haber 2014, p. 141-4). In other words, the British constrained banking era of the 1960s demonstrates that repressing private credits via distortive banking regulation has its long-term costs in the form of lower growth rates in the economy. Onerous barriers hindering production have reduced growth and entry. This was possible due to some techniques of transfers from the government to get the electoral support; however, this system collapsed after a decade.

4.4.2 Modus operandi - the instruments of the lobby's influence

The main argument for the pervasive policy influence of banks is that coalitions of different social groups pledge to contribute to efforts to influence banking policy in their collectively preferred direction - in our case to employ a zero risk weight on specific investments. In the presented "policy for sale" model, these contributions influence the outcome of elections by enhancing the politician's popularity.

The chapter conceptualizes lobby contributions as a form of exchange that increase the electoral returns for the politician. They provide re-election relevant assets. This is because voters' preferences may be manipulable through campaign expenditures. These can affect voters' perceptions of the desirability of different policies.⁷³ A lobby coalition can strategically transmit private information through channels like media campaigns to the public.

To do this, today the coalition of interest groups employs a much wider variety of mechanisms. Traditional channels of influence rely upon campaign contributions and the "revolving door" by offering the politician lucrative employment opportunities in compensation for being cooperative. However, recently new mechanisms seem to be

⁷³Influencing voters' preferences can be motivated with rational ignorance. Since access to information by a single voter appears to be costly, media campaigns can provide him with (biased) costless information about the consequences of policies. They are influential because they determine the part of information that are available and more importantly the part of information that are not. Hence, lobby groups can use private information to persuade politicians that electoral self-interest lies in taking specific industry-friendly positions. Grossman and Helpman (1994) show that interest groups indeed can influence uninformed voters by endorsing candidates or policies.

come increasingly relevant. It is conceivable that cultural capture, through shaping of assumptions and vocabularies, and informational lobbying, by supplying politicians with one-sided information, can be used to influence the regulatory outcome.

Informational lobbying

Policy-makers depend upon the regulated industry, because they need information to do their job properly. The technical nature of global banking influences access to the financial network since it creates incentives for regulators to interact more frequently with players who have a high degree of expertise.

Importantly, the distribution of this expertise is asymmetric: only very few individuals have the technical know-how to contribute to the development of banking regulation. Consequently, regulatory bodies frequently recruit from the largest financial firms and rely on the expertise of their most senior representatives to specify the rules. Griffith-Jones and Persaud (2008) point out that industry influence will occur when the financial sector possesses better technical expertise and superior resources than regulators. Hence, the highly technical character of regulatory networks like the Basel Committee can make the regulatory community susceptible to capture. According to Hellwig (2010), "when the model-based approach to capital regulation was introduced regulators were so impressed with the sophistication of recently developed techniques of risk assessment of banks that they lost sight of the fact that the sophistication of risk modeling does not eliminate the governance problem".⁷⁴

Therefore, contributions in this chapter's model can be interpreted as the provision of costly information that politicians require for their work. This includes in-depth policy analysis, reports, or expertise since lobby groups analyze, synthesize and summarize in a politically user-friendly form information to promote the lobby goals that their group shares. They make arguments, offer amendments, plot strategies or help the politicians to promote the probability of their claims. Hence, capturing arises not because the regulator is intentionally lured into favoring private interests by the banking lobby at the expense of the public interest, but rather that they are persuaded by the lobby's view that they come to believe they can best serve the public interest by advancing the one-sided claims of the banking lobby.

⁷⁴Hakenes and Schnabel (2013) formalize this special case of informational lobbying and analyze when banks successfully persuade the regulator that banking regulation is not necessary. Due to a discrepancy in the degree of sophistication between banks and regulators, a more sophisticated bank can produce arguments that the regulator may not understand. If career concerns prevent him from admitting this, he rubber-stamps even bad banks, which leads to regulatory forbearance.

Campaign contributions

A recent wave of the public choice literature finds evidence that changes in financial contribution levels determine changes in voting behavior over banking regulation in the US. For example, Mian et al. (2010) show that the amount of campaign contributions from the financial sector is a strong predictor of voting on the Economic Emergency Stabilization Act of 2008 that provided the Treasury up to 700 billion US-Dollar in bailout funds that could be used to support the financial industry. According to Blau et al. (2013), for every dollar spent on lobbying, firms received between USD 485 and USD 585 in the support of the Troubled Asset Relief Program (TARP). Firms that lobbied had a 42 percent higher chance of receiving TARP support than firms that did not lobby. Dorsch (2013) point out that TARP voting with the banking lobby is shown to be greater for legislators from districts where employment in financial firms is important electorally. District heterogeneity implies district-specific electoral constraints on legislator's abilities to collect rents from special interests. Moreover, Nunez and Rosenthal (2004) provide evidence that both ideology and interest group interventions are important in voting on bankruptcy legislation in the US Senate. Roughly fifteen votes in the U.S. House of Representatives appeared to have been changed directly through interest group pressures proxied by campaign contributions.

Network connections

Career incentives can play a role, since the regulators' human capital is highly industry specific and the best job for people holding that specific human capital are with the regulated industry. As argued above, people regulating the financial industry largely come from that industry or interact with that industry in their social live.

Becker and Morgenson documented Tim Geithner's social interactions during his time as head of the Federal Reserve Bank of New York in their "New York Times"-article (April 26, 2009). Interestingly, these personal ties seem to have a market value. Acemoglu et al. (2010) find that Geithner-connected financial firms gained abnormal positive returns to shareholders following the announcement of Geithner's nomination for Treasury Secretary.

Faccio et al. (2006) provide a possible explanation for this "network"-premium. They demonstrate that those firms with at least one of its top officers or one large shareholder having been head of the state or a member of the national Parliament are significantly more likely to be bailed out than similar non-connected firms. Thereby, financial institutions are more likely to appoint politicians if the bank faces structural problems. For example, in a sample of Turkish banks it turns out that the appointment of former

Parliament members generates higher access to deposits at lower costs, especially if the former politician's party is currently in power (Disli et al. 2013).

In a broader context, Igan and Mishra (2011) empirically examine the effects of network connections of financial firms on voting patterns of legislators, using US data from 1999-2006 which include the bills targeted, lobbyists hired, lobbying expenditures and campaign contributions as a measure of network connections. They find strong evidence that network connections were positively linked to the probability of a legislator changing position in favor of corrosive regulation. Their evidence highlights that hiring connected lobbyists who had worked for legislators in the past enhanced the effectiveness of lobbying activities. Vice versa, Goldman et al. (2009), using data of 500 S&P companies in the US, show that stock prices increase abnormally following the announcement of the nomination of a politically connected individual to the board.

Braun and Raddatz (2010) present stylized facts at the macro level about the politician-banker nexus as a form of lobby influence. They point out that countries with politically connected banks are different from those with unconnected banks. The connectedness is strongly negatively linked with economic development and more prevalent where coalitions between bankers and politicians are likely to be less costly and more influential. Network connections turn out to be positively related to corruption but negatively with accountability of politicians.

Cultural capture

Finally, the recent financial crisis has also provided an alternative explanation for why the financial sector has gained the cooperation with the regulatory community: not simply by appealing to material self-interest, but also by convincing society that corrosive regulation is in the public interest. Indirect capture of agencies by means of capturing of the academic profession on which regulators rely for expertise or even appointments can shape the regulatory landscape (see Box 4.2 for a discussion of the franchise value theory).

Theoretical models become "chameleon" models (Pfleiderer 2014) when they assert that they have relevant policy implications, but when challenged about the reasonableness of its assumptions and its connection to the real world, they emerge being theoretical bookshelf models that have diplomatic immunity. Pfleiderer (2014) illustrates the misuse of theoretical models in banking with the paper "Why high leverage is optimal for banks" (DeAngelo and Stulz 2013) that establishes that banks should be 100 percent funded by deposits due to the bank's role as producer of liquidity. However, this corner solution is only obtained, if the authors rule out many important aspects in

banking, such as agency problems, safety net provision, systemic risk and other distortionary factors that determine financial markets. Nonetheless, the model was cited in the media (e.g. by "The Economist") and therefore contributes to the public discussion concerning reforming the banking sector.

Alaisdair Turner has referred to a "cognitive capture" to describe the incentives of banking regulators and researchers to engage in "industry-friendly problem solving" together with the regulated industry itself.⁷⁵ This form of capturing becomes more relevant if the same individuals represent the regulatory community as well as the regulated entities; for instance, Jaques de Larosière, former governor of the French central bank and simultaneously head of the Market Monitoring Group by the IIF, the key international banking lobby group, is the author of a widely read influential European Commission report on the lessons of the crisis for European financial regulation.⁷⁶

When the regulators share social ties to the industry and are more sympathetic to the industry's understandings about the world, she is able to shape the regulators' belief (Kwak 2013). As a result, she might induce them to identify with their interests, and the regulatory community might make "conflict-free" decisions because her conception of the public interest has been colonized by the industry.

Box 4.2 Franchise Value Theory

As highlighted in the safety net model in chapter 3 prudential forms of regulation would want to impose capital requirements to increase the bank's stake in their franchise and thereby discourage risk-taking. However, in the 1990s a new theoretical argument was introduced by economists that soon entered the policy debate on the regulation of banks.

The franchise value theory states that a high net present value of a bank will increase a bank's cost of bankruptcy and thereby induce the bank to invest more prudently in less risky portfolios compared to a bank that has nothing to lose. Banks should be allowed to make positive margins to enhance financial stability (Keeley 1990; Allen and Gale 2004; Hellmann et al. 2000a; Cordella and Yeyati 2003). If we assume that the bank does not distribute all dividends after each

period, in economic terms this franchise value effect is a substitute for an increase in capital requirements, because both measures result in higher downside risk for banks. Critically, the main difference between both approaches is the distributional consequence, since the burden of boosting a bank's franchise value, e.g. by stifling bank competition and ensuring monopoly rents, is born by consumers or depositors, whereas the burden of increasing capital requirements is born by the owner of banks. In other words, the franchise value theory can be used by the banking lobby as an economic justification for setting restrictions on bank competition (Hellmann et al. 2000a), vis-à-vis allowing (safety net motivated) merger and acquisition activities or motivating a lender of last resort policy (Cordella and Yeyati 2003).

⁷⁵see Alaisdair Turner, "Interview with financial crisis inquiry commission staff", 2010.

⁷⁶Another prominent example and manifestation of the close alliance of the regulatory community and the regulated entities is Marc Saidenberg, member of the Basel Committee during drafting Basel III, but also head of regulatory policy at Merrill Lynch and member of the IIF Committee on Market Best Practices until 2008.

4.4.3 Policy lessons

In the light of the ongoing debate about changing the regulatory environment for banks, especially concerning their investment policy by creating discriminating instruments, there might be the threat of distortions comparable to the British experience of the 1960s. Measures of financial repression, or in general, of distortive regulation favoring specific groups not only suppress growth; moreover, they allow the government to extract lobby contributions to make the policy attractive for the electorate.

Accordingly it follows that an efficient policy of portfolio regulation may benefit from an insulation of political rent-seeking and from clear rules of accountability for the responsible regulator.

First, to address the inherent conflict of interest of a self-interested government, the domestic regulation of a bank's investment policy should be delegated to a transparent and independent authority or constrained by supranational law. Our analysis suggests that financial repression becomes feasible if regulation induces excessive investments in sovereign bonds. However, if there is a limit on the bank's concentration of sovereign debt (like it is the case for any other asset in a bank's balance sheet), the crowding-out effects that constitute rent creation and the electoral support of wealthy citizens to the politician is alleviated.⁷⁷ Thus, with respect to the international harmonization of banking regulation, we strongly recommend a harmonization of maximum government debt holdings by banks.

Second, better political institutions should allow citizens to control opportunistic policies that benefit a subgroup of citizens. If the political system becomes more accountable, lobbying for financial frictions becomes expensive. Greater political accountability, defined as the shadow cost incurred by politicians by reducing welfare, induces lobby groups to accept lower credit frictions. As a result, the lobby of supporters will make less contributions and there are lower levels of financial repression. By informing voters, media help make politicians more sensitive to the interests of their constituencies and less prone to being lobbied by the group of supporters. Dyck et al. (2008) argue that profit-maximizing media firms can play an important role in reducing the power of vested interests.

The implication that competition increases with greater political accountability is empirically supported by Perotti and Volpin (2012). They show that countries with higher

⁷⁷Another possibility to alleviate crowding out effects on part of SMEs is to establish a standardized and transparent securitization program that transforms relatively illiquid loans to SMEs into an asset class with high market liquidity. Brunnermeier and Sannikov (2014) propose a new European asset class for SMEs that would re-establish cross-border financial intermediation within the euro area.

newspaper circulation have more intense competition in the product markets, and that access to finance plays a role. The reason is that media diffusion (measured as daily newspaper circulation) appears important for dispersed citizens to monitor the actions of politicians and induce policies sensible to citizen's preferences (Besley and Prat 2006). According to Perotti and Volpin (2012) countries with more accountable politicians have more entrepreneurship and a higher density of producers in financially dependent industries. This is also in line with the finding that high corrupt countries produce high entry barriers (Djankov et al. 2002).

4.5 Concluding remarks

This chapter highlights the critical role advocacy coalitions of banks with real sector interest groups play when policy-makers manipulate rules governing the financial sector. The importance of access to credit and the allocation of finance as a source for rent creation makes bank policies an important tool in the policy process. The reason is that subsidized credit programs are indirect forms of fiscal policy that have long-run distributive effects within the society for example, by allowing entry of competitors or determining growth opportunities of a specific sector. Since the regulatory rent is shared, the banking lobby has the opportunity to build strategic coalitions to create and maintain subsidy programs which in turn affect electoral outcomes. Therefore, this chapter shows how a group of actors with shared economic interests evolves when the policy-maker intervenes in a bank's decision of credit allocation by discriminating specific forms of investment.

This chapter formalizes this process with a model of endogenous policy formation when there is electoral discipline and groups can use contributions. Politicians are portrayed as choosing bank policies to maximize probabilities of re-election. Hence, the political choice emerges as a trade-off between the regulatory rents for the coalition created by policy intervention and the associated welfare loss for the society. The mechanism is motivated with the example of financial repression in the form of a zero risk weight of capital requirements for sovereign bonds that is observed in the light of the recent financial crisis. The model argues that the privilege is an effective way of changing the distribution of income through the back door and creating electoral support for this specific form of deregulation of the banking sector. However, the argument of directed lending for populist goals can be generalized to other specific forms of subsidy programs, such as the regulatory treatment of hedge funds, mortgages or small and medium-sized enterprises.

5 Optimal national banking regulation*

This chapter adopts a public interest view on banking regulation to discuss how the regulatory-supervisory system should be designed to limit the frequency and cost of a banking crisis. In contrast to the previous chapters, the regulator's objective abstracts from electoral support and only aims to prevent a costly breakdown of financial intermediation. Accordingly, a model of banking regulation with two policy instruments is developed: both minimum capital requirements and the supervision of domestic banks alleviate the vulnerability of banking. The model shows that a mix of both instruments minimizes the costs of preventing the collapse of financial intermediation. However, once allowing for cross-border banking, the optimal policy is not feasible and countries are better off by harmonizing regulation on an international standard.

5.1 How can a banking crisis be efficiently prevented?

In economic theory, banking crises are considered as a manifestation of imperfect information. As demonstrated by the recent financial crisis, asymmetric information between depositors and banks can cause the breakdown of financial intermediation. For the state, this is not only costly in terms of fiscal costs (e.g. due to deposit insurance obligations); moreover, there is also broad empirical evidence suggesting that financial intermediation is an important growth enhancing mechanism (King and Levine 1993; Beck et al. 2000). Studies suggest that the probability of a value-destroying banking crisis responds to two factors: changes in the minimum capital requirement regulation (Barth et al. 2006, Laeven and Levine 2009) and changes in domestic supervision (Mitchener and Jaremski 2012, Buch and DeLong 2008).

Intervention via capital requirement regulation can be justified with moral hazard incentives. Banks do not fully internalize the benefits of equity because they are shielded at least partly against the downside risk of their investments by the banking safety net. Therefore, limited liable banks have an incentive to take excessive risks. Requiring banks to refund their investments with a minimum equity rate is a regulatory instrument that shifts the risks borne by the safety net back to the shareholders. Hence, moral hazard and the incentive of excessive risk-taking is reduced, as shown by Sinn

*Parts of this chapter are published and base on Buck and Schliephake (2013).

(1980), Rochet (1992), Hellmann et al. (2000a) and Repullo (2004). Furthermore, higher capital requirements increases the risk buffer of banks and thereby decreases both fiscal cost of a crisis to taxpayers as well as the risk of contagion among banks, as pointed out by Allen and Carletti (2013) or Admati and Hellwig (2013).

Supervision can be justified as protecting the unsophisticated depositors. For example, by making banks "fit and proper", people may be more willing to put their savings in banks, rather than having it outside financial intermediation in less productive places, with negative effects on the economic development. By definition, supervision moderates the exit of failed business models and hence affects the market structure and conduct in the banking sector.

The following narrative illustrates this point: On Sunday, March 5 1933, the newly inaugurated US President Franklin Roosevelt proclaimed a fourday suspension of all banking transactions after a month-long bank-run. In a 15-minutes radio address to the American people he declared that only safe banks would be licensed to re-open by the US Treasury.

"People will again be glad to have their money where it will be safely taken care of and where they can use it conveniently at any time. I can assure you that it is safer to keep your money in a re-opened bank than under the mattress."⁷⁸

Convincing citizens of the integrity of the banking system was critical, as the recovery from Depression depended on the functioning of the banks and the end of hoarding behavior by depositors.

Such a requirement to have "safe and sound" tests for potential entrants into banking is not only crucial for detecting mismanagement, but also reflects a long history of fraud in finance (Kindleberger 1996), which, if left uncontrolled, can lead the society to avoid the formal banking sector. Caprio and Klingebiel (1996) show that outright looting is a main factor for the frequency and cost of many banking crises in developing countries.

The toolkit for prudential regulation that protects the banking system from a financial crisis therefore comprises two elements: policies that limit risk-taking incentives via capital requirement regulation and direct measures of screening that enhance the ability of the average bank to control risk (selection). However, the interplay between capital requirements and supervision has not received much attention in the academic and the public debate. Supranational reforms to date have concentrated on the design of capital regulation, whereas the specific standards of supervision remain left in the hands of national authorities. Even after two substantial revision processes, the main

⁷⁸New York Times, March 13, 1933, p. 1.

focus of the Basel Accords created by the Bank of International Settlements remains the regulation of capital and liquidity standards.⁷⁹

To fill this gap, the focus of the following analysis is the question, in what way both policies can ensure financial intermediation and are able to reduce a country's susceptibility to financial crises?

5.1.1 The argument: Capital regulation and supervision

This chapter disentangles the regulator's choice between higher capital requirements and more supervision by explicitly considering both policy instruments to secure the stability of a domestic banking sector. Due to the coexistence of moral hazard and adverse selection, we show that both instruments are needed to ensure financial intermediation at the lowest costs. Intuitively, both problems result from asymmetric information regarding the actual riskiness of banks. Supervision reduces the adverse selection problem and the probability of a crisis, whereas capital regulation solves an individual bank's moral hazard problem, reducing the cost of a market breakdown. Therefore, a regulator minimizes the expected cost of a collapse via a neo-classical production function with both input factors. However, the cost burden of intervention differs: the cost of increasing capital is born by the banks, and the cost of supervising and improving the banking sector is borne by the regulator and usually by taxpayers.⁸⁰ Interestingly, if we allow for a certain degree of biased preferences of the regulator, this highly stylized model yields a rich set of results.

This chapter examines the optimal regulation of a banking sector in a closed economy that comprises banks, which differ with respect to their ability to control the risk of their investment projects. If depositors cannot observe the actual ability of each bank, they will deposit less money in banks compared to fully informed depositors. To reduce the inefficiency stemming from asymmetric information, the regulator selects an optimal combination of a minimum capital requirement level, which incentivizes banks

⁷⁹Although the regulatory framework encourages convergence towards common supervisory standards, the rather general implementation guidelines are by far less detailed and matured than the regulation of capital requirements, which leaves national authorities room to incorporate supervisory practices that are best-suited to their own national systems. As a result, one may observe considerable variations in supervisory standards in jurisdictions that are adopting the Basel framework. Regulation differs, for example, with respect to definitions of the requested reporting items, time-tables or technical details.

⁸⁰This assumption is consistent with recent empirical findings, such as those by Masciandaro et al. (2007), who analyze the financial governance of banking supervision in a sample of 90 countries. The authors conclude that full public financing is the most common budgetary arrangement for central banks as banking supervisors. However, some may be financed by both taxpayers and supervised institutions which is the case in Germany where the banking sector pays half of the costs.

to control their risk, and supervisory effort, which influences the quality of the banking sector (i.e. the proportion of banks that are able to control their risky investments). Her optimal choice depends on both the cost of supervisory effort in influencing the quality of the average bank and the weight a regulator places on the rent or the size of the domestic banking sector. This cost-minimizing approach represents a rather broad view of regulation compared to the prudential framework found in most of the existing literature.

In an extension we show that with institutional competition among regulators, the optimal combination of policy instruments crucially depends on the observability of differences in national regulation in the banking sector. Jurisdictions evolve into a "club" supplying a regulatory framework for banks. In such a situation, the regulatory costs of preventing the breakdown of financial markets increase with the mobility of banks. Moreover, if depositors cannot distinguish between different national regulatory regimes, incentives to underbid the other country's capital ratios emerge, resulting in a high probability of a collapse. This finding of a deregulation race implies that competition among regulators causes a rent-shifting between banks and taxpayers compared to the optimal policy mix in autarky, which always reduce domestic welfare.

5.1.2 Related literature

The presented model contributes to the literature on the fragility of financial intermediation, originally initiated by Sinn (1980). If people's liability to pay is limited and there is a lower downside risk if they fail to pay their debts, then they might have an incentive for excessive risk on the presumption that, if the gamble succeeds, they win, and if the gamble fails, their creditors lose (the so-called BLOOS-rule, *you cannot get blood out of a stone*; see also Stiglitz and Weiss 1981 in a credit market equilibrium context). Accordingly, undercapitalization of banks can trigger a financial crisis by inducing gambling behavior when banks enjoy the privilege of limited liability (Sinn 1980; and later adapted by Rochet 1992, Dewatripont and Tirole 1994, Holmstrom and Tirole 1997; Sinn 2003 for implications). With asymmetric information between lenders and banks this gamble for resurrection is catalyzed, since banks offer their lenders lemon bonds and consequently have no incentives for prudent investment decisions. To address this market failure regulators need to impose capital requirements.

The role of capital regulation in ameliorating bank's moral hazard and its interactions with incentives coming from bank's future profits is analyzed in Hellmann et al. (2000b) and Repullo (2004), where banks can earn permanent margins due to market power. Incentives for risk-shifting erode with a higher franchise value, *i.e.* discounted expected

profits of a bank. Boyd and De Nicolo (2005) and Martinez-Miera and Repullo (2010) further explore this link in the presence of an additional entrepreneur-incentive channel where banks cannot perfectly control the risk-profile of their clients.

The model of this chapter adapts the idea of lemon banking, introduced by Sinn (1980), and analyzes a competitive banking sector where banks are heterogenous with respect to the ability to control the risk-return structure of their portfolio. However, we allow for a second regulatory instrument to govern the banking sector, namely banking supervision to solve the classical lemons problem à la Akerlof (1970). This ultimately allows us to analyze the cost-efficient mix to prevent the breakdown of financial intermediation.

Banking supervision, i.e. prudential oversight of financial institutions, is an important method for reducing the adverse selection problem and to enhance the (deposit) market's information set. Since bank bonds are informationally-sensitive and hard to evaluate for outsiders, investors are not able to anticipate all relevant information. Instead, market prices are strongly affected by supervisory announcements and inspections (Berger and Davies 1998; Jordan et al. 2000).⁸¹ Following Morrison and White (2005) chartering banks is one central tool for preventing adverse selection problems. We capture this idea by modeling the breakdown of financial intermediation as a confidence crisis where uninformed depositors are unwilling to give their money to a bank which they select at random. We show that regulators can forestall the withdrawal of deposits ex-ante by investing in supervisory technology, thereby improving their perceived ability to discriminate between good and goofy banks.

The results of the second part of this chapter are related to the small but growing theoretical literature on the economics of regulatory competition in banking. In a globalized world, regulators must consider that banks seek to go abroad and thus must address externalities created by mobile banks. Empirical studies document increased foreign bank entry in many economies; for example, Barth et al. (2006) show in a sample of 91 countries that on average 45% of banking assets were owned by banks that are more than 50% foreign owned. A recent study by Ongena et al. (2013) provides an analysis of spillover effects of national capital requirement regulation and supervision on the lending behavior of cross-border banks. The authors find empirical evidence that stricter regulation and supervision in the home country reduces risk-taking among

⁸¹Morgan (2002) empirically supports significant opacity in the banking sector by comparing the frequency of disagreements among bond-rating agencies regarding the values of firms across sectors of activity. Disagreements are higher for financial institutions than for other economic sectors. In addition, Iannotta (2006) provides evidence that a bank's opaqueness increases with its financial assets, bank size and capital ratio. Flannery et al. (2013) find significant bank balance sheet opacity during times of financial crisis, as well as evidence that capital and policy actions increase transparency and substitute for each other.

banks but increases risk-taking in lending in foreign countries. Their findings suggest that national capital regulation and supervision may have important spillover effects. Instead of enhancing bank stability, stricter capital regulation and supervision may simply reallocate the risk-taking behavior to other countries.

Kilinc and Neyapti (2012) develop a general dynamic equilibrium model to analyze the joint welfare implications of stricter capital regulation and supervision. In their model banking regulation and supervision have the same impact on the economy: they reduce transaction costs and thus increase the efficiency of financial intermediation. Because more efficient financial intermediation facilitates economic growth, the authors show that an increase in regulation and supervision unambiguously increases welfare.

This chapter makes a similar argument; however, we are interested in the particular adverse effects of each policy instrument on the efficiency and size of the banking sector. With a partial equilibrium analysis we derive the optimal input mix of both instruments to establish financial intermediation at minimum cost. In other words, we address the Coasian question of an optimal selection of regulatory policies in the banking sector - but we incorporate market frictions such as restricted access to markets and asymmetric information, which are not considered in standard general equilibrium models. Analyzing the regulator's incentives to use each specific instrument subsequently allows us to discuss the welfare implications of international competition in capital requirement regulation among heterogeneous countries. In such a framework we support the fundamental result of Sinn (1997), showing that non-cooperative setting of capital requirements is lower than a coordinated policy. The reason for the disincentives to introduce stricter regulation is the opaqueness of regulatory intervention on international capital markets. He argues that states only intervene in private markets if the invisible hand fails (selection principle); accordingly, Sinn shows that a reintroduction of a market through the backdoor of systems competition does not work. This chapter extends Sinn's (1997) seminal work by allowing for the possibility of supervisory interventions by states.

The analysis of cost-efficient regulatory intervention provides a rationale for the international harmonization of minimum capital standards à la Basel when banks shop for their regulator. We show that the equilibrium outcome of regulatory competition is welfare-inferior compared to a world with closed economies. Consequently, there are two driving forces for the international harmonization of capital requirements: (1) independently of the information structure, harmonized capital regulation counters a regulatory race that increase the overall cost of intervention, and (2) the network benefits of harmonization make optimal regulation cheaper for national supervisors.

5.2 The economic model: A cost-minimizing approach

5.2.1 Lemons equilibrium without regulation

The arguments are developed in a partial equilibrium model with three types of risk-neutral agents: regulators, banks and depositors.⁸²

Consider a continuum of banks normalized to 1. Banks simply collect funds from depositors and equity investors to finance risky projects. Unmonitored projects return R in the case of success with probability p_L and zero in case the of failure with $(1 - p_L)$. Suppose that a fraction $\theta \in [0, 1)$ of banks has access to a monitoring technology, which allows them to increase the probability of project success to $p_H = p_L + \Delta p > p_L$ at a cost m . We call these banks efficient. The remaining banks in the national banking sector $(1 - \theta)$ are said to be goofy.

Equity is assumed to be expensive and thus to be scarce, i.e. the opportunity cost of equity ρ is greater than the efficient investment, $\rho > R \cdot p_H$. The assumption that bankers prefer to economise on equity is a regular assumption in banking theory, but not undisputed. The assumption is commonly justified by the scarcity of bankers' wealth (*e.g.* Morrison and White 2005) or the existence of agency problems (*e.g.* Holmstrom and Tirole 1997). In line with the analysis of the previous chapters high opportunity cost of equity may also capture the underpriced safety net for banks generating incentives for debt-finance. We interpret banks' lobbying for lower capital requirements as evidence in support of an existing cost advantage of debt over equity. As a consequence, we conduct our analysis under the premise that banks do not invest equity in an unregulated world, but prefer to be financed by deposits.

A large pool of depositors, each endowed with 1, may either invest in a riskless storage technology yielding a certain return of $\gamma \geq 1$ or lend it to a bank without any form of deposit insurance. Therefore, banks may raise deposits as long as the offered expected return on deposits exceeds the depositor's outside option $r_D \geq \gamma$. Let $R \cdot p_H > \gamma > R \cdot p_L$ such that non-monitored projects have a negative expected value. This relationship implies that a depositor is unwilling to deposit with a bank that does not monitor. However, due to banks' opaqueness, a bank's type is supposed to be private information and cannot be credibly communicated to depositors. Therefore, the decision to deposit depends on the average quality of banks in the economy provided that efficient banks have enough "skin in the game" in the form of equity to monitor their projects.

⁸²The basic setup again follows Holmstrom and Tirole (1997) and Morrison and White (2005), with perfect correlation of risk for each type of bank. Alternatively, assume that depositors are fully insured, but the insurance risk premium to be paid by the banks depends on the average risk in the banking sector. We will discuss the case of safety net provision in the extension 5.3.1.

This unobservability assumption reflects information asymmetries between depositors and banks and is in line with traditional banking models as well as recent empirical findings. The opacity of the banking sector implies that depositors cannot distinguish between banks based on their individual balance sheets. In particular, a single bank is unable to signal its quality by any choice variable such as additional equity, profits or the leverage ratio. Depositors may only observe the minimum capital requirement standard implemented by the national regulator. Given that inside equity funding is costly and cannot be used by banks to signal their quality due to balance sheet opaqueness, any bank will intuitively minimize costly equity capital so that capital requirements are always binding. First, consider an unregulated economy in which no bank is willing to hold equity.

We model the breakdown of financial intermediation as a confidence crisis where depositors are unwilling to give their money to a bank which they select at random. We now may construct two conditions for the existence of financial intermediation, i.e. depositing: first, monitoring must be incentive-compatible for efficient banks. The fraction θ of banks will choose to monitor projects only if the return from monitoring exceeds the return from not doing so, i.e. $(R - r_D)(p_L + \Delta p) - m \geq (R - r_D)p_L$. Therefore, banks must receive a sufficiently high rent to be incentivized to monitor. In other words, the monitoring incentive compatibility constraint for efficient banks provides an upper bound on the deposit rate:

$$r_D \leq r_D^{MIC} := R - \frac{m}{\Delta p}. \quad (5.1)$$

This upper bound on the refinancing cost is increasing in the value added of monitoring $\frac{\partial r_D^{MIC}}{\partial \Delta p} > 0$ and decreasing in the cost of monitoring $\frac{\partial r_D^{MIC}}{\partial m} < 0$. Any deposit rate $r_D > r_D^{MIC}$ will destroy the efficient bank's incentives to monitor, and will result in a homogenous banking sector where the probability of the project succeeding equals p_L . If $r_D \leq r_D^{MIC}$ depositors anticipate that the fraction θ of banks engage in monitoring. Knowing the overall fraction of banks with monitoring technology allows for the deduction of an expected unconditional probability of project success of $(p_L + \theta \Delta p)$.

Note that the monitoring incentive constraint also excludes the possibility that efficient banks signal their quality through higher deposit rates. Any bank that would offer a deposit rate $r_D \leq r_D^{MIC}$ cannot credibly commit to monitor and cannot signal its efficiency due to higher deposit rates in equilibrium.⁸³

⁸³The efficient banks would be able to credibly signal their type by offering a higher deposit rate only if they make higher profits than goofy banks. To see that such a case is not feasible, note that no bank is able to attract depositors by offering an interest rate that is higher than the monitoring incentive constraint r_D^{MIC} , because depositors would foresee that efficient banks lack

Anticipating this average probability, depositors are willing to deposit their endowments at the bank if the expected return from depositing exceeds their outside option $r_D \cdot (p_L + \theta \Delta p) \geq \gamma$. Therefore, the second condition for depositing is given by the participation constraint from depositors, which yields a lower bound on the deposit rate. Depositors require at least a deposit rate that is equal to, or greater than

$$r_D^{PCD} := \begin{cases} \frac{\gamma}{p_L} & \text{iff } r_D > r_D^{MIC}, \\ \frac{\gamma}{p_L + \theta \Delta p} & \text{iff } r_D \leq r_D^{MIC}. \end{cases} \quad (5.2)$$

Owing to the perfectly elastic supply of deposits, i.e. no competition among banks for deposits, the depositor's rent is eroded, resulting in a binding participation constraint denoted by $r_D[\theta] := \frac{\gamma}{p_L + \theta \Delta p}$ if θ efficient banks monitor.

However, financial intermediation is only possible in an opaque banking sector when the deposit rate that is required by depositors does not violate the bank's monitoring condition. If the natural fraction of efficient banks is sufficiently high, financial intermediation may exist without any regulatory intervention. However, throughout this paper, we will assume that the "natural" proportion of banks that have access to a monitoring technology is too small so that unregulated depositing is not feasible without any regulation.⁸⁴

Definition 1 (*Lemons Equilibrium*) *If $\theta < \hat{\theta} := \frac{\gamma}{\Delta p R - m} - \frac{p_L}{\Delta p}$, financial intermediation is on average less productive than investments in the storage technology and the banking market disappears.*

Proof: *If $\theta < \hat{\theta}$, it follows that $\frac{\gamma}{p_L + \theta \Delta p} > R - \frac{m}{\Delta p}$. Depositors correctly foresee that no banks are willing to monitoring. From (5.2), it is clear that depositors require $r_D = \frac{\gamma}{p_L}$ to participate. However, for $\gamma > R \cdot p_L$, no bank would be able to pay such a deposit rate without experiencing losses, i.e. the required return for the depositor's participation constraint to hold will violate the participation constraint of the non-monitoring banks. Although lending to efficient banks is socially valuable, depositors are unwilling to deposit, leading the banking market to break down; a lemons equilibrium à la Akerlof (1970) emerges.*

the incentive to monitor. They would require a deposit rate $r_D = \frac{\gamma}{p_L} > R$, which is strictly higher than the return a bank makes from investing the deposits. Therefore, the maximum interest rate that unregulated banks can credibly offer is r_D^{MIC} (or with binding capital regulation r_D^{MICk}). By definition, this deposit rate is the rate that equals the profit of monitoring efficient and goofy banks.

⁸⁴The participation constraint of a monitoring bank is given by the condition of non-negative profits: $(R - r_D)p_H - m \geq 0$ and hence $r_D \leq r_D^{PCE} := R - \frac{m}{p_H}$. Note that the lower bound on the deposit rate of the efficient bank's participation is always above the MIC, as $p_H > \Delta p$ and the MIC will be violated first. By contrast, goofy banks will make non-negative profits whenever $(R - r_D)p_H > 0$, which is the case for any deposit rate $r_D \leq r_D^{PCG} := R$.

In a lemons equilibrium, even banks with efficient monitoring technology would not be able to raise funds and no investments would be made, even though monitored projects could create value. Efficient banks leave the market for financial intermediation. As a result, the financial market is unable to channel funds effectively to firms that have the most productive investment opportunities.

In the following sections we argue that the market inefficiency caused by asymmetric information may be alleviated by two alternative policy instruments: supervision and capital standards.

5.2.2 The effects of supervision

We now introduce the first policy instrument used to ensure financial intermediation and foster depositors' confidence in the banking sector, which simultaneously influences the composition of efficient and goofy banks. The information asymmetry between the depositor and the bank can be addressed, at least in part, through an institution that provides some kind of guarantee about the quality. For example, a bank license being "safe and sound" provides some form of basic quality standards and quality assurance. The expected effect of "safe and sound" tests is to avoid the decline in the market size of financial intermediation (and perhaps even market extinction).

To do this, the regulator has the possibility of spending resources on supervisory officers, watchdog institutions, and specialized equipment to prevent goofy banks from obtaining a licence. The regulator controls the pool quality of the banking sector in a direct way via screening and auditing domestic banks, via on- and offside examinations, or via disclosure requirements to select out goofy banks. Historically, this was the first intervention in the banking sector to protect the safety of financial markets.

In terms of the model, the fraction of efficient banks in our economy and thereby the absolute number of goofy banks G , is the output of the regulator's investment in a supervisory technology. In other words, for a given size of the banking sector, we endogenize $\theta = \frac{E}{E+G}$ reflecting the supervisory effort e of the national regulator with $\theta(e) = f[e]$, $\theta(0) = 0$ where f is a production function for the pool quality in our economy. Given f , a higher level of effort spent on running supervisory agencies and institutions to evaluate the soundness of national banks, facilitates the discovery of offenses and the identification of goofy banks. Barth et al. (2006) demonstrate that 80 percent of all countries impose basic requirements to screen entrants to better ensure that they are "fit and proper".

However, prudent supervision is costly and increasingly complicated, due to the growing complexity of financial products, firms and markets as trade and innovations in

information and communication technologies has expanded significantly. Forms of informational lobbying by the banking sector as discussed in Chapter 4 may also represent additional cost for prudent supervision. According to Goodhart et al. (2013) the cost of banking supervision may be divided into three classes: the institutional cost of operating supervisory agencies, the costs of compliance and structural costs which include ways in which supervision affects markets such as the possible impairment of competition. All of these costs become excessively burdensome with the regulator's investment in supervision.

Therefore, let the cost of supervision be continuously increasing in effort, convex, and twice differentiable $c[0] = 0$, $c[e^{max}] = \infty$, $c'[0] = 0$, $c'[e] > 0$, $c''[e] > 0$. Intuitively a regulator has a certain capacity (manpower or time) that allows her to screen only a limited number of banks. It is straightforward that she may enhance the pool quality of the banking sector, if she supervises with great intensity. Although doing so would be easy and cheap for one bank, an increase in the number of supervised banks may increase the institutional cost. For too many banks, it might not even be at all possible "to keep an eye" on each bank. In addition, the excess burden of supervisory activities (structural costs) increases with the number of banks supervised.

To keep the model simple and tractable, we parametrize θ as a linear increasing function of effort such that $e = \theta$ where the cost function is equal to $c[e] = \frac{c}{2} \cdot \theta^2$. The source of financing of banking supervision is assumed to come directly (budget assigned by government) or indirectly (seigniorage) from taxpayers via lump-sum taxes that do not change the investment choice of households.⁸⁵ Accordingly, a better screening ability of the regulator, reflected in a lower marginal cost of supervision c , implies less for taxpayers and fewer goofy banks in the banking sector for a given cost level. It follows that regulators that face high supervisory effort costs, may allow more goofy banks. They show this behavior not because their basic motivation differs but because their benefits and costs differ from a regulator that faces less effort cost. In other words, the efficiency of a supervisor's technology determines the ex-ante composition within the national banking sector.

The introduction of supervision does not affect the *MIC* of efficient banks, but does change the composition of the banking sector, and thus shifts the *PCD* of depositors downwards. The intuition is simple: depositors will encounter investment in supervision by adapting their beliefs of the overall market quality and thus the required deposit rate, given that efficient banks have an incentive to monitor. The pool quality improves so that the critical deposit interest rate r_D that ensures participation of de-

⁸⁵See Masciandaro et al. (2007) for an in-depth analysis of the financing sources of banking supervision for 90 countries. The authors show that public financing is the most common budgetary arrangement for central banks as supervisors.

positors drops. All banks benefit from screening provided by the regulator because of lower deposit rates. As a consequence, the profits of the remaining banks are greater in jurisdictions with better supervision ability, i.e. lower supervisory costs, $c[\theta]$. The highest rent per bank may only be achieved when efficient banks are left in the banking sector, such that $\theta = 1$ (although this would imply a prohibitively high effort cost).

However, it is possible that the outside option of the depositor may subsequently exceed the value-added from monitoring. This implies that the expected value of the depositors' alternative investment is more profitable than the expected return of efficient bank investments. Hence, a policy of supervision has a natural limit where the banking market freezes regardless of the level of supervisory effort.

Lemma 1 *For a sufficient high value-added from monitoring, supervision can ensure financial intermediation. If $\gamma > p_H \left(R - \frac{m}{\Delta p} \right)$, supervision alone cannot solve the moral hazard problem.*

Proof: *Consider the highest quality a banking sector may have, $\theta = 1$, where there are only efficient banks in the sector. The deposit rate required by depositors is $\frac{\gamma}{p_H}$, provided that the MIC is not violated. However, with $\frac{\gamma}{p_H} > R - \frac{m}{\Delta p}$, this is not the case. Depositors foresee that efficient banks have no incentive to monitor and thus require $\frac{\gamma}{p_L} > R$. Without any additional capital requirement, the market breaks down.*

Even if supervision alone may solve the moral hazard problem $\theta = 1$, it might not be optimal, due to increasing supervision costs. If a country does not have the supervisory capabilities or simply the ability to raise taxes to oversee banks the regulator may be forced to take different actions. Moreover, an improved pool quality of the banking sector will lead the size of the sector to shrink. Keep in mind that an investment in supervision may be interpreted as a contractionary policy that limits the scope of financial intermediation by selecting out goofy banks.

Therefore, there might be reasons why a regulator makes use of a second policy tool. We call this tool minimum capital requirements.

5.2.3 The effects of capital standards

The introduction of a minimum capital requirement changes the individual incentive constraints of banks. The first effect of capital concerns the monitoring condition of efficient banks. To see this, note that if a bank refunds each investment by a fraction of capital k , the incentive to monitor changes to $(R - r_D(1 - k))(p_L + \Delta p) - m \geq$

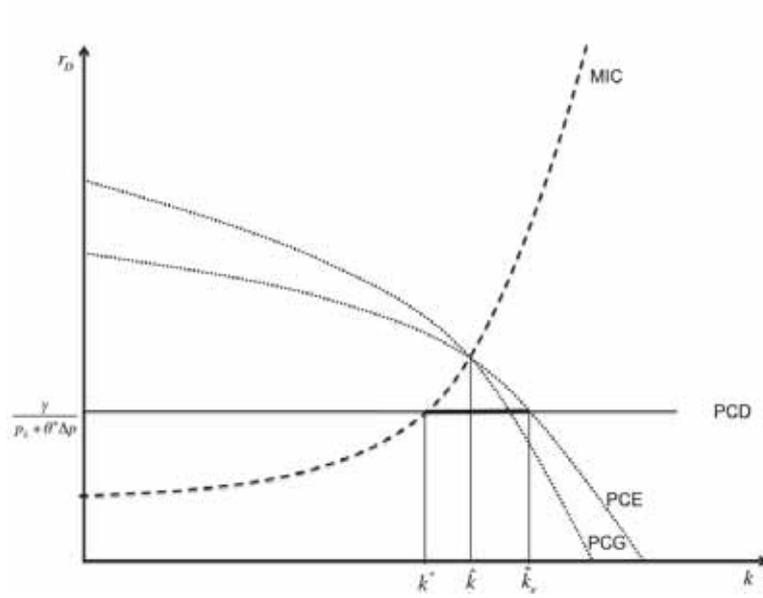


Figure 5.1: The intermediation region for a high pool quality

The figure plots the constraints on deposit rates as functions of the capital regulation, i.e. the participation constraint of depositors, PCD , the participation constraint of efficient and goofy banks, PCE and PCG , and the monitoring incentive constraint, MIC . A market for financial intermediation is possible if the imposed capital regulation is set within the feasible range $k \in [k^*, \hat{k}^e]$, where k^* denotes the minimum capital standard necessary for monitoring investments at a given deposit rate r_D , and \hat{k}^e represents the capital standard where intermediation allows zero profits for efficient banks.

$(R - r_D(1 - k))p_L$. It follows that the incentive constraint becomes

$$r_D \leq r_D^{MICk} := \frac{R - \frac{m}{\Delta p}}{(1 - k)} > r_D^{MIC}. \quad (5.3)$$

This tells us that a capitalized bank, which refunds a proportion of its investments with equity, is able to pay higher deposit rates without violating its incentive constraint. Because $\frac{\partial r_D^{MICk}}{\partial k} > 0$, the incentive constraint (MIC) is upward sloping in a deposit rate-capital ratio space. Efficient banks wish to provide monitoring services only when the deposit rate is sufficiently low to compensate them for monitoring activities. A minimum capital requirement reduces the rent an efficient bank requires to be willing to monitor. Therefore, with more “skin in the game” efficient banks may accept higher deposit rates, while still credibly offering the assurance to monitor their projects ex-post. Figure 5.1 illustrates how the monitoring incentive constraint MIC is increasing in k . Without any regulation, depositing does not occur, as all depositors prefer to invest in the storage technology instead of lending money to banks. The equity funding rate k^* gives the minimum capital requirement rate that establishes financial interme-

diation by solving the moral hazard problem of efficient banks for a given required return of depositors $r_D[\theta]$.

However, because equity funding is costly, a higher capital requirement rate diminishes the rents of both bank types. Therefore, it also influences each bank type's incentive to participate, i.e. the break-even point which limits the range of feasible capital standards.

The participation constraint of a monitoring bank is given by the non-negative profits condition: $(R - r_D(1 - k))p_H - m - \rho k \geq 0$. Solving for a maximum deposit interest rate, we obtain:

$$r_D[\theta] \leq r_D^{PCE} := \frac{R - \frac{m + \rho k}{p_H}}{(1 - k)}. \quad (5.4)$$

Because we assumed that $\rho > p_H \cdot R$, the minimum capital requirement must be small enough to sustain the continued operation of efficient banks: $k < \hat{k}_e[r_D] := \frac{p_H(R - r_D[\theta]) - m}{\rho - p_H \cdot r_D[\theta]}$.

Goofy banks, on the contrary, will make non-negative profits whenever $(R - r_D(1 - k))p_L - \rho k > 0$, which is the case for every deposit rate

$$r_D[\theta] \leq r_D^{PCG} := \frac{R - \frac{\rho k}{p_L}}{(1 - k)}, \quad (5.5)$$

implying a break-even capital standard that is equal to $\hat{k}_g[r_D] := \frac{p_L(R - r_D[\theta])}{\rho - p_L \cdot r_D[\theta]}$. Let $\hat{k}[r_D]$ denote the capital standard that solves $MIC = PCG = PCD$. With a sufficiently high cost of capital $\rho > \frac{p_L \cdot m}{\Delta p}$, we may derive the following Lemma:

Lemma 2 *For a sufficiently high proportion of efficient banks, $r_D[\theta] < r_D[\hat{k}]$, there exists a continuum of minimum capital requirement rates $k \in [k^*, \hat{k}_e]$ that solves the moral hazard problem. Otherwise, capital requirements alone cannot guarantee financial intermediation, $k \in [\emptyset]$.*

Proof: *With $\rho > \frac{p_L \cdot m}{\Delta p}$, it can be easily shown that $0 < \hat{k} < 1$. Therefore, there exists a maximum interest rate $r_D[\hat{k}]$ that simultaneously makes the MIC (5.3) and the PCs of each bank type (5.4), (5.5) binding. Any capital requirement above \hat{k}_e would further decrease the required interest rate for monitoring incentives but violates (5.3). Therefore, there exists no capital requirement that guarantees that efficient banks monitor and are willing to participate.*

Lemma 2 tells us that observable and binding minimum capital requirements can only overcome a lemons equilibrium in the market if the fraction of efficient banks is sufficiently high. Subsequently, by decreasing the moral hazard incentives in an opaque

banking sector, efficient banks credibly commit to monitor. However, capital regulation cannot solve the adverse selection problem by crowding out goofy banks. On the one hand, it is true that for any $k > \hat{k}$, monitoring banks are more profitable than goofy banks, $r_D^{PCE} > r_D^{PCG}$. Consequently, setting a sufficiently high capital requirement $\hat{k}_e \geq k > \hat{k}_g$ will induce the exit of goofy banks first. On the other hand, depositors correctly anticipate that only efficient banks participate and monitor: The expected success of projects increases to p_H and the required return on deposit falls to $r_D = \frac{\gamma}{p_H}$. However, with lower deposit funding costs, goofy banks find it profitable to participate in banking - and re-enter the market. Therefore, crowding out goofy banks by setting a sufficiently high capital requirement cannot be an equilibrium unless the capital requirement is set such that $\hat{k}_e \left[\frac{\gamma}{p_L + \theta \Delta p} \right] > k > \hat{k}_g \left[\frac{\gamma}{p_H} \right]$. From these observations we can define the depositors' participation constraint as follows:

$$r_D^{PCD} := \begin{cases} \frac{\gamma}{p_L} & k < k^* \\ \frac{\gamma}{p_L + \theta \Delta p} & \hat{k}_g \geq k \geq k^* \\ \frac{\gamma}{p_H} & k > \hat{k}_g. \end{cases} \quad (5.6)$$

The depositors' willingness to invest does not depend linearly on the capital requirement, since a bank's probability of success is affected not by the capital structure of the bank, but only by the monitoring incentives of banks and the incentives to enter the market.⁸⁶ Intuitively, depositors require a "goofy" risk premium for the average success probability in the banking sector.

Recall Figure 5.1 where the *PCs* of depositors, efficient and goofy banks, as well as the monitoring incentive constraint are plotted. A capital standard k^* , as the intersection point of the *MIC*- and the *PCD*-curve labels the lowest capital ratio that must be implemented to guarantee the existence of a national banking sector. Capital requirements that exceed this threshold may solve the moral hazard problem induced by asymmetric information, but a prohibitive high requirement \hat{k}_e will violate the bank's participation constraint of non-negative profits. It follows that effective regulation is only possible within the feasible set $k = \{k^*, \hat{k}_e\}$. Such a policy is welfare-superior compared to an unregulated economy: The expected output of the regulated banking

⁸⁶The fact that higher equity funding does not directly influence the bank's success probability, is a result of the simplicity of our model where defaulting investment projects have perfect correlation. One major argument in favor of higher capital requirements is that equity provides a buffer against unexpected losses. Such a condition could be implemented in our model by a shock to risky investment returns, where a proportion of the projects do not succeed. When a bank has funded its investments with more equity, it will be able to absorb larger shocks; in other words, the actual return on investment covers at least the deposit liabilities. However, this additional stability enhancing buffer effect does not change our results, although it would increase the complexity of our model and is, thus, neglected.

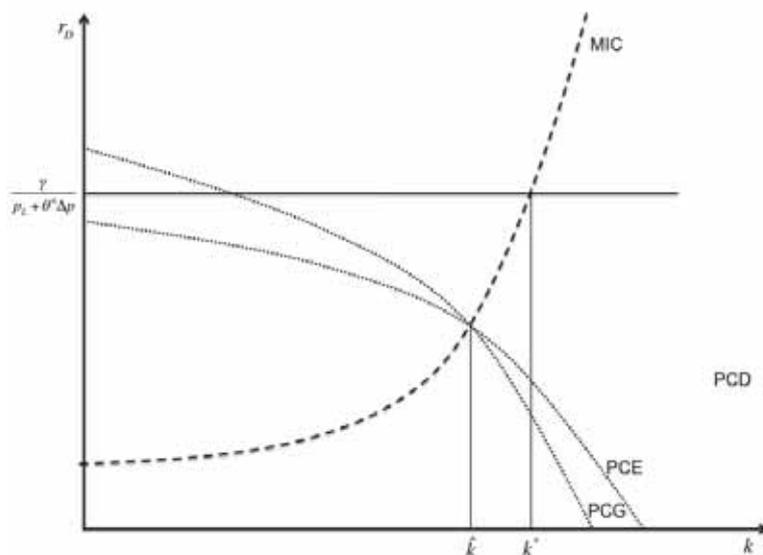


Figure 5.2: The intermeditation region for a low pool quality

The dashed monitoring incentive constraint, MIC , and the dotted participation constraints of each bank type, PCE and PCG , intersect below the depositors "participation constraint", PCD . Because the capital standard k^* that solves the efficient banks moral hazard problem is prohibitively high, no bank is willing to remain in the market. For any capital requirement policy the intermeditation region is empty.

sector is strictly higher. Because the transfer between the bank and the depositor is welfare-neutral, the level of the deposit rate is negligible from a regulator's perspective.

Definition 2 (Welfare) *A policy is welfare-superior, if the expected output of the banking sector exceeds the cost of implementation.*

One interesting corollary of the model setup is that we observe an implicit cross-subsidy for goofy banks. Efficient banks must pay higher refinancing costs in an opaque banking sector compared to a transparent one; by contrast, goofy banks face lower refinancing costs. In other words, goofy banks free-ride on the monitoring activity of their efficient competitors. This positive externality may be interpreted as a cross-subsidy equal to $\left[\frac{1}{p_L + \theta \Delta p} - \frac{1}{p_L + \Delta p} > 0 \right]$. It is straightforward that this condition has consequences for the reluctance of capital standards: if banks maximize profits, $\Pi^i = p^i \cdot (R - r_D (1 - k)) - \rho \cdot k - m$, one can show that $\Pi^E > \Pi^G$ for any $k = \{k^*, \hat{k}_e\}$.

However, Figure 5.2 illustrates the second case of Lemma 1 where the natural fraction of efficient banks is too low, and the feasible set of capital requirement regulation is empty $k = \{\emptyset\}$. Here, capital regulation alone cannot solve the lemons market;

i.e. regulation cannot implement a situation where efficient banks will monitor and participate. In this case, non-relevant capital standards yield the same outcome and welfare as in an unregulated banking sector. In other words, depositors' confidence in the banking sector is so low that only a prohibitively high capital standard k^* satisfies the monitoring condition of efficient banks and the market breaks down.

After having introduced the two parameters of our model that govern the banking sector (directly to increase the number of efficient banks via supervision or indirectly via incentivising monitoring of efficient banks with capital standards), we now analyze the optimal policy mix.

5.2.4 The optimal policy mix

The concern of the regulator is to prevent the breakdown of financial intermediation at the lowest cost. To reach this goal, she must balance the cost and benefits of both policy instruments which are driven by the characteristics of the domestic economy. However, we allow for the possibility that the regulator has a certain preference for both instruments; in other words, she weighs the rent of domestic efficient banks and the rent of the taxpayers.⁸⁷ If one policy instrument will produce more output with the same inputs, this information will become an ingredient in choosing among supervision and capital standards. Therefore, the regulator's objective function may be expressed as

$$\max_{\theta, k} U = \phi \cdot \Pi^E[\theta, k] + (1 - \phi) \cdot \left(\Pi^D[\theta, k] - \frac{c}{2} \cdot \theta^2 \right),$$

constrained by the conditions for the monitoring of efficient banks (5.3), for the banks' participation (5.4), (5.5) and for the depositors' participation (5.6). The terms $\Pi^E[\theta, k]$ and $\Pi^D[\theta, k]$ denote the rents of efficient banks and depositors respectively and the parameter $\phi \in [0, 1]$ captures the weight that the regulator places on the rent of efficient banks. Because we assume perfect competition on the deposit market, the profit of depositors is zero $\Pi^D[\theta, k] = 0$. Inserting the profit function of efficient banks, we may rewrite the utility maximization problem, which is in fact a cost minimisation problem:

$$\max_{\theta, k} U = \phi \cdot \{ p_H \cdot (R - r_D[\theta] \cdot (1 - k)) - m - \rho \cdot k - (1 - \phi) \cdot \frac{c}{2} \cdot \theta^2 \} \quad (5.7)$$

⁸⁷We thus assume that the regulator cares only for the taxpayers' money and the expected value of financial intermediation. Because goofy banks are inefficient and reduce the value of the banking sector their profits are ignored. Given a country's taste and economic structure this condition implies that the regulator chooses efficient capital standards and bank supervisory actions in a Coasian manner.

$$\begin{aligned}
& \text{s.t.} \\
& r_D[\theta] = \frac{\gamma}{p_L + \theta \Delta p}, \\
& k \geq 1 - \frac{\left(R - \frac{m}{\Delta p}\right)}{r_D}, \\
& k \leq \frac{p_H(R - r_D) - m}{\rho - p_H r_D} \\
& 0 \leq k \leq 1, \quad 0 \leq \theta \leq 1,
\end{aligned}$$

where $r_D[\theta]$ labels the deposit refinancing cost. The regulator now maximizes welfare U and decides how to ensure financial intermediation with the most cost-efficient usage of her two tools capital standards k and supervisory effort θ . Partial derivation yields:

$$\frac{\partial U}{\partial k} = \left[\phi \cdot \{p_H \cdot r_D[\theta] - \rho\} < 0 \mid \rho > \frac{p_H}{p_L} \gamma \right],$$

$$\frac{\partial U}{\partial \theta} = -\phi p_H \frac{\partial r_D[\theta]}{\partial \theta} (1 - k) - (1 - \phi) \cdot c \cdot \theta.$$

The first derivative with respect to k is always negative for $\rho > \frac{p_H}{p_L} \gamma$: capital is comparatively costly by assumption for any feasible level of the deposit rate.

The regulator chooses the lowest feasible capital requirement and the *MIC* (5.3) becomes binding for any $\phi > 0$. Substituting (5.3) into $\frac{\partial U}{\partial \theta}$ yields

$$\frac{\partial U}{\partial \theta} = \phi p_H \left(\frac{R \cdot \Delta p - m}{p_L + \theta \Delta p} \right) - (1 - \phi) \cdot c \cdot \theta.$$

Indeed, the chosen policy affects the rents of the two interest groups, the banking industry and the taxpayers, who are assumed to have opposite interests regarding the policy. Tighter capital standards in an opaque banking sector reduce the profitability of banks for example, by restricting the investment policy or preventing the expansion of investment activities. This limiting may be regarded as the banking sector's direct regulatory burden consisting of opportunity costs for the banking sector or, alternatively, as the forgone benefits from financial intermediation to depositors. Banks thus have an incentive to minimize the capital standard and lobby for supervisory effort, thereby implicitly shifting the cost burden of regulatory intervention to taxpayers. On the other hand, taxpayers have the interest to maintain financial intermediation via setting high capital requirements, as banks would ultimately bear the cost burden. Intuitively, the composition of both policy tools determines rent-shifting between taxpayers and banks. Given the conflicts about the policy mix, resolution occurs in the political realm, based upon distributional and economic efficiency criteria. The organization of political systems may thus also play a prominent role in determining national banking regulation.

Jacksonian regulation ($\phi = 0$)

Consider first the extreme case where efficient banks receive no weight in the regulator's welfare function. The term Jacksonian regulation dates back to US President Andrew Jackson (1767 – 1845) who fundamentally opposed government-granted monopolies to banks ("The bank is trying to kill me, but I will kill it!", Brands (2006), p. 468).

Because $\frac{\partial U}{\partial k} = 0$, $\frac{\partial U}{\partial e} < 0$, we know that the monitoring incentive constraint by banks (*MIC*) determines the necessary supervisory effort. If the participation constraint never becomes binding before the monitoring incentive constraint, i.e. $\rho < \frac{pL \cdot m}{\Delta p}$ the regulator will simply set capital requirement regulation equal to one $k = 1$ and saves any effort on supervision with $\theta = 0$. However, with $k = 1$ the bank would lose its function as a financial intermediary. Therefore, this trivial solution might appear to be rather unconvincing. If equity capital is costly, i.e. $\rho > \frac{pL \cdot m}{\Delta p}$, the regulator must spend a minimum supervisory effort to secure the existence of financial intermediation, i.e. the *MIC* and the *PCE* become binding. The regulator sets a capital requirement $\hat{k} = \frac{pL}{\Delta p} \cdot \frac{m}{\rho}$ and exerts just enough supervisory effort to satisfy $PCD = MIC = PCE$. In particular, the regulator exerts effort to increase the average bank quality just up to the amount where the minimum deposit rate required by depositors equals the break-even deposit interest rate up to $\theta = \frac{\gamma \cdot (1 - \hat{k})}{\Delta p R - m} - \frac{pL}{\Delta p}$.

Home-biased regulation ($0 > \phi \geq 1$)

We now turn to the more relevant case where the regulator is subject to be captured by a home bias for the financial industry; in other words he also considers the profits of monitoring banks. Barth et al. (2012) argue that referees in several types of sport are found to be biased in favor of the home team and this might be true for banking regulators as well.⁸⁸ At the same time, the financial sector of most countries have grown dramatically in recent decades and represents an important source of value-added for the society: highly paid jobs and tax revenue. Auerbach et al. (2010) document the increasing fiscal importance of the financial sector in the US and the UK before the recent crisis. In both countries tax revenues from financial corporations are more than 25 percent of total corporate tax revenues in 2003.

If the profitability of banks influences the regulator's decision, a trade-off arises between

⁸⁸ With the words of Barth et al. (2012), p. 8: "For regulatory officials, the 'home crowd' is the financial service industry. People from the financial service industry 'surround' regulatory officials; they meet with regulators daily. It is the financier who will immediately jeer and taunt officials if they do not like their 'calls'. Since regulators might have recently worked for the financial service industry and might soon be going to work there, it would be natural for regulators to identify fairly closely with the financial services 'community' that envelops them."

spending more costly effort on supervision and allowing banks to yield higher profits. Intuitively, a policy-maker that places more weight on efficient bank margins will vote for lower capital ratios, and vice versa. Such a regulator would balance the weighted marginal cost of supervision with the weighted marginal cost of higher capital requirements for the banks.

Coasian regulation ($\phi = 0.5$)

A special case of home-biased regulation, $\phi = 0.5$, will yield the social welfare function, where the regulator selects supervision and capital regulation in an economically efficient manner based upon wealth maximization but not Pareto optimality (Acemoglu et al. 2005). This view is often called the “Coasian theorem of banking regulation” and may be reinterpreted as a condition where the banking sector “regulates” itself by credibly agreeing on minimum capital ratios and bears the cost for spending effort on peer monitoring.

The optimal mix of a regulator with $0 > \phi \geq 1$ depends on her marginal rates of substitution to the corresponding relative prices, i.e. costs. Using (5.7) we may generally characterize her decision with the following Proposition.

Proposition 1 *For $\phi \in \left[0, \frac{c_i}{R\Delta p - m + c_i}\right]$, there exists a unique optimal pair of k^* and $\theta^* \in [0, 1]$ that maximizes regulator’s utility.*

Proof: *If (5.4) and (5.5) are non-binding, and effort costs are sufficiently high, i.e. if $c > \frac{\phi}{(1-\phi)} (R \cdot \Delta p - m)$, there exists a unique interior solution. For a given level of effort cost, the first-order condition implicitly defines the optimal supervisory level θ^* and capital standard $k[\theta^*]$. The detailed analysis is in Appendix 5A.*

The intuition for Proposition 1 is derived from the fact that bank supervision reduces the number of goofy banks in the market, and thus the required interest rate in the domestic deposit market. The bank’s incentive to monitor projects increases, and capital requirements may be reduced; optimal regulatory capital standards decrease with the number of efficient banks in an economy. A higher fraction of efficient banks leads to a lower capital standard required to maintain depositing in a banking sector: $\frac{dk^*}{d\theta} = -\frac{1}{\gamma} (R \cdot \Delta p - m) < 0$ (see Figure 5.3). A regulator will balance the weighted profitability of efficient banks with the marginal costs of supervision and select an optimal level of enforcement e^* that translates into a specific θ . Therefore, the regulator chooses an optimal supervisory effort that trades off the higher marginal effort cost with the lower marginal cost of capital requirements consistent with financial intermediation.

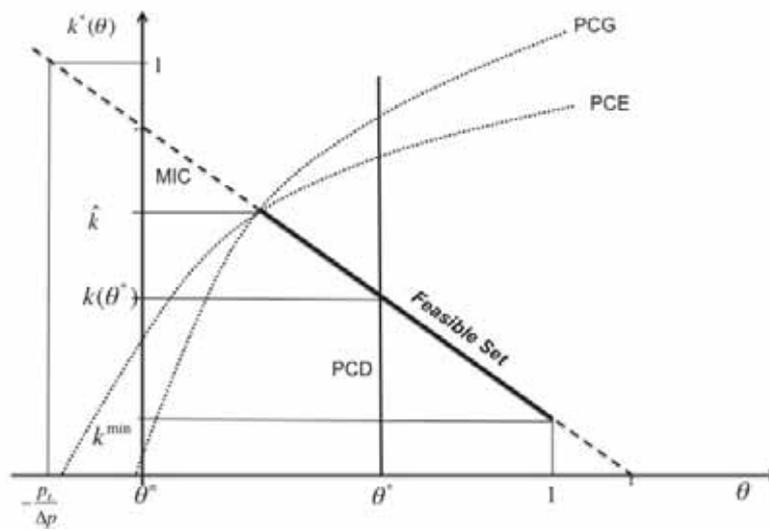


Figure 5.3: The feasible regulatory set

The figure depicts the monitoring incentive constraint MIC and the participation constraints of each bank type as well of depositors, PCE , PCG , and PCD , as functions of the supervisory effort θ . The optimal regulatory policy comprises both minimum capital requirements $k^*[\theta^*]$ and a supervisory effort θ^* considering the corresponding constraints. The feasible set of solutions is depicted as a bold line.

The feasible policy set

The appeal of capital requirements and supervision that will be optimally set by regulators depends on the economic state. Within a feasible set of effective regulation, our model predicts how the regulator adjusts to certain features and shocks in the domestic economy.

Figure 5.3 illustrates the decision problem of the regulator by plotting the optimal capital standard and supervisory effort in a $k^* - \theta$ -diagram. Whereas the downward sloping curve graphs the MIC function, the upward sloping lines capture the participation constraints of the banks, and the vertical line captures the participation constraint of depositors. The figure shows that there is a well-defined window for possible combinations of a capital standard and supervision that ensures financial intermediation ($\hat{k} > k > k^{min}$).

From Lemma 1, we know that for a prohibitively high outside option of depositors/monitoring costs, the effort spent on supervision alone cannot solve the moral hazard problem. Therefore, the regulator must still set a capital requirement $k = k^{min}$ to ensure that efficient banks monitor and financial intermediation actually occurs. On the other hand, Lemma 2 tells us that capital requirement regulation alone cannot also solve the adverse selection problem if the required capital requirement is above the

capital requirement that ensures that banks break even, i.e. $k[\theta] > \hat{k}$. Therefore, the regulator must spend a minimum supervisory effort such that financial intermediation occurs in equilibrium. There is thus a natural limit for possible combinations of feasible capital standards and supervisory investments.

Specifically, for an interior solution the point of intersection between the optimal supervisory effort and the *MIC* is the regulator's optimum. The first-best capital ratio that maximizes the regulator's utility within the feasible policy set depends on her supervisory efficiency and on the parameters of the domestic banking industry. The following table briefly summarizes the comparative statics.

	θ	c	ρ	m	Δp
k^*	-	+	-	+	-

First, it is worth noting that a jurisdiction in which a high effort is spent on supervisory enforcement may allow banks to operate with lower capital requirements. However, it is optimal to have stricter capital regulation when the regulator is less efficient in controlling the quality of the banking sector, whereby a regulator's ability to supervise efficiently is reflected by the marginal costs of supervision. Therefore, lower cost efficiency in supervisory effort leads to higher optimal capital requirements.

Lemma 3 *Within the feasible policy set, capital standards and supervision are substitutes.*

Second, when the economy is in good condition (the cost of equity ρ is sufficiently low), it is optimal to require banks to hold capital sufficient to contain moral hazard, i.e. to set higher capital standards, whereas in bad economic states (where equity costs are sufficiently high), it becomes optimal to decrease capital standards. Essentially, such a countercyclical policy of capital standards increases the regulator's welfare by lowering the impact of equity shocks on banks.

Lemma 4 *Within the feasible policy set, capital standards are set counter-cyclically.*

The intuition is straightforward. Whereas the benefits from monitoring are independent of the state of the world, the cost of inducing monitoring is higher in bad states, when capital is costly. Analogously, a higher monitoring cost decreases the profit of efficient banks which lowers the optimal effort level, thereby increasing the optimal capital requirement. Moreover, both the *MIC* and the participation constraint of efficient banks become more likely to be binding. For higher levels of value-added by

monitoring, there is a greater probability that the *MIC*, holds. In terms of our model, higher profits justify lower capital requirements.

In summary, the model suggests that there are two ways to ensure financial intermediation. The first is the introduction of minimum capital requirements that reduces banks' margins. The second is to exert effort on sophisticated supervision to improve the efficiency of the average bank in the market declining the size of the banking sector. We obtain a lower bound for the cost of banking regulation based upon the minimal rents necessary to implement both cost-efficiency and the existence of the intermediation.

The analysis highlights that the cost minimization problem of the regulator requires two actions: making monitoring profitable via capital standards (this ensures the existence of the pie we call a banking sector that is to be divided among depositors and banks) and ensuring that no participation constraint is violated (minimizing the costs, and thereby maximizing the size of the pie). We show that for any domestic regulator, the optimal combination of both instruments that maximizes domestic utility under the constraint that financial intermediation occurs, depends on her marginal rates of substitution to the corresponding relative costs where the first term is related to the weight the regulator places on the rent of each interest group. Therefore, the regulator implicitly creates rents by selecting a policy mix of capital regulation and supervisory effort that deviates from the weighting of a benevolent social planner (*i.e.* $\phi = 0.5$).

The static partial equilibrium focus of our model allows to gain a deeper understanding of the relations and mechanism between the different policy instruments analyzed. The optimal design of regulatory interventions comprises both, capital standards as well as the regulation of the domestic pool quality via supervision. Moreover, the specific capital ratio should be a function of the conditions of the economy (the business cycle) and the value-added of banking for the provision of credit (credit-substitution channels through other forms of finance).

Our qualitative results still remain robust in a dynamic setting. To see this, consider free entry and exit. In such a setting, the regulator may decide whether to renew licenses at the beginning of each period. Subsequently, in any legislative period, the regulator selects her optimal mix of capital standards and supervision, *i.e.* entry regulation depending on the specific circumstances of the economy.

5.3 Extensions and discussion

5.3.1 Safety net insurance

The assumption in our baseline model that uninsured depositors discipline the banking system by requiring a deposit rate varying with the average quality of a domestic bank is arguably strong. The banking system of modern societies is certainly characterized by widespread domestic safety net systems and a resulting lack of market-disciplining reactions of depositors. Notably, these deposit insurance systems were even broadened during the 2007–2009 financial crisis (see chapter 3).

However, the qualitative results remain unchanged if we introduce a risk-adjusted safety net financed by banks and enforced by a regulator as a safety net manager.

Consider a safety net manager that has the same information as the depositors before, i.e. she cannot observe the riskiness of a single bank but knows the risk level of the banking sector as a whole. In this case, banks must pay a risk premium $\varepsilon [p_L, \Delta p, \theta]$ that decreases with the banking sector quality θ and with the success probabilities of bank assets p_L and Δp . If the safety net must pay the outstanding liabilities r_D for all failing banks, the risk premium exactly reflects the average riskiness of the banking sector. In other words, the resulting premium captures the expected cost of bailing out the failed bank's depositors $r_D \cdot (1 - (p_L + \theta \Delta p_L))$.

However, only solvent banks are able to contribute to the safety net fund, i.e. $\varepsilon [p_L, \Delta p, \theta] \cdot (p_L + \theta \Delta p_L)$. Substituting the expected cost equal to the expected average payments into the safety net fund, yields the fair risk premium for each bank $\varepsilon [p_L, \Delta p, \theta] = \frac{r_D \cdot (1 - (p_L + \theta \Delta p_L))}{(p_L + \theta \Delta p_L)}$.

Due to the safety net, depositors do not face any risk: they recoup their money regardless of whether the bank fails. Retaining our assumption of perfect competition among depositors, the equilibrium deposit rate equals the depositors' outside option γ and no longer responds to changes in regulation or supervision. In other words, in an economy with full risk-adjusted safety net, the depositors lose their bank disciplining role and require only the fixed deposit rate $r_D = \gamma$. The active role to discipline banks based upon average riskiness is delegated to the safety net manager. Nonetheless, our qualitative results remain robust, as the banks' funding cost now comprises the required deposit rate plus the safety net risk premium. In particular, the banks face aggregate costs of deposit funding ($r_D + \varepsilon [p_L, \Delta p, \theta]$) that are exactly equal to the *PCD* of our model:

$$r_D + \varepsilon [p_L, \Delta p, \theta] = r_D + \frac{r_D \cdot (1 - (p_L + \theta \Delta p_L))}{(p_L + \theta \Delta p_L)} = \frac{\gamma}{p_L + \theta \Delta p_L}.$$

Consequently, all constraints for financial intermediation are unaffected by the introduction of a safety net. A risk-adjusted state insurance that is financed ex-post by the banking sector yields the same qualitative results.⁸⁹

5.3.2 Regulation with international spillovers

The second discussion considers the role of regulatory competition among jurisdictions on the optimal bundle of policy tools. The essence of international competition is that the integration of national markets changes the allocation of banks and, consequently, the economic environment for optimal national policies. Since the institutional framework determines the factors of production for banks, jurisdictions evolve into a "club" supplying a regulatory framework.⁹⁰ Therefore, this extension analyzes a regulator's optimal reply to the globalisation of banking markets, explicitly considering international spillovers.

We discuss consider two jurisdictions $i \in [A, B]$, linked through bank mobility, that set sufficiently high political weight on the interests of domestic taxpayers, $\phi \in \left[0, \frac{c_i}{R\Delta p - m + c_i}\right]$. The home country principle in regulating foreign banks applies and we allow that two symmetric banking sectors can finance projects abroad. However, we assume that the regulator in each country differs with respect to her supervisory efficiency. More specifically, consider country A with effort cost c_A and country B with effort cost c_B , where $c_A < c_B$ without loss of generality. Ceteris paribus, the resulting share of monitoring banks in the more efficient country exceeds that of the less efficient one, i.e. $\theta_A^* > \theta_B^*$, and the respective optimal national capital ratios set by the domestic regulator are $k_A^*[\theta_A^*] < k_B^*[\theta_B^*]$. Note that even though country B has a higher observable capital requirement, the quality of the banking sector is lower, resulting in a lower average

⁸⁹Cordella and Yeyati (2003) arrive at a similar result when they study the impact of competition on banks' risk-taking behavior. Analyzing the cases of uninsured but fully informed depositors and risk-based full deposit insurance, their model results in the same equilibrium risk levels. However, if the deposit insurance is not paid by banks but by taxpayers, the analysis becomes more complicated. As discussed by Morrison and White (2011) ex-ante payment may introduce further room for moral hazard. In their framework taxing bankers to pay for the deposit insurance is welfare-neutral, as in our discussion above. A higher deposit insurance reduces the deposit interest rate for banks and increases their return from investing. If banks are taxed, they pay less to the depositors but contribute to the insurance company with their equity capital making moral hazard more likely. Morrison and White (2011) thus show that deposit insurance financed by general taxation may be welfare-enhancing and that the optimal level of deposit insurance varies inversely with the quality of the banking sector.

⁹⁰The idea that a country may usefully be described as a club that organizes the production of club goods dates back to Tiebout (1956). Accordingly we argue that a regulatory product such as banking regulation is characterized for depositors by immobility, rivalry in use and the possibility of exclusion of outsiders. On the other hand, if depositors cannot distinguish between different national regulatory regimes, regulation becomes a lemon good and systems competition will lead to the same type of market failure that justified regulatory intervention in the first place: a deregulation race occurs.

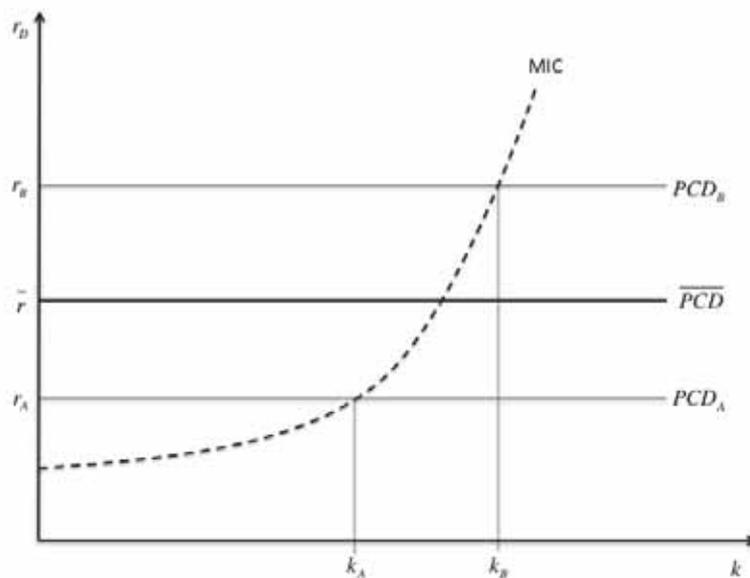


Figure 5.4: International deposit rates

If depositors cannot observe the supervisory effort of each country, international refinancing implies the same deposit rate r_D for the banks in each jurisdiction A and B . The low-cost country A faces higher refinancing costs, whereas jurisdiction B benefits from lower interest rates. Here, B has incentives to lower the capital requirement rate k_B , whereas A 's capital requirements fail to satisfy the monitoring incentive constraint of efficient banks.

rate of success. As argued above, a less cost efficient supervisor will compensate for a lower quality of the banking sector with higher capital requirements. In other words, a higher-quality banking sector entails lower capital requirements to discipline banks.

We assume that asymmetric information makes it difficult for depositors to distinguish the characteristics of competing regulatory systems.⁹¹ The reason may be that it is difficult for them to interpret national banking laws in foreign languages which may act in accordance with unwritten cultural habits and which may differ in the degree of strictness with which they implement the rules. Depositors may be expected to have an information deficit and thus may demand a fixed interest rate independently from the bank's localisation. A recent study by Liedorp et al. (2013) confirms the notion of intransparent supervisory systems. Based upon a survey, the authors construct an

⁹¹Alternatively, there could be complete information regarding the quality and costs of banking supervision. Subsequently, depositors adjust the deposit rates to the quality of the national banking sector and there are incentives for banks to move to the more efficient jurisdiction. Hence, sufficiently low switching costs yield the standard result, where the expected volume of deposits in the more efficient country A expands and financial intermediation in the less efficient one breaks down. However, even in the absence of systemic spillovers on the competing economy A , the movement of banks implies distortions on the regulatory policy in A since the banking pool quality decreases. To preserve the financial sector, even the regulator in A must either increase capital requirements or expend more effort on supervision (see Buck and Schliephake 2013).

index for 24 banking supervisors with an average score of 8.4 points (out of 15) whereby they found large differences among countries that are hard to explain.

In other words, in this subsection, regulation is assumed to be a lemon good, and depositors are only able to observe the average supervisory effort and capital regulation of national regulators. Because individual jurisdictions are not distinguishable and depositors lend their endowments with any bank without knowing the characteristics of its home jurisdiction, we assume the international deposit rate to be $r_D [\theta_A^*] < \bar{r}_D < r_D [\theta_B^*]$. This situation is illustrated in Figure 5.4.

When banks may only borrow from a pooled deposit market but are regulated with $k_A^* [\theta_A^*] < k_B^* [\theta_B^*]$, the incentive in both countries are distorted. In country B , banks benefit from the lower overall lending rate. However, in country A , a higher deposit rate will prevent the efficient banks from monitoring; i.e. $k_A^* [\theta_A^*]$ is too low to satisfy the monitoring incentive constraint.

Due to the lower capital requirement rate in country A , both types of banks migrate to A . However, because both jurisdictions are faced with the same international deposit rate, there is no incentive for borrowing in the more efficient jurisdiction. If switching costs are sufficiently low, both bank types move to the jurisdiction with lower capital requirements and thus the size of the financial sector in A increases. However, with low capital requirements yet relatively high deposit rates, efficient banks have no incentive to monitor in A . To prevent a collapse, the regulator should in fact increase capital requirements. However, the crux of pooled deposit rates is that the regulator does not benefit from an increase in capital requirements because depositors do not punish non-monitoring efficient banks via adjusted country-specific interest rates. Accordingly, market monitoring as a disciplining device via interest rates does not work.

Proposition 2 *With unobservable supervision, each jurisdiction has an incentive to decrease domestic capital standards down to k^{\min} .*

Proof: *Country B observes an outflow of her banks. If switching costs are low, the entire banking sector disappears. Otherwise, goofy banks remain in country B . However, with an international deposit rate, the smaller banking sector in country B does not break down due to the low pool quality. A regulator caring for the existence of a domestic banking sector will decrease the capital ratio to prevent the outflow of domestic banks. It is straightforward that it is optimal to slightly decrease the capital ratio offered by the other jurisdiction.*

With pooled deposit rates, the undersupply of capital regulation appears to be the non-cooperative equilibrium in the one-shot game. This result may be translated into a supervisory cost level necessary to ensure depositing even with k^{\min} . Therefore, the

profitability of banks will increase owing to the *race to the bottom* and the regulatory cost burden is shifted to the taxpayers.⁹² With cross-border banking, both countries will lose in welfare terms compared to the case of autarky such that international harmonisation of capital requirements is desirable for both countries. Therefore, our model suggests a prisoner's dilemma.

5.3.3 Policy implications

The question posed in this section is whether regulatory competition may avoid the existence of a lemon equilibrium at lower costs by mitigating the efficient banks' moral hazard problem. We see that, with open economies, the political equilibrium is no longer the only result of an analysis of the marginal rates of substitution between the costs of supervision and capital requirements; instead, it reflects the strategic interaction with other jurisdictions in regulatory competition whereby observable capital ratios become a strategic weapon in the battle for attracting banks. The intuition is that banks seek the most lenient of all possible regulators. In this respect, systems competition becomes counterproductive depending on the opacity of international financial markets. Optimal strategic choices of domestic regulators are rooted in the degree of the observability of differences in country-specific regimes for depositors. If the observability is sufficiently low, domestic capital ratios cannot send any price signals to investors and cannot reward efficient banks in better regulated economies with cheaper refinancing and thus the optimal cost-minimizing policy is no longer feasible.

We gain similar effects if we allow for heterogeneity with respect to the weighting of the rent of the banking sector between both jurisdictions, i.e. in the capturing of a regulator. Suppose both countries are identical regarding supervisory efficiency ($c_A[\theta_i] = c_B[\theta_i]$). Let k^* be an interior equilibrium in the case of autarky. For this equilibrium, it holds that $k_A^* < k_B^*$ if $\phi_A > \phi_B$. Intuitively, country B values capital regulation more highly than country A does, but B 's costs regarding its equity cost and opportunity cost, in terms of supervision, remain the same. As we have shown above, a higher preference for capital requirements is a stigma in regulatory competition, resulting, in a welfare loss if we allow for bank mobility. One evident implication of this re-interpretation of different regulatory bliss points in capital ratios is that institutional competition will reduce stability when the differential of the regulator's weighting for domestic banks in autarky is sufficiently high between the competing jurisdictions. A

⁹²However, due to the pooling of deposit rates, regulators may now have an incentive to shirk in identifying goofy banks, as supervisory effort creates a positive externality on the other countries' refinancing conditions. If this free-riding effect is severe, we have an unstable global economy, where depositors overestimate the average expected repayment. When depositors update their beliefs, the global banking system faces a collapse.

larger differential $[\phi_A - \phi_B]$, renders it more likely that competition among regulators plays a role in destabilizing the financial sector or, put differently, that the laxity in capital standards by only one captured banking regulator makes regulatory harmonization more likely to be needed to prevent a collapse. Thus the model suggests that the most captured (inefficient) domestic policy-maker determines the non-cooperative equilibrium in regulatory competition, which is indeed a competition of laxity.

From a welfare perspective, it is plausible that both jurisdictions have an incentive to cooperate to ensure the lowest combination of capital ratios and supervisory effort that is necessary to maintain global banking. Therefore, regulators demand collective action to govern the global banking sector. This provides an impetus for coordinating capital ratios and striving for an international standard regarding banking capital adequacy, to which we will turn to in the next subsection.⁹³

5.3.4 Empirical discussion

One key message of this chapter is the two-way interaction between capital standards and supervision. According to the model, the fraction of goofy banks in the domestic banking sector depends on the regulator's willingness to supervise. The reason for introducing sophisticated supervision is to address the adverse selection problem in the banking sector. By sorting out goofy banks, the supervisor increases the average quality of banks in the sector, which decreases the interest rate that depositors demand for lending their money. This selection process also reduces the size of the national banking sector. The argument is in line with recent empirical findings (Heider et al. 2008; Flannery et al. 2013) as well as the origins of bank supervision in the US. Heider et al. (2008) demonstrate that liquidity crises occur when the adverse selection problem between banks becomes acute. The authors show that the (interbank) market breaks down when the quality of the individual bank is unknown, such that efficient banks prefer to hoard liquidity rather than lending in the interbank market. In the light of the 2007-2009 crisis, Flannery et al. (2013) argue that market collapses are encouraged by cyclical increases in asset opacity and that the regulator must take steps to ensure that transparency via supervision persists even as equity values fall.

According to Mitchener and Jaremski (2012), the rise of formal supervisory institutions

⁹³Indeed, the political science literature argues that the genesis of the Basel Accords may support the idea of such a destructive regulatory race (see Kapstein 1991). In the 1980s, it was said that raising the capital requirements for US banks would negatively affect their international competitiveness unless foreign banks were forced to recapitalize in a similar fashion. In light of the Mexican crisis in 1982, this finding provided the impetus for US authorities to push for an international agreement on capital ratios and the Basel Committee on Banking Supervision quickly emerged as the ideal forum to achieve this.

in the US responded to state banks' closures and banking panics by the time the Federal Reserve System was founded. Their results suggest that the amount of supervision is positively correlated with the size of the banking sector, i.e. the number of banks. However, the authors argue that "states implemented their optimal or desired level of supervision and changed it based upon environmental factors rather than slowly ramping up expenditures in some linear way". Moreover, Dincer and Neyapti (2008) show empirically that the combination of past financial crises and prevailing levels of financial market development are a precondition that positively affects the quality of the regulatory and supervisory frameworks adopted in a country.

Our result that the optimal effort in ex-ante supervision is inversely correlated with the level of capital requirements is supported by several cross-country studies based upon the World Bank dataset of 107 countries. Barth et al. (2006) find that the stringency of capital requirements is negatively associated with the share of denied bank applications. This finding is in line with our story that a country that alleviates the adverse selection problem is expected to allow banks to operate with lower equity capital. Furthermore, recent data suggest that in response to the 2008 financial crisis, many countries made capital regulation more stringent, whereas domestic bank entry requirements mostly remained unchanged (Barth et al. 2012). The index that the authors develop, proxies the hurdles that entrants must overcome to obtain a bank license.

We also discuss the consequences of differences in individual optimal policy mixes in an integrated financial world where banks actively shop for regulators.

In an opaque world, where the national supervisory effort is not observable, we find that the moral hazard problem of banks cannot be solved. Moreover, regulators may have an incentive to reduce capital requirements to free-ride on the international deposit rate. The result is an unstable global banking sector, where depositors believe that the banking sector is safer than it actually is. If depositors update their beliefs, financial intermediation collapses. These negative spillovers are more serious, when differences between countries are more pronounced. This relationship is in line with the findings of Houston et al. (2012), who provide empirical evidence that supports the lemon result. Banks transfer funds to financial markets with less regulation. Their study indicates that bank flows are positively related to the stringency of capital regulation imposed on banks in their home country, and negatively related to regulations in the host country. However, these effects are stronger if the host country is a developed country with strong property and creditor rights, a finding that is also in line with our model prediction.

5.4 Concluding remarks

This chapter builds a simple framework to jointly discuss the stability and welfare implications of capital standards and supervisory enforcement. In the model, banking regulators seek to prevent a market breakdown. Direct forms of regulation (supervision) enhance the ability of the average bank to control risk whereby indirect regulation via capital requirements establishes incentives that elicit socially desired monitoring activity by banks. Therefore, both regulatory instruments reduce the banking sector's vulnerability to a collapse. However, each instrument imposes a cost on different interest groups. The opportunity cost of capital regulation is borne by the banking sector, whereas the cost of supervision is borne by the taxpayer. This chapter shows that in isolation there exists a unique optimal policy mix that outweighs the cost and benefits of each instrument.

The regulator's objective function trades off the cost of capital regulation for the banking sector with the losses from taxation due to the enhancement of transparency via supervision. We show that the costs are minimized when the regulator chooses the optimal policy mix.

Specifically, this chapter demonstrates that the precise size of capital requirements should depend on the conditions of the economy (set higher requirements in a boom, lower requirements in a recession), the value-added of banking for the provision of credit (set higher requirements when there is credit substitution through other forms of finance, e.g. bond or stock markets) and the quality of supervision in detecting imprudent business strategies (set higher requirements if supervisory quality is low).

However, with cross-border banking, the optimal policy is not feasible anymore and countries are better off by harmonizing regulation on an international standard.

6 Supranational banking regulation

With economic integration having deepened and the capacity of domestic regulators to control banking activity within their borders declined, the locus of regulation has gradually shifted from the domestic to the supranational level. At present, the Basel Committee on Banking Supervision has emerged as the central forum for agreeing on international regulatory standards of the banking industry. This chapter studies the policy choice of a group of heterogeneous countries who jointly provide the public good "financial stability". Owing to the conflicting interests among member states, the outcome hinges on how and by whom these standards are specified in equilibrium. The chapter thereby concentrates on two important features of supranational banking regulation, namely the design of decision-making rules and the distribution of the political power within the Committee.

6.1 How can harmonization create efficient regulation?

The last decades have witnessed a fundamental transformation in the regulation of banks across the world from a national to an international level. The regulatory answer to the Great Depression in the 1930s was entirely unilateral and uncoordinated, whereas today regulatory responses are coordinated through a process of international standard setting (Kapstein 1991). This development was spearheaded by the adoption of minimum banking standards in particular countries (the US and the UK in 1981), but with the introduction of the first Basel Accord in 1988 common requirements were adopted by the G-10, followed by the implementation by around 100 countries worldwide (Jackson 1999). Today, the Basel recommendations for common regulatory standards have a significant impact on global banking regulation.

The Basel Accords comprises supervisory guidelines negotiated by representatives of central banks and national regulatory commissions that were members of the Basel Committee on Banking Supervision (BCBS). The Committee is the ultimate decision-making body of the BCBS with responsibilities to ensure that its mandate is achieved.

The most prominent aims of the Basel Committee are the enhancement of the safety of internationally active banks and the promotion of competitive equality among banks.

These aims have been the key moments in negotiations by participating countries.⁹⁴ Members meet four times every year to discuss emerging regulatory issues and explore ways of harmonizing national standards for banking regulation. The decisions of the Committee are taken by consensus (unanimity rule) among its members whereby the BCBS seeks input from all relevant stakeholders on policy proposals. Therefore, the consultation process includes issuing a public invitation to interested parties to provide comments on policy proposals issued by the Committee within a specified time frame which ultimately ensures that the preferences of BCBS members are shaped by domestic interests (see chapter 4 for some case studies, especially Box 4.1).

Despite the decisions of the Committee have no legal force, minimum requirements and recommendations are formulated in the expectation that national authorities will implement them. In this way the Committee encourages convergence towards common standards and monitors the implementation.

However, after decades of international negotiations and reforms, the real impact of the Basel Accords on international financial stability proves not to be satisfying at all. Figure 6.1 suggests that the record of the Basel framework in fostering financial stability has been rather disappointing. Despite the Basel framework having built up a complex regulatory apparatus, the financial crisis between 2007-2008 has caused the largest fiscal costs since the Great Depression. For example, European governments provided state aid totalling 1.5 trillion euros. The Capital Requirement Directive (CRD IV) that implements the Basel III regulation is extensively criticized for failing to adopt measures to sufficiently recapitalize banks (Acharya et al. 2014a).

The question how regulation can be improved to be more efficient in fostering financial stability is discussed intensively in the aftermath of the financial crisis. Current explanations for the lenient construction of the revised Basel Accords have focused on arguments like the regulatory capture of banking regulators or myopic behavior of governments (Admati and Hellwig 2013, Lall 2012 and Acharya and Rajan 2013).

However, this chapter introduces an additional source for inefficiency into the game of managing international financial stability via banking regulation: The constitutional design of the Basel process and the asymmetry of the distribution of benefits and costs among member states of a regulatory union that ultimately determine the allocation of the political power in any international decision-making process.

⁹⁴The Basel Committee has created a structure of related regional supervisory groups, leaving them to determine their own membership and working methods. There is also a formal international conference every two years where all the countries with effective supervisory bodies are invited. Although the Committee's initial work focused on determining the responsibilities of home and host country regulators vis-a-vis cross-border banks, its mandate expanded in the 1980s as regulators in the United States looked for a way of defending their domestic banking industry against the increasing Japanese competition (see Goodhart 2011).

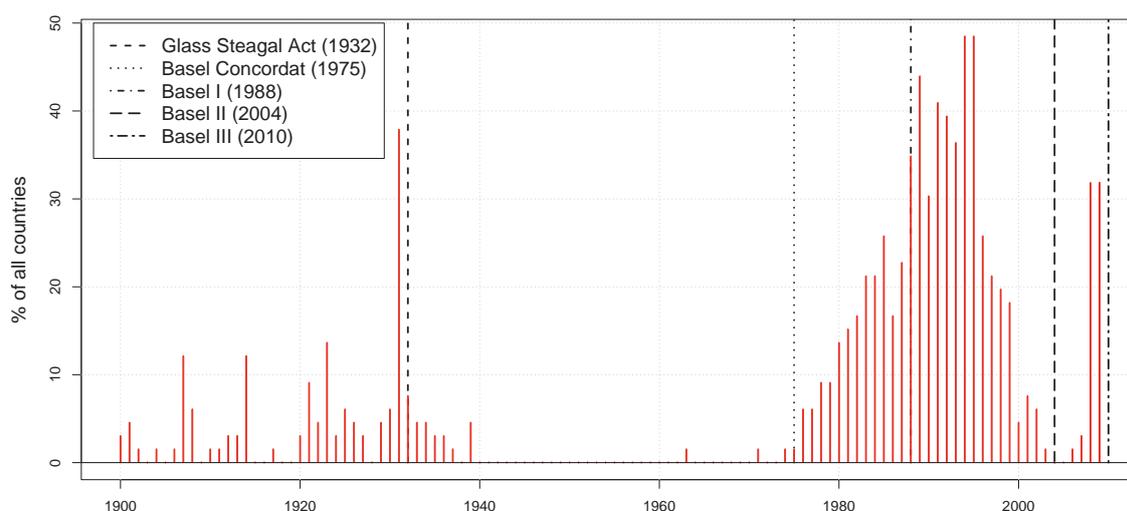


Figure 6.1: Banking crises and regulatory responses (1900 - 2010)

Own calculations. Source: Reinhart and Rogoff (2009).

6.1.1 The argument: Asymmetric distribution of losses

Following the analysis of chapter 5 one of the main reasons for countries delegating some power to a supranational Committee is the benefit of coordinating banking regulations that affect each other and prevent a regulatory competition of laxity. Therefore, this chapter models the Basel Committee as a heterogeneous collection of countries that decide together on a certain common policy of capital regulation, which implies spillovers across members.

On the one hand, the benefits of the public good "financial stability" through banking regulation are most probably equally distributed among perfectly financially integrated jurisdictions. On the other hand, the fiscal costs of resolving a banking crisis are born domestically and have a different amplitude. Figure 6.1 documents that there is considerable variation of commercial banks' assets to GDP of the top five banks among 26 member countries of the BCBS, ranging from 50 percent in India to over 400 percent in Switzerland. In terms of output losses, a financial crisis creates different costs related to the relative importance of the banking sector. Countries with higher relative importance suffer higher cost in terms of reforming the regulatory landscape after a crisis have hit the banking sector. At a general level, the dispersion of benefits and the concentration of crisis costs imply that with a common regulation, each jurisdiction retains a political incentive to minimize country-specific intervention costs. The cost-benefit analysis of an agreement on a specific supranational capital requirement regulation subsequently determines the equilibrium proposal of the Committee.

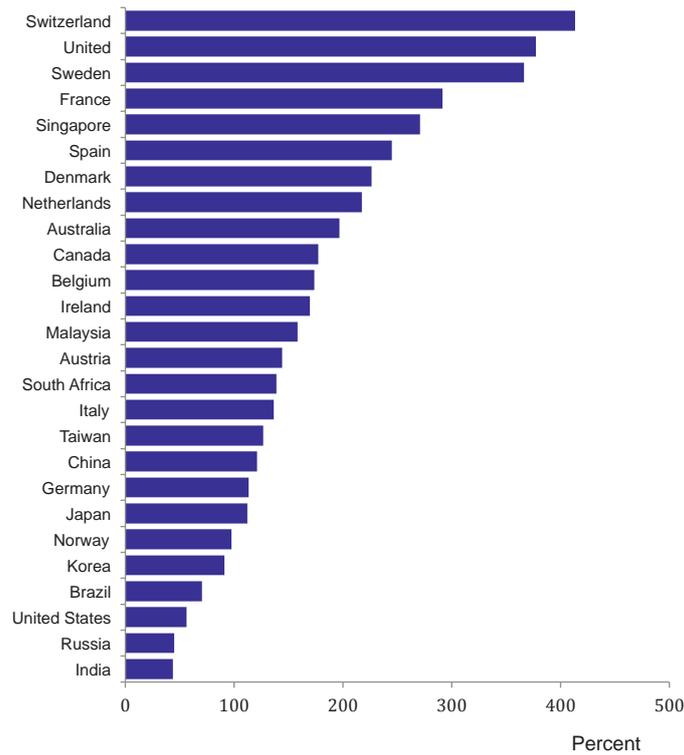


Figure 6.2: Balance sheet assets (as % of GDP) of the top five commercial banks
Source: Caprio (2013)

Our model suggests that there is a country-specific optimal level of banking regulation for a given size of the domestic banking sector. For different countries, these bliss points for an optimal policy are heterogeneous such that the constitutional design determines the outcome of supranational voting. We show that countries in which the financial sector is more important favor stricter regulation, but also have higher cost of waiting for the implementation of an agreement when a crisis hits. As a result, supporters of stricter regulation have a systematic disadvantage in the agreement process, which leads to a bias of the Basel recommendations for laxer regulation.

Technically, this is shown in two steps. The Basel Committee is modeled as a collective decision-making institution that formulates international standards for capital requirements in a crisis scenario. Voting among member states between two alternatives (lax regulation versus strict regulation) is repeated indefinitely until sufficient support is reached. However, maintaining a non-agreement on a reform of the regulatory system results in a continuation of the financial crisis, thus creating costs to all countries' welfare.⁹⁵ Critically, the decline in welfare is strictly rising in the output loss

⁹⁵The model does not require that the international standards agreed in the Committee are implemented one-to-one into national regulation but we allow for some discretion. We simply assume that the international agreement on a stricter policy compared to the status quo itself already has an impact on the banking sectors due to the raised expectations of borrowers and investors thereby

of non-agreement. Consequently, at some point in time, static preferences on banking regulation of every member state disappear and jurisdictions are willing to accept any proposal.

Since member preferences have varying intensities due to private costs of non-agreement in the form of domestic output losses, the voting outcome is crucially influenced by the preferences of jurisdictions who are less affected by crisis costs. Intuitively, they give low value to an early consensus. Therefore, the model suggests that the constitutional design of the Basel Committee changes the pivotal jurisdiction in the voting process on supranational banking regulation and *de facto* creates voting power to patient jurisdictions in crisis times when non-agreement is costly.

As a next step, the simple model allows to positively analyze the efficiency of the status quo of BCBS decision-making and derive normative insights into alternative voting procedures. In the voting equilibrium, the greater supermajority is required, the more impatient jurisdictions become pivotal, thus producing an outcome with lax banking regulation. The reason is that those that are in relative terms favored by the status quo can block the adoption of stricter rules, whose outcomes, although fair, would run counter to the status quo interest. It emerges that unanimity might be a bad voting rule, even if consensus is reached without any delay.

6.1.2 Related literature

To date, relatively little attention has been paid to public choice consideration of the Basel Committee, especially on voting arrangements. Instead, the policy debate and the literature on the design of supranational banking regulation have focused mainly on the coordination of prudential capital regulation and regulatory forbearance and techniques of lobbying.

The financial economics literature examines the incentives and disincentives for cross-border regulatory cooperation. Dell'Arricia and Marquez (2006) develop a two-country model with structural spillovers between two national banking systems. In their framework, high capital standards induces a positive spillover to foreign banks, but also destroys the profitability of domestic banks which are weighted by the national regulator. As a result they show that competition among regulators leads to a competition of laxity: Without harmonization, nations select sub-optimally low standards of minimum capital requirements. Trading off the benefits and costs of centralization Dell'Arricia and Marquez (2006) show that nations with relatively homogenous banking systems have a stronger incentive to form a regulatory union.

enhancing the stability and reducing the cost of a financial crisis.

Complementary to their findings, Acharya (2003) discusses the desirability of uniform capital requirements among countries with divergent closure policies. He illustrates that ex-post policies can have an incremental effect on the optimality of ex-ante regulation and, thus, must be taken into account when designing prudential ex-ante policies. He concludes that, with heterogeneous closure policies, level playing fields can result in a welfare-declining race to the bottom.

However, in contrast to Dell’Arricia and Marquez (2006), we allow for asymmetric multipliers of the financial market on domestic growth. Therefore, costs and benefits of the internalization of spillover effects in a Basel club are related to the relative importance of financial markets of the jurisdiction in question. The core of a country’s preference on banking regulation is the tension between the benefit in gaining huge markets of financial intermediation and the advantages of creating a harmonized regulatory union with common policy rules.

In line with these theoretical arguments, Thiemann (2012) finds empirical evidence that supervisors’ are concerned about the competitive positions of domestic banks, which is found responsible for some of the worst lapses of supervision before the crisis.

In the context of the recent financial crisis and the making of Basel III, Howarth and Quaglia (2013) document the diverging preferences of EU politicians, rooted in features of the domestic banking system. Consistent with our model predictions, the authors argue that the configuration of the national financial system largely shapes the preferences on Basel III.

Interestingly, British and US regulators, which had previously preferred “soft” regulation (Hodson and Mabbett 2009, Posner and Véron 2010), support new strict rules on capital requirements in crisis times. By contrast, French and German politicians not only resisted increases in capital requirements as such; moreover, they also wanted to preserve some past rules that allowed securities other than banks’ common equity to be treated as capital.⁹⁶ As the outcome of the negotiations the final version of Basel III was less strict than the draft issued in December 2009, in particularly containing longer transition periods. This was mainly due to the resistance of continental European and Japanese politicians, where Germany refused to endorse the document prepared by the BCBS, asking for and subsequently obtaining some revisions at the crucial meeting of the BCBS in September 2010, prior to the agreement in December 2010.⁹⁷

⁹⁶The original proposals for higher capital requirements were eroded in a search for a compromise between the US, the UK and Switzerland, promoting higher requirements, and continental European countries, resisting them and asking for longer transition periods. The Governor of the Bank of England argued that the new level of required capital should have been substantially higher than the levels set out in Basel III. US treasury minister Timothy Geithner mentioned that “the top three things to get done are capital, capital, capital” (Washington Post, 25 March 2010).

⁹⁷Strong French and German opposition reflected the higher leverage ratios of most large banks in

Admati and Hellwig (2013) argue that the UK, Sweden and Switzerland have been most forceful in promoting stricter banking regulation in international negotiations since the crisis because their financial sectors are large and severely hit by the financial crisis. The model that this chapter develops explicitly takes into account these fiscal arguments in crisis times when country representatives supranationally vote on banking regulation. The voting power shrinks the larger domestic political pressures due to crisis costs. Hence, the model suggests that the outcome of crisis-driven changes to Basel regulation is determined by the distribution of expected losses (if there is no agreement).

By analyzing how the final shape of the regulatory framework interacts with the heterogeneity in the importance of the financial market, our approach is also related to the growing literature on optimal decision rules. The voting weights in collective decision making have always been a central part of treaties. Sutter (2000) and Bârsan-Pipu and Tache (2009) examine the reallocation of voting weights for the prospect of widening of a regulatory union. However, the issue of the weights ascribed to jurisdictions of differing banking sector size has not been explicitly modeled in the context of creating a common supranational policy. Nonetheless, such a heterogeneity may have an incremental effect on the efficiency of the supranational policy.

The idea that centralization can result in inefficiencies, where the majority will not consider the welfare of the minority when making the policy decisions, is not new in the literature and dates back to Lockwood (2002) and Besley and Coate (2003). In a seminal paper, Aghion and Bolton (2003) analyze optimal majority rules and show in a static scenario that jurisdictions are willing to commit to a majority rule *ex-ante* given enough uncertainty regarding the *ex-post* preferences. In a complementary approach, Maggi and Morelli (2006) examine the optimal majority voting rule in a dynamic scenario where a single union project is repeated over time. If nations are sufficiently patient and uncertain about their future preferences, the optimal majority rule can be supported even with voluntary participation.

In contrast to this, we assume that the preferences of the voting jurisdictions are commonly known. This assumption reflects an essential element of international decision-making like in the BCBS, whereby countries present their evidence and exchange their opinions *ex-ante* (see Goodhart 2011). Even if the Committee members enter the voting procedures with some private information, they will reveal it in equilibrium to persuade opposing voters. Furthermore, we assume that once voting about banking regulation, it can be described as binary voting on keeping the status quo (soft regulatory rules) or increasing the regulatory standards, i.e. agreeing on strict banking regulation.

France and Germany. The peak association of the German banking system asked for grandfathering clause of at least 30 years for own funds instruments (Zentraler Kreditausschuss 2010, p. 3).

In our approach, we combine both discussed streams of the literature and explicitly analyze the static national preferences for domestic banking regulation as well as the link between voting arrangements and the implementation of a joint policy for governing international financial markets. The modeling of the former draws on the previous chapter by capturing the trade-off between financial stability and growth opportunities through financial intermediation. The modeling of the latter draws on the insights of Kwiek (2014). Our results suggest that the intensities of preferences of member states as well as their costs during a crisis are the key determinants of the voting outcome in Basel.

The remainder of this chapter is organized as follows. Section 2 presents the joint decision-making process between agents with heterogeneous preferences and the impact of impatience due to high crisis costs on the aggregate voting outcome under different rules. We subsequently provide a microeconomic foundation of different preferences on regulation of jurisdictions and derive the impatience of jurisdictions as an increasing function of the banking sector importance, i.e. crisis costs.

6.2 The economic model: Basel regulation and the constitutional design

We model the collective decision-making process based upon the statements of the actual Basel Committee members in the form of a repeated voting game without uncertainty about each others preferences.

We consider a Committee consisting of $N \geq 2$ jurisdictions who vote on two alternatives of banking regulation standards, a lax capital requirement regulation \underline{k} , reflecting a marginal change of the status quo, or a strict regulation \bar{k} . One of them might be selected at a certain time so that the outcome of the game is a pair consisting of the selected alternative and the time when the decision was reached.

Suppose that the decision is made by some majority rule. At the beginning of a voting round each jurisdiction announces her vote sequentially for either \underline{k} or \bar{k} . Similar to the repeated voting model with complete information of Kwiek (2014) the supermajority required for an international agreement is $N + 1 - m$, where $m = 1, 2, \dots, \bar{m}$ can be interpreted as a minimal blocking majority ($\bar{m} = \frac{N}{2}$ if n is even, and $\bar{m} = \frac{N+1}{2}$ if n is odd). We will discuss the implications of different voting systems, i.e. blocking majorities, below.

If there is no majority for an alternative in a voting round, the international procedure goes to the next round. The time interval between two consecutive voting rounds is

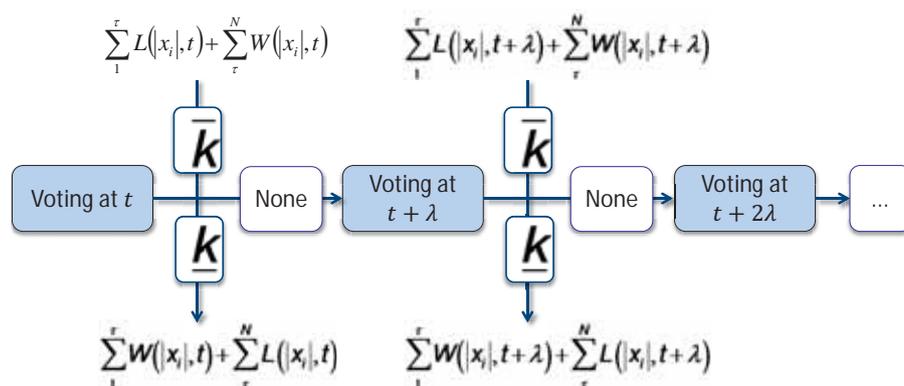


Figure 6.3: The game tree of binary repeated voting

captured by λ . Theoretically, there could be infinite voting rounds, although we assume that the Committee members are impatient. Similar to a Ståhl bargaining game the utility gained from an agreement shrinks when the decision is postponed to the next round. Therefore, the utility of each jurisdiction depends on two components: (1) the chosen alternative and (2) the time until a decision is agreed on.

If one of the two alternatives of strict or lax regulation is selected immediately, the payoff of each Committee member i is determined by parameter x_i which is a summary of preferences of voter i . In line with Kwiek (2014) x_i reflects the gain difference in utility when the more preferred alternative is immediately selected compared to the less preferred alternative. Given that there are two alternative A and B , in his model a positive x_i means that voter i prefers alternative A over alternative B . A negative x_i means that alternative B is preferred, and $x_i = 0$ reflects a voter that has no preference, i.e. is indifferent between the two outcomes.

We adapt this idea to our model. Committee members truthfully reveal the information on the optimal regulation of their jurisdiction. This revelation defines the set of possible outcomes.

As we assume for tractability that the Committee votes binary for strict or lax regulation, the lowest and the highest preference give the reference points for strict and lax regulation, since no member is better off by a harmonized regulation that is more lax or strict than the extreme bliss points. Figure 6.3 illustrates the basic setup for decision-making in the Basel Committee.

Before analyzing the voting equilibrium, we first turn to the determination of the first best preferences of each jurisdiction to regulate the financial market which indeed crucially depend on the economic environment.

6.2.1 Economic environment

To build the argument, we consider an integrated financial world in which each country's banking sector competes in with the other's for financial intermediation.

In autarky, the country's government can set capital requirement regulation, denoted by $k_i \in \{0, 1\}$ with $i \in \mathbb{Z}^+$ and $i \in [1 \dots N]$ to contribute to global financial stability.

Let the probability of a socially costly financial crisis for each country i be equal to $p = \sigma - k_i - \gamma \sum_1^{j=N} k_j$, where σ represents the probability of a domestic banking crisis in the absence of any regulation. The parameter γ captures the idea of positive spillovers from strict regulation in the neighbor country on the banking sector stability in i . We assume that $\sigma > \gamma$.

In case of a banking crisis, banks default and need to be bailed out which creates social cost Δ for the domestic country (financed by lump-sum taxes) but no cost to domestic banks due to limited liability.

The banking sectors of each country compete in an internationally integrated market. The global demand for financial services is described by the following indirect demand function

$$r_L(L) = a - b(L_i + L_{-i}), \quad (6.1)$$

where r_L captures the interest rate on bank loans, L_i is the domestic supply of financial intermediation from country i , and L_{-i} the foreign supply of financial intermediation.

Each banking sector supplies an amount of L_i and generates aggregate profits of

$$\max_{L_i} \Pi_i = (r_L(L) - r_D)L_i - \alpha_i k_i L_i, \quad (6.2)$$

where r_D reflects the funding cost of banks, which we normalize to 0. The parameter $\alpha_i \in \mathbb{N}^+$ with $i \in [1 \dots N]$ reflects the banking sector's cost efficiency with respect to required equity financing in jurisdiction i . Technically, the parameter is a multiplier of the marginal costs equity requirements burden to a bank. A sector with an α_i close to zero is barely affected by capital regulation, while a larger α_i implies a credit crunch in the banking sector if capital regulation is increased. Intuitively, the parameter measures how easy banks in a jurisdiction are able to raise new equity and can be interpreted as market frictions that are given for each jurisdiction. Higher α_i , thereby, imply higher costs of raising equity.

The values of α are observable and, without loss of generality, countries can be ordered such that $\alpha_1 \leq \alpha_2 \leq \dots$. Subsequently, with $\Pi_i = (a - b(L_i - L_{-i}))L_i - \alpha_i k_i L_i$, the first

order condition for the banking sector is

$$-2bL_i + a - bL_{-i} - \alpha_i k_i = 0, \tag{6.3}$$

and gives the reaction function:

$$L_i = \frac{1}{2} \frac{a - \alpha_i k_i - b(L_{-i})}{b}. \tag{6.4}$$

Accordingly, if all countries implement their own capital requirement regulation, the asymmetric Cournot equilibrium is:

$$L_i [k_i] = \frac{a - (N + 1) \cdot \alpha_i k_i + \left(\sum_1^{j=N} \alpha_j k_j \right)}{b(N + 1)} = \frac{a + \left(\sum_1^{j=N} \alpha_j k_j \right)}{b(N + 1)} - \frac{\alpha_i k_i}{b}. \tag{6.5}$$

The heterogeneity in the ability to raise equity affects the size of a banking sector in each jurisdiction. The more efficient the banking sector is, i.e. the lower the costs are of raising equity (low α) the larger is the domestic banking sector. Therefore, the heterogeneity of parameter α introduces the heterogeneity of banking sector size and importance among countries into our model.

Secondly, we see that an increase of national capital standards is, *ceteris paribus*, associated with lower levels of financial intermediation $\frac{\partial L_i}{\partial k_i} = -\frac{\alpha_i}{b}$, which is negative for positive b and α . High capital requirement regulation has a cost: Implementing k_i creates a loss in the market share in the global banking market due to lower profitability of banks operating in the domestic banking sector, which is assumed to have negative effects on the growth opportunities of a country.⁹⁸

6.2.2 Optimal national banking regulation

Each jurisdiction considers two effects banking regulation has on the domestic market for financial intermediation. Higher capital regulation reduces the number of loans provided to the economy, but also reduces the probability of a financial crisis and, hence the expected social cost. We summarize these two effects in the following function that

⁹⁸There is broad empirical evidence showing that the financial system is an important growth-enhancing mechanism until a certain point. More external funding of private activity precedes economic growth (King and Levine 1993, Beck et al. 2000). Financial development fuels growth in financially dependent and emerging sectors (Rajan and Zingales 1998) and enhances capital reallocation towards growth sectors (Wurgler 2000).

depicts a certain utility of jurisdiction i :

$$U_i = L [k_i, k_{-i}] - \left(\sigma - \sqrt{k_i} \right) \cdot \Delta. \quad (6.6)$$

The first term reflects the size of the banking sector and its positive linear impact on the growth of the jurisdiction, whereas the second term reflects the expected social cost of the breakdown of financial intermediation.

The exogenous parameter Δ in (6.6) represents the fixed costs of a banking crisis. The parameter $\sigma \in (0, 1)$ captures the financial sector's inherent probability of a crisis without any capital regulation, i.e. the laissez-faire vulnerability of the financial market. This probability is reduced by the capital requirement of banks at a decreasing rate.⁹⁹

However, the more capitalized the banking sector is, the lower is the marginal impact of a further increase of the capital requirements. Nonetheless, if $k_i = \sigma^2$ the probability is reduced to zero. In the extreme case, where $\sigma = 1$ this would translate into a requirement for full equity funding, which naturally results in a perfectly secure banking sector. A completely equity funded bank cannot become insolvent, thus, the probability of a banking crisis is negligible.

Alternatively, a country can join a regulatory union called "Basel club". Consider a regulatory union of N countries that enjoy spillovers from each other's national capital regulation.

Let the parameter γ capture the positive spillover effects of the implementation of capital regulation to other countries. When $\gamma = 1$ we are in the Samuelson case of a pure public good at the supranational level. To exclude negative crisis probabilities, we restrict our attention to the plausible range of k , by setting the technical assumption that the highest optimal requirement ratio is not too strict $\bar{k} < \frac{\sigma}{(1+\gamma N)}$.¹⁰⁰

Certainly, this assumption excludes an upper bound of $\bar{k} = 1$, although the set of possible policies is $k_i \in [0, 1]$. However, a policy choice of $k_i = 1$ translates into a capital requirement of 100 percent, which would destroy the role of banks as financial intermediaries.

⁹⁹The intuition is straightforward: An undercapitalized banking sector is very prone to a financial crisis. In the extreme case of no own equity funding and full leverage, the unexpected default of even one customer would trigger financial distress. Hence, the introduction of capital requirements in an undercapitalized banking sector reduces the probability of a crisis.

¹⁰⁰The lowest crisis probability occurs when all countries agree and implement the highest capital requirement, i.e. strict capital requirement regulation \bar{k} , in this case, the crisis probability of all countries is $\sigma - \bar{k} - \gamma \cdot N \cdot \bar{k}$. The technical assumption subsequently excludes negative probabilities.

Taking into account the spillover effect and inserting (6.5) in (6.6), the regulator in member country i chooses $k_i \in [0, 1]$ to solve

$$\max_{k_i} U(k_i) = \left(\underbrace{\frac{a + \left(\sum_{j=1}^{j=N} \alpha_j k_j \right)}{b(N+1)}}_{L_i} - \frac{\alpha_i k_i}{b} \right) - \left(\sigma - \sqrt{k_i} - \gamma \sum_{j=1}^{j=N} k_j \right) \Delta. \quad (6.7)$$

Note that we assume that membership in the club is a necessary condition for receiving some externalities. Spillovers are zero if a country is out. This is a simplifying assumption that could be relaxed without essential changes in the results. The underlying idea is that international cooperation, such as common policies, improves the coordination. As discussed in Tarullo (2008) international cooperation in the sense of Basel regulation provides reassurance to all members, that the banking system of all other member countries is sufficiently capitalized and hence, is stable and sound with a low probability to trigger an international financial crisis.¹⁰¹

The optimality condition for every jurisdiction i is given by

$$\frac{\alpha_i}{b} = \frac{\Delta}{2\sqrt{k_i}}. \quad (6.8)$$

The intuitive interpretation for this expression is as follows: at the margin, the gain from higher capital regulation is given by lower expected costs that are associated with a collapse of the domestic financial sector (RHS). This gain has to be weighted against the marginal cost in states in which there is no crisis. As the supply of loans is negatively affected by capital regulation, these marginal costs simply reflect the induced reduction in growth due to a smaller financial sector (LHS). Note again that α_i represents the cost of regulation for the society. Hence, the individually optimal level of capital regulation is a function of the heterogenous efficiency of the financial sector, i.e. the heterogenous sizes and importance of banking sectors:

$$k_i^*(\alpha_i) = \left(\frac{\Delta b}{2\alpha_i} \right)^2. \quad (6.9)$$

Note that the individually optimal capital requirement level does not consider the positive spillovers to other countries and will thus be chosen too low compared to a centralized decision maker.

¹⁰¹Moreover, Tarullo (2008) mentions that international harmonization fosters the feasibility and efficiency of supervision of international active banks. Finally, he mentions the direct benefits of for the international active banks themselves, facing one harmonized capital requirement instead of different regulations in each country in which they are active.

Jurisdictions with more cost efficient and hence predominant banking sectors, that result from a lower α_i , prefer stricter capital regulation than jurisdictions with smaller and less cost efficient banking sectors. This is in line with the above discussed empirical and anecdotal evidence.

Lemma 1: *Jurisdictions with larger banking sectors prefer to implement stricter capital regulation.*

Proof: *It is straightforward to see, that the ordering of the efficiency parameter for jurisdictions $\alpha_1 \leq \alpha_2 \leq \dots$ implies also an ordering of individually optimal capital regulation: $k_1 \geq k_2 \geq \dots$ because $k_i^*(\alpha_i)$ is strictly decreasing in α .*

As discussed above, the international harmonization of capital standards may imply possible positive spillover effects that are not considered in the individual optimal policy. However, the jurisdictions are aware of these positive spillovers and willing to join the Basel club to exploit and benefit from the positive spillovers of supranational capital regulation. In order to benefit from these spillovers the jurisdiction sends a delegate to the Basel Committee that seeks to agree upon an optimal regulation for his jurisdiction.

To apply our setting to the repeated voting procedure we normalize the voting outcome to the least and highest preferred regulation, i.e. $\underline{k} := k(\alpha_N)$ and $\bar{k} := k(\alpha_1)$. The gain difference in utility x_i is subsequently given by

$$x_i = \left[U(\bar{k}) - U(k_i^*) \right] - \left[(U(\underline{k}) - U(k_i^*)) \right]. \quad (6.10)$$

For example, consider the jurisdiction with the most efficient and thus largest banking sector α_1 . The preferred outcome of this jurisdiction is $k_1 = \bar{k}$. The gain difference in utility is subsequently given by $x_1 = -[U_1(\underline{k}) - U_1(\bar{k})] > 0$. On the contrary, the smallest jurisdiction that prefers lax regulation $k_N = \underline{k}$ has a negative gain in utility $x_N = [U_N(\bar{k}) - U_N(\underline{k})] < 0$ because the maximum welfare is reached at $U_N(\underline{k})$.

6.2.3 Dynamic voting equilibrium

Thus far, we have silently assumed that there are no cost of waiting for jurisdictions when voting for supranational capital regulation in the BCBS. However, inaction - especially in crisis times - might be diverging costly for every jurisdiction. As argued above, an international agreement can be acceptable if the waiting costs for a jurisdiction exceeds a specific threshold. In this context, we assume that a jurisdiction with a large domestic financial sector relative to GDP, becomes increasingly desper-

ate if no decision is reached at a given voting round. More generally speaking, those jurisdictions with the highest stake in the agreement are the less patient voters.

Therefore, we assume that the country-specific costs of waiting can be expressed as a decreasing function of the relative banking sector size $c[\alpha]$. This crucial assumption can be justified given the dependency of domestic GDP on the the number of loans provided by the domestic financial sector. If time passes and no agreement is met, the output loss for jurisdictions with low levels of α is relatively higher than the loss of jurisdictions where banking sectors play a minor role. Accordingly the countries with more prominent bankings sectors will be more cooperative in finding a consensus. The static benefits generated by the first best preference may dissipate in finite time, the so-called indifference time. At this point of time, it simply does not pay to insist on the more preferred alternative characterized for a given costs of waiting. Therefore, we now introduce the indifference time of countries as the key driver of the voting outcome.

Note that x_i describes the welfare gain, when the more preferred outcome is selected by the majority compared to the less preferred outcome. Denote with $W(|x_i|, t) = |x_i| - (\tau + \lambda)^2 \cdot c(\alpha_i)$ the welfare for jurisdiction i if the preferred agreement is reached in round t and with $V(|x_i|, t) = -(\tau)^2 \cdot c(\alpha_i)$ the welfare that is reached if the less preferred outcome is agreed on in round t . The indifference time of jurisdiction i $\tau(|x_i|, \lambda)$ is implicitly defined by the following expression: $W(|x_i|, \tau + \lambda) = V(|x_i|, \tau)$, where λ is the (possibly small) time interval between two voting rounds.

Subsequently, the indifference time of a jurisdiction i can be implicitly stated by:

$$|x_i| - (\tau + \lambda)^2 \cdot c(\alpha_i) = -(\tau)^2 \cdot c(\alpha_i) \tag{6.11}$$

The indifference time is thus equal to $\tau_i(\alpha_i) = \frac{|x_i|}{2\lambda c(\alpha_i)} - \frac{\lambda}{2}$. Which country now has the highest willingness to wait for an agreement?

Interestingly, each jurisdictions solves a trade-off when negotiating in Basel. On the one hand, the sensitivity of a jurisdiction's welfare is decreasing in α , i.e. the welfare of the larger banking sector jurisdiction is more sensitive to deviations from the optimal capital regulation level $\frac{\partial^2 U_i}{\partial k \partial \alpha_i} = -\frac{1}{b} < 0$. Naturally, in the negotiation about optimal regulations, jurisdictions with greater banking sectors have more at stake, since their larger sector is more affected. Nonetheless, on the other hand, the waiting costs are larger, since the number of loans drops in times of financial distress and the resulting output loss is more severe. The occurrence of a financial crisis affects the intensity of preferences. This is captured in the indifference time τ . Overall, the indifference time disentangles the trade-off between the gain in the individual utility (x_i) and the cost of waiting for another round for agreement ($c(\alpha_i)$). If these costs are strictly

greater than zero for the jurisdictions with the largest banking sectors and converge to zero for the smallest banking sector jurisdictions, country-specific indifference times are a decreasing function of the size of the banking sector. Crisis-induced waiting costs overcompensate the loss obtained from the less preferred alternative.

As a next step, it is useful to sort the members of the Basel Committee from the lowest to the highest indifference time (τ_1, \dots, τ_N) where $\tau_{k:N}$ is the k th lowest element.

Now we can solve for the subgame perfect Nash equilibrium, which gives the unique voting outcome. Following Kwiek (2014) the equilibrium is completely characterized by the indifference times of the two pivotal members in the Committee that enjoy veto power, since this term captures the optimal behavior for the two jurisdictions with the minimum blocking majority. It can be shown that the following Lemma holds in equilibrium.

Lemma 2 (From Kwiek (2014)): *For $m < \frac{N+1}{2}$ there exists a time $\hat{\lambda} > 0$ where in any equilibrium the voting game stops and the Committee selects the alternative preferred by the pivotal jurisdiction with the higher indifference time. Subsequently, it holds for all $\lambda < \hat{\lambda}$ that the Committee selects this policy in the first round.*

Proof: The general proof by backward induction can be found in Kwiek (2014).

The intuition for this Lemma is as follows. For a given majority rule, we can define the two pivotal jurisdictions m who prefer the opposing alternatives \underline{k} and \bar{k} as those with indifference times $t_{m:N}$ and $t_{N+1-m:N}$.

Given a blocking majority of m , the m th voter preferring the lax and the m th voter that prefers the strict regulation is pivotal, since they have veto power in the Basel Committee. In other words, these are the m th closest jurisdiction to alternative \bar{k} and the m th closest jurisdiction to alternative \underline{k} , according to their indifference times.

For example, if $m = \frac{1}{2}$, e.g. there is a simple majority rule, the game has only one pivotal voter, the median voter, who determines the voting outcome. If instead $0 < m < \frac{1}{2}$, the pivotal voter with the larger gains in utility will determine the voting outcome, i.e. if $|x_m| < |x_{N-m}|$ the stricter regulation will be the voting outcome and vice versa. However, if the distances are the same, and particularly in the case of the unanimity voting, where $m = 0$, the individual gain in utilities cannot determine the voting outcome. Naturally, the failure to select an outcome result in the next round of voting, bringing each voter closer to his indifference time.

The implications for the decision-making process in the Basel Committee is straightforward. Let $\frac{\partial \tau}{\partial \alpha} > 0$, \underline{k} be the minimum capital requirement preferred by the pivotal jurisdiction with the higher indifference time and let \bar{k} is the other alternative. Suppose

that the voting game is unresolved in a voting round t . Following Lemma 1, we know that jurisdictions with larger banking sectors prefer voting for the strict alternative, although their waiting costs are also strictly higher such that the intensity of their preferences drops over time. Anticipating that there is a point in time where the number of jurisdictions that vote for the strict alternative are fewer than the minimal blocking minority due to asymmetric waiting costs, Committee members will coordinate on voting for alternative \bar{k} to stop the game in round t . The fact that voting is sequential within each round enables to establish the dynamic voting equilibrium.

Proposition 1: *If $c(\alpha_N) \rightarrow 0$ jurisdictions with less important banking sectors have higher indifference times and implement their preferred (lax) regulation in the first round.*

Proposition 1 tells us that with unanimity, the Basel Committee is locked in a status quo bias, given that jurisdictions favoring stricter regulation after a crisis occurred are systematically disadvantaged under the unanimity rule due to higher waiting costs. In crisis negotiations, after a sufficiently long time, the jurisdictions that suffer the most from the banking crisis prefer to sacrifice the prospect of getting the favored regulation in the next round by accepting the less preferred (lax) regulation today. Therefore, the model is consistent with the general idea that in times of economic distress, when losses are centralized and the cost of waiting rapidly increases, any supranational reform of banking regulation with unanimity is subject to a status quo bias. Unanimity simply gives the country with the lowest cost burden of a banking crisis veto power such that structural reforms can be blocked by this rule unless there are possibilities to re-negotiate regulatory loopholes or exemptions.

From a social planner's perspective, when in equilibrium the Committee chooses the low capital requirements, which maintains the aggregate volume of loans within the regulatory union, this minimizes the stabilizing spillovers. In contrast, a club with a uniform policy \bar{k} for each country would assure this internalization perfectly, but would face a smaller market for financial intermediation.

6.3 Discussion

The results point into the direction that the Basel Committee, meeting in crisis times to reconsider international banking regulation, has a bias for laxity. The current voting procedure, characterized by unanimity, can undermine an agreement on strict regulation because low minimum blocking majorities enhance the voting power of states that prefer the status quo. The "one country, one vote" principle, gives countries with

economically smaller banking sectors who suffer less from a systemic banking crisis, a disproportional large power, possibly inducing a bias into Basel decision-making.

While Basel proposes some flexibility in implementing the recommendations in national law, national regulators are locked in a status quo bias. The reason is that any upward deviation from the agreed regulatory policy is costly for a member of the Basel club (due to the loss of network benefits and the potential loss of market shares in financial intermediation). There are only a very few countries, such as Switzerland, Sweden and the UK, that have enforced the Basel recommendations on capital requirement regulation earlier and more strictly, mainly due to huge output losses during the crisis.

Of course, losses in the market share of financial intermediation because of higher capital requirements are reduced to some degree by leakages. Credit substitution could occur through bond and stock markets. When increases in minimum capital requirements diminishes the supply of credit, alternative sources for credit must not fully offset the change in aggregate supply. Adrian et al. (2012) study the behavior of US firms during 2007 - 2009 financial crisis and find that both in the aggregate and the individual firm level, bond issuance compensated for the contraction in supply of bank credit during the crisis. Large, relatively low risk firms with access to public debt markets are at a relative advantage during times of bank credit contraction. Some firms' access to bond markets may thus substantially weaken the impact of capital regulation on aggregate credit. In other words, leakages from securities offerings cannot be addressed by international coordination of capital standards so that a low degree of bank orientation proves to be a source for voting power in the Basel Committee.

From a public choice perspective, one can re-interpret the model of decision-making in the Basel Committee as a lobbying game by the international banking industry. With the expectation of bailouts, the financial industry might try to capture the regulatory process to implement the more preferred alternative of low capital standards. However, with an international organized lobby such as the Institute of International Finance (IIF) and heterogeneous expected crisis costs in the form of domestic output losses among member states, the model results still hold. The representatives of those countries with the smallest domestic pressure in the case of a crisis are easier to persuade. The unanimity rule in crisis times does the rest.

Various options come to mind to reduce the voting power of patient members in the Basel Committee whose domestic economy is less affected by crisis costs. As already pointed out, the voting procedure could switch from the unanimity rule to a qualified majority that enlarges the minimum blocking majority, for example. The most far-reaching option is to introduce a system of weighted votes, whereby the weights reflect the economic importance of the national banking sector in the countries.

6.4 Concluding remarks

This chapter offers a public choice perspective on international decision-making on banking regulation by introducing a distortion due to the constitutional design of the Basel process.

The current procedure of agreement on internationally harmonized capital requirements in banking regulation is repeated voting under the unanimity rule in the Basel Committee. Thereby, evidence shows that countries with greater financial markets prefer stricter regulation in the bargaining process and are trying to push international harmonization of regulation forward. Therefore this chapter develops a microeconomic foundation for both observations and implements them into a model. From a normative perspective, the analysis of this chapter suggests that, given the preference distribution and impatience of larger financial markets, the current procedure, namely unanimity rule as repeated voting procedure with complete information implies a tendency for proposals with lax regulation.

The intuition is straightforward. Under the unanimity rule with full information on dispersed preferences, the willingness to vote for the less preferred alternative is higher, the less patient the voters are. If the observations are true, this implies that exactly those jurisdictions that prefer the strictest regulation are the less patient and thus less likely to push their preference through the voting procedure. The lower the blocking majority, the more powerful are the more patient voters, i.e. the Committee members from small jurisdictions that prefer lax regulation. However the point of this chapter is not to argue that majority voting has no benefits, but rather to document the impact of alternative voting mechanisms that can improve overall stability in the financial sector. As a result of this discussion, the implementation of a simple majority rule in the Basel Committee may help to implement stricter regulation. Nonetheless, this depends on the distribution of preferences.

7 Shaping the future

This chapter summarizes the main findings of the dissertation. The rise of a crisis-prone banking sector and its political power is explained by the interest of politicians to preserve electoral support. Strategic coalition building and corrosive capture has helped banks to extract rents until this day. The core policy question that this chapter addresses is how to induce politicians to regulate banks in the public interest as a by-product of their private aim of being re-elected.

7.1 Summary: A century of increasing banking rents

Banking rents are a necessary condition for the existence of financial intermediation. In the ideal world of complete financial markets, banks would be redundant, since direct forms of private lending will dominate. However, as soon as market frictions like information asymmetries arise, there is room for banking.

This thesis has shown that public choices can affect these rents. Chapter 2 makes the case that the emergence of bank-oriented systems can be explained with the political system during the Great Depression. During this time, autocratic countries significantly suppressed direct forms of finance (uninformed lending) by weakening the legal position of claimholders in favor of the management board and the state. The industrial elite had an incentive to support such low corporate control rights since this is an effective way to increase financial entry costs for competitors. Corporate law and poor protection of claimholders was used as a strategic instrument to support the monopoly position of an industrial elite. The model of chapter 2 rationalizes the empirical fact why elite-dominated societies have shaped institutions with low legal control and more reliance on banks that develop private arrangements to substitute the lack of legal control (informed lending) after the Great Depression. Bank rents emerge as a by-product of poor control rights, which can trigger path dependencies, as was the case in countries such as Japan or Germany which still are a bank-oriented economies.

Chapter 3 documents that global banking activity to GDP continuously rose following WWII, and so did the associated rents. Figure 7.1 illustrates that banks' balance sheets have grown dramatically in relation to the underlying economic activity over the past

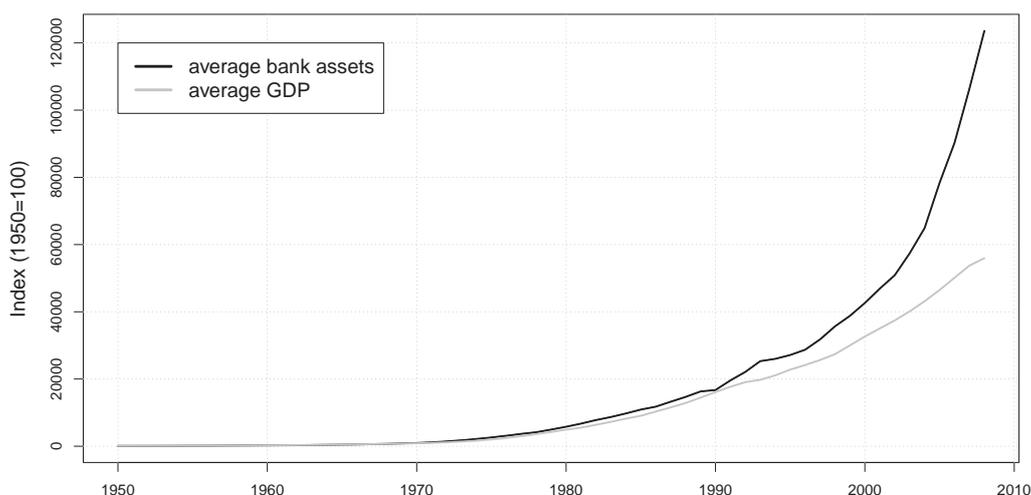


Figure 7.1: The growth of banking in developed countries (1950 - 2008)

Note: The countries covered are the US, Canada, Australia, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland and the UK. Bank assets are defined as in Figure 3.1. Own calculations. Source: Schularick and Taylor (2012).

century. There has been a secular intensification of this growth since 1990.¹⁰²

The relative expansion of bank rents compared to other forms of finance can be explained with modern crisis management, specifically with the provision of a safety net, comprising liquidity, deposit and capital insurance for banks. Since the Great Depression state insurance has become the central regulatory instrument to quell an incipient panic in domestic banking systems. Whenever crises emerged, the safety net has grown leading to the ubiquitous provision of risk-free deposits. Moreover, as financial integration deepened, regulatory competition among countries forced policy-makers to increase safety net guarantees, even if there was only the threat of spillovers from foreign banking panics. Regulators compete for footloose bank deposits and employment and produce a hysteresis of the provision of banking rents. Today most financial institutions borrow under the shadow of an implicit sovereign guarantee.

Most importantly, these policy interventions have strong distributive effects which distort governance and incentives. Regardless how politicians operate as uncompensated insurance providers, any intervention generates windfalls for its recipients and further windfalls for its counterparties. Consequently, the net present value of the protected institution rises hand-in-hand with the scope of the safety net.

¹⁰²One might argue that a rise in the banking scale has growth-enhancing effects for domestic GDP. Empirical studies support this view, albeit only within limits. There is a threshold of around 80-100 percent at which private credit-to-GDP have a negative impact on GDP growth (Arcand et al. 2012). This finding is consistent with earlier cross-country evidence suggesting that, at credit-to-GDP ratios above unity, output volatility tends to increase (Easterly et al. 2001).

Although some degree of moral hazard is unavoidable, even under the best circumstances, the specific elements of domestic safety nets have catalyzed the growth of banking to a worryingly high level. Chapter 3 shows that value-maximizing banks have expanded their access to the safety net subsidies in four ways: by openly minimizing their equity-to-asset ratio, and increasing their size, interconnectedness and the volatility of their portfolio. Indeed, the rapid expansion of the balance sheet size of banks, illustrated in Figure 3.1, was not accompanied by a commensurate increase in the banks' equity base. Data suggests that over the same period, banks' capital ratios fell from 25 percent at the start of the 20th century to around 8 percent at its end (see Figure 3.6). Moreover, size and complexity create additional value for large institutions, promoting a TBTF status and consequently cheaper funding conditions.

The policy question in the last decades has been how to minimize the distortions from regulatory competition and from moral hazard generated by safety net provision?

The regulatory answer was the harmonization of regulatory standards on a supranational level in the so-called Basel framework, implying a micromanagement of banks' investments via risk weights and risk models. However, as chapter 4 demonstrates, the metric of risk-weighting can be subject to tactical maneuvers by politicians following a political support bias when specifying exemptions for their most favored constituencies. When the regulator intervenes in the credit allocation process of a bank through subsidizing specific assets with lower requirements, rents to a subgroup of citizens are created and thus generate an electoral value for politicians. As a consequence, the bank lobby has a strong incentive to gain influence over the drafting of regulation by building coalitions with those groups to create loopholes in the regulatory treatment of their investments, i.e. to preserve the rents inherent in the safety net. The power of banking coalitions grew over time as powerful players like the hedge fund industry, activist groups or SMEs entered the scene. The banking sector and its coalition partners have been the primary winners from a complex risk-weighting system.

The electoral support model of banking regulation in chapter 4 provides a framework for describing a politician's choice of banking intervention in the form of determining optimal capital requirements that ensure re-election. Today, corrosive capture by the banking lobby has replaced the capture via entry barriers which was preferred by the industrial elite in the last century (as modeled in chapter 2).

The second threat to stability comes from the macroeconomic implications of a risk-based framework for governing the global banking sector with the Basel approach. The act of encouraging all banks to consider portfolio risk in the same way and rewarding them when they increase the proportion of "low risk" assets in their portfolio increases the fragility of the global banking sector. Similar business strategies encourage a sim-

ultaneous run for the exit, which involves the simultaneous drying up of markets for these assets in crisis times.

7.2 The changing role of the state

The rise of banks in the past century came along with a changed role of the state. Until the end of the 19th century the cost of bank failures tended to be borne by the bank shareholders themselves, however, nowadays, the costs of banking crisis are shifted to taxpayers via safety net guarantees. States have become safety net managers.

As a consequence, the taxpayers' exposure to banking risk can be better interpreted as an implicit contract rather than an ordinary external effect (Kane 2010). Because taxpayers have become a last-resort financier of domestic banks, the implicit contract makes taxpayers to true owners of banks in times of trouble. Safety nets are salient tax-transfer schemes. It follows that, like any other stakeholder, taxpayers deserve having their stake serviced (1) explicitly and (2) fairly priced.

However, this thesis shows that both objectives, transparency and prudence, are challenged by constraints of public choice: the need for electoral support and the politician's dilemma of time-inconsistency (Kydland and Prescott 1977; Chari and Kehoe 2013). In the banking sphere, the time-inconsistency problem arises, because politicians have incentives for lax regulation today since this will promote growth and satisfies voters, but at the same time increases the risk of bad credit booms and crises tomorrow (Trebesh et al. 2013). In other words, politicians face a myopia trap, whereby they only deliver the prudent policy, when its electoral prize is sufficiently high.

Therefore, effective regulatory reforms must address both the incentive problems of protected banks to limit financial risk-taking or the abuse of safety net rents, as well as the incentive conflicts of policy-makers that need the support of the electorate, which can undermine efficient safety net management.

7.3 Implications for the design of banking regulation

The core problem is how to design national safety nets so that they do not produce subsidies to banks when they expand their debt capacities, risk-profile or their political clout in clever ways. In doing so, most importantly, regulation should explicitly take into account the interaction between regulators and other actors, which takes place through either potential lobbying by private groups or regulatory competition among jurisdictions.

Based upon insights from chapter 5 and 6, the thesis concludes by emphasizing five general principles to monitor and mitigate access to safety nets. The goal is not to provide a checklist for institutions, but rather to improve the process through which regulators choose them.

Insight 1: Counter the opaqueness of banking rents

The general public does not have access to the information necessary for evaluating banking regulation. As argued in chapter 3 banks have incentives to use the safety net as a way to exploit poorly informed taxpayers. Indeed, safety net subsidies are easy to overlook in good times. Therefore, it is important to measure and monitor safety net costs and benefits by a central institution. What is the implicit subsidy of a TBTF institution? Chapter 3 (Box 3.1) has discussed several concepts of measuring the implicit banking subsidies financed by taxpayers. Though the social costs of the subsidy may be underestimated by these concepts because they fail to account for moral hazard incentives, transparency of artificially generated funding cost advantages improves the acquisition of information for both policy-makers (as safety net managers) and taxpayers to incorporate regulation that neutralizes the provided regulatory rents. Making implicit taxpayers' support of banks visible, improves both the administration of safety net managers and the incentives for control by the electorate. The reason is that the provision of information about protected banks transforms stock market prices of publicly traded banks into clearer signals of institutional strength or weakness. By informing voters, the media can help to make elected politicians more sensitive to the interests of their constituencies. A better informed public is more able to rein in rent-seeking and gives politicians fewer incentives to, even unintentionally, serve the interests of special groups.

For example, the detection of subsidies can be improved by developing common metrics for measuring the value of safety net support at individual banks and requiring that these banks have to report this value to their supervisors at regular intervals.

Insight 2: Counter moral hazard by banks

The models of chapter 5 and 6 suggest that an effective way of addressing the moral hazard problems generated by safety nets is to implement minimum capital requirements within a prudent range. This reduces the likelihood of a failure and protects the economy from spillover effects of failure. Equity and bail-in capital would provide more continuous cushions to safeguard taxpayers from having to inject funds into banks and would serve as a check on banks.

From a microeconomic perspective (chapter 5), the precise size of capital requirements should depend on the conditions of the economy (set higher requirements in a boom, lower requirements in a recession), the value-added of banking for the provision of credit (set higher requirements when there is credit substitution through other forms of finance, e.g. bond or stock markets) and the quality of supervision in detecting imprudent business strategies (set higher requirements if supervisory quality is low). From a macroeconomic perspective (chapter 6), these requirements should also reflect the expected crisis cost of a bank failure (net of the liquidation value). In other words, if insolvency costs are expected to be in a range of 10 percent of the bank's balance sheet, the bank should be forced to hold equity or bail-in capital in exactly this range.

Insight 3: Counter the complexity of regulation

One lesson from chapter 4 is that simpler rules are needed to protect regulators from corrosive capture. The increasingly complex risk weight approach of banking regulation has opened the proverbial pandoras box by giving room for a lobby game aiming at providing exemptions and lower risk weights for specific asset classes. The combination of ambiguous information and a lack of expertise might prevent even the most benevolent regulator from creating policies that improve social welfare. Despite a legitimate reason for discriminating regulatory requirements based upon the risk profile of the underlying investment, the adoption of simpler fixed capital ratios has three main benefits: first, it improves the transparency of regulation and reduces the compliance cost for both banks and supervisors; second, it sets limits to the benefits of lobbying and the scope of regulatory arbitrage; and third, this would remove an important source of increased covariance in banks' exposures, thus reducing systemic risk.

Insight 4: Counter the political dependencies of regulators

The discretion of bank regulators in managing the banking safety net demands accountability to their mandate of protecting taxpayers' interests. As argued in chapter 3, re-election minded politicians are keen on holding on to redistributive policies and might be subject to a myopia trap when fighting crises. Indeed, policy-makers have much shorter time horizons than taxpayers and are, particularly in crisis times, enticed to use off-budget ways such as banking regulation as a source for allocating money.

Following Haldane (2013) in the monetary policy debate, the institutional solution for the myopia problem is the delegation of policy-making to an independent central bank. Indeed, the self-same logic can apply to prudential banking policy. Making banking regulators independent of political authorities as is done in Art. 19 of Council

Regulation (EU) No. 1024/2013, which creates the SSM can result in prudent policies. This also implies a change in the ways officials for the Basel Committee are recruited, trained and compensated. Otherwise there is the danger that regulators would become direct agents of the banking lobby or follow the primate of short-term interests.

Secondly, the creation of a supranational banking union can reduce the dependence of banks from their home country and thereby might alleviate the nexus between domestic politics and the banking sector. Critically, a prudent design of a banking union requires that a central resolution authority should be able to close a bank even against the will of the home country.

Insight 5: Counter the status quo bias in regulation

Finally, the model of chapter 6 illustrates that the Basel Committee or any other supranational authority will in all likelihood adopt a capital ratio too low due to the specific voting procedure. The reason is that the unanimity rule gives the country with the lowest cost burden of a banking crisis veto power such that structural reforms are blocked by this rule. If unanimity is used, those favored by the status quo can potentially block the adoption of stricter rules, whose outcomes, although fair, would run counter to the status quo's interest. The implementation of a simple majority rule in the Basel Committee may help to implement stricter regulation.

Banking is politics. Throughout the thesis, I have discussed the linkages between banking regulation, rents and financial stability. The political system during the Great Depression has strongly affected the development of bank-oriented financial systems; policy interventions by myopic regulators in the form of an underpriced safety net can explain the emergence of crisis-prone megabanks after WWII; and, regulatory competition and politics can rationalize why there has been a stabilization of the regulatory status quo.

Ironically, mainstream economic models of policy making in the arena of banking do not incorporate the central role of politics. I hope I have convinced the reader that the banking sector is an integral part of the market economy and any political system. Well-functioning and sound regulatory rules underpin the allocation of scarce capital and foster investment and growth, while imprudent lending can lead to systemic failures and financial crises. This thesis has shown that an increasing focus on governance is important. A public choice approach of banking regulation can help to gain a better understanding of the institutional weakness in this regulatory apparatus. For better or worse, any society gets the banking system that its institutions permit.

Appendices

Appendix of Chapter 2

Appendix 2A: Incentive-compatible banking

We can show that the business model of a monitoring bank is only feasible if there is sufficient high expropriation risk B in our economy such that a costly monitoring device substitutes the lack of legal protection.

Banks provide monitoring service if and only if the value-added exceeds the monitoring costs, that is $R_L(B) - R_K \geq c$. Since $\Phi \geq c$, we know that this condition holds for all $B \geq \tilde{B}$. However, (2.4) suggests that this condition is not satisfied for $B < \hat{B}$, because in this case $R_L(B) = R_K(B)$. Therefore, it emerges that the relevant region of the split-off point B where monitoring becomes profitable is $B \in [\hat{B}, \tilde{B}]$. Using (2.4) and (2.5) this problem can be rewritten as $-\frac{\psi}{1-\theta} + \psi + B \geq c$. Solving for the critical threshold yields $\tilde{B} = c + \frac{\theta\psi}{1-\theta}$. This is the minimum level of expropriation risk that is necessary to make monitoring attractive and thus banking possible.

Appendix 2B: Proof of Proposition 1 (Market structure)

To obtain the equilibrium number of firms as a function of the expropriation level B , we can distinguish four cases.

1. We start by considering sufficient low levels of $B \in [0, \underline{w}]$. If $B \leq \underline{w}$ rent extraction has no effect on any financial barrier and every entrepreneur with $w_i \in [\underline{w}, I]$ can open a firm. Inserting the equilibrium price of the consumption good, $p = a - n$, the number of firms is equivalent to the total number of entrepreneurs in our economy, namely $n = m = a - \psi - I$.
2. For $B \in [\underline{w}, \tilde{B}]$ it is clear that the equity barrier w_E is the lowest entry barrier for external finance and becomes binding to get the total number of active firms. Thus, we solve a system of two equations. Lemma 1 states that only entrepreneurs with an endowment of wealth larger or equal to the equity entry barrier w_E have access to equity finance. Since entrepreneurs' wealth is uniformly distributed on

the support $[\underline{w}, I]$, we know further that $n = m(1 - \frac{I-p+\psi+B-\underline{w}}{I-\underline{w}})$.

$$(I) \quad n = m\left(1 - \frac{I - p + \psi + B - \underline{w}}{I - \underline{w}}\right) \quad (II) \quad w_E = I - p + \psi + B.$$

The solution of this problem is $n = \frac{m(a-\psi-B)}{I-\underline{w}+m}$, $\frac{\partial n}{\partial B} < 0$.

3. For $B \in [\check{B}, \tilde{B}]$ banks provide monitoring service (see Appendix 2A) and the bank barrier w_L proves to be the lowest entry barrier for external finance to get the total number of active firms. In this range of B , we further know that the incentive constraint determines the financial barrier. Thus, equation (2.5), IC gives us the second condition to solve for the total output:

$$(I) \quad n = m\left(1 - \frac{I - p + \psi + B - \underline{w}}{I - \underline{w}}\right) \quad (II) \quad w_L = I - p + \frac{\psi}{1 - \theta} + c.$$

The solution of this problem is $n = \frac{m(a-\frac{\psi}{1-\theta}-c)}{I-\underline{w}+m}$. Interestingly, the total number of firms within this range of B is irrespective of the specific level of B . However, it is worth noting that the fraction of entrepreneurs financed by banks $\frac{n_L}{n} = \frac{\psi - \frac{\psi}{1-\theta} + B - c}{a - \frac{\psi}{1-\theta} - c}$ is increasing in B .

4. For $B \in [\tilde{B}, +\infty[$ the bank barrier w_L remains the lowest entry barrier for external finance, although the participation constraint now becomes binding. Thus, equation (2.5), PC gives us the second condition to solve for the total output:

$$(I) \quad n = m\left(1 - \frac{I - p + \psi + B - \underline{w}}{I - \underline{w}}\right) \quad (II) \quad w_L = I - p - \psi - (B - \Phi) + c.$$

The solution of this problem is $n = \frac{m(a-\psi-B+\Phi-c)}{I-\underline{w}+m}$ and the fraction of bank-financed firms $\frac{n_L}{n} = \frac{\psi-c}{a-\psi-B+\Phi-c}$ is again increasing in B .

Appendix of Chapter 4

Appendix 4A: Proof of Lemma 1 (Market Structure)

To see that total output of entrepreneurs responds to changes in the deposit rate charged to banks, we proceed in two steps.

First, we will derive the equilibrium number of entrepreneurs in the economy; second, we take the first derivative with respect to the refinancing cost of a bank r_D to show that the number of active entrepreneurs is a decreasing function of the bank's cost of funding; in other words, we prove the spillover-effect of r_D on the industry structure in the economy.

The equilibrium number of entrepreneurs solves a system of two equations, taking into account the distribution function of wealth among citizens and the entry barrier for entrepreneurship that defines the marginal citizen that is able to get a loan.

$$n = \frac{\bar{w} - w^L}{\bar{w}} \quad (.1)$$

$$w^L = 1 - \frac{p - \frac{b}{1-\theta}}{r_D + c} \quad (.2)$$

Substituting (.2) in (.1) and using the market equilibrium condition, $p = a - n$, we can then solve for n , p and w^L as a function of the interest rate:

$$n = \frac{(r_D + c)(\bar{w} - 1) + a - \frac{b}{1-\theta}}{1 + \bar{w}(r_D + c)} \quad (.3)$$

$$p = \frac{(r_D + c)[\bar{w}(a - 1) + 1] + \frac{b}{1-\theta}}{1 + \bar{w}(r_D + c)} \quad (.4)$$

$$w^L = \frac{\bar{w}[r_D + c + 1 - (a - \frac{b}{1-\theta})]}{1 + \bar{w}(r_D + c)} \quad (.5)$$

We can now analyze the effect of the interest rate on the number of entrepreneurs that receive funding from the bank:

$$\frac{\partial n}{\partial r_D} = \frac{\bar{w} - 1 - \bar{w} \cdot (a - \frac{b}{1-\theta})}{(1 + \bar{w} \cdot (r_D + c))^2} < 0. \quad (.6)$$

To sign this term we exploit that $a - \frac{b}{1-\theta} \geq \bar{w} - 1$. This follows directly from re-arranging (.5), knowing that $w^L < 1$.

As (.6) is negative for $a - \frac{b}{1-\theta} = \bar{w} - 1$ and further decreasing in $a - \frac{b}{1-\theta}$, we can unambiguously sign $\frac{\partial n}{\partial r_D}$.

It is then straightforward to show that:

$$\frac{\partial p}{\partial r_D} = \frac{1 - \bar{w} + \bar{w}(a - \frac{b}{1-\theta})}{(1 + \bar{w}(r_D + c))^2} > 0 \quad (.7)$$

$$\frac{\partial w^L}{\partial r_D} = \frac{\bar{w}[1 - \bar{w} + \bar{w}(a - \frac{b}{1-\theta})]}{(1 + \bar{w}(r_D + c))^2} > 0. \quad (.8)$$

Appendix 4B: Proof of Proposition 1 (Crowding-Out)

In this Proof we show that the decrease of minimum capital requirements for sovereign bonds is translated in less investments in the real sector in the form of loans, whereas investments in bonds are increasing $\frac{\partial G}{\partial k_G} < 0$. The channel for the crowding out mechanism is the deposit rate r_D . We proceed in two steps. Firstly, we show that a decrease in k_G is associated with an increase in fundig costs r_D . Secondly, this reduces the optimal number of loans to entrepreneurs offered by banks.

We start by characterizing the equilibrium in the deposit market. Market clearing requires that the supply of deposits, i.e. savings, is equal to the number of loans and government bonds that are financed by deposits, $S = L + G$. We can analyze the impact of k_G on the deposit rate by using the implicit function theorem.

$$\begin{aligned} H &\equiv S - L - G = 0 \\ \frac{\partial r_D}{\partial k_G} &= \frac{\frac{\partial H}{\partial k_G}}{-\frac{\partial H}{\partial r_D}} = -\frac{\frac{\partial S}{\partial k_G} - \frac{\partial L}{\partial k_G} - \frac{\partial G}{\partial k_G}}{\frac{\partial S}{\partial r_D} - \frac{\partial L}{\partial r_D} - \frac{\partial G}{\partial r_D}}. \end{aligned} \quad (.9)$$

Next, consider the equilibrium number of government bonds.

$$\begin{aligned} G &= a - r_D \left[\gamma + (1 - \gamma) \cdot (\theta_G + k_G - \theta_G \cdot k_G) \right]. \\ \frac{\partial G}{\partial r_D} &= -\left(\gamma + (1 - \gamma)(\theta_G + k_G(1 - \theta_G)) \right) < 0. \\ \frac{\partial G}{\partial k_G} &= -r_D(1 - \gamma)(1 - \theta_G) < 0. \end{aligned}$$

The volume of loans granted by the banks is equal to

$$\begin{aligned} L &= \frac{1}{\bar{w}} \int_{w^L}^1 (1 - w_1^i) dw_1^i = \frac{1}{2} \cdot \frac{(1 - w^L)^2}{\bar{w}}. \\ \frac{\partial L}{\partial r_D} &= -\frac{1 - w^L}{\bar{w}} \cdot \frac{\partial w^L}{\partial r_D} = -\frac{(1 + \bar{w}(a - \frac{b}{1-\theta} - 1))^2}{(1 + \bar{w}(r_D + c))^3} < 0. \end{aligned}$$

Aggregate savings in the economy are made by citizens that do not have enough wealth to open a firm and become workers, and self-financed entrepreneurs whose wealth

exceeds the production cost of 1: According to (4.3) each worker with wealth $w^S \equiv w^i < w^L$ saves an amount of $S^i = w^i - (a - r_D)$ and each self-financed entrepreneur with $w^{\bar{S}} \equiv w^i > 1 + a - r_D$ saves $S^i = w^i - (a - r_D) - 1$. Thus aggregate savings are equal to:

$$S = \frac{1}{\bar{w}} \left(\underbrace{\int_{w^S}^{w^L} (w_i - (a - r_D)) dw_i}_{\text{savings worker}} + \underbrace{\int_{w^{\bar{S}}}^{\bar{w}} (w_i - (a - r_D) - 1) dw_i}_{\text{savings entrepreneurs}} \right)$$

$$\frac{\partial S}{\partial r_D} = \frac{1}{\bar{w}} \left(\underbrace{\frac{\partial w^L}{\partial r_D} \cdot (w^L - (a - r_D))}_{\text{number of savers}} + \underbrace{(w^L - (a - r_D) + \bar{w} - (1 + a - r_D))}_{\text{savings per saver}} \right) > 0.$$

Taking together, we can now sign $\frac{\partial r_D}{\partial k_G}$:

$$\frac{\partial r_D}{\partial k_G} = \frac{\frac{\partial H}{\partial k_G}}{-\frac{\partial H}{\partial r_D}} = -\frac{r_D(1-\gamma)(1-\theta_G)}{\underbrace{\frac{\partial S}{\partial r_D}}_{>0} - \underbrace{\frac{\partial L}{\partial r_D}}_{<0} - \underbrace{\frac{\partial G}{\partial r_D}}_{<0}} < 0. \quad (.10)$$

In the last step we consider the implication on the optimal supply of loans. As shown in (.7), it is obvious that $\frac{\partial w^L}{\partial r_D} > 0$ which means that the entry barrier to get a loan increases as a result of a bank's increasing refinancing costs.

Appendix 4C: Social Optimum

We derive the utilitarian social welfare function by defining the indirect utility function of the average citizen in the economy.

The indirect social utility function W^{Soc} consists of the weighted group-specific indirect utility from consumption of the numeraire Y_1 and Y_2 , and the indirect utility from the entrepreneurial good X and the public good G which are both irrespective of a citizen's group, hence wealth.

$$W^{Soc} = \frac{1}{\bar{w}} \left\{ \int_0^{w^S} \left[w_i \left(a - \frac{w_i}{2} \right) + \Pi^W \right] dw^i + \int_{w^S}^{w^L} \left[\frac{(a - r_D)^2}{2} + \Pi^W + r_D w^i \right] dw^i \right.$$

$$+ \int_{w^L}^1 [p - r_D(1 - w^i)] dw^i + \int_1^{w^{\bar{S}}} \left[(w_i - 1) \left(a - \frac{w_i - 1}{2} \right) + p \right] dw^i$$

$$\left. + \int_{w^{\bar{S}}}^{\bar{w}} \left[\frac{(a - r_D)^2}{2} + p + r_D(w^i - 1) \right] dw^i \right\} + \frac{(a - p)^2}{2} + \frac{a^2 - (r_D \cdot \chi)^2}{2} - r_D(a - r_D \cdot \chi),$$

where $w^S = a - r_D$ captures the necessary wealth of workers to be able to save,

$w^{\bar{S}} = 1 + a - r_D$ captures the necessary wealth of entrepreneurs to save and χ measures the inverse distortion due to the externality as defined in (4.13).

Differentiating the social welfare with respect to k_G and knowing that $S - L - G = 0$, we obtain

$$\frac{\partial W^{Soc}}{\partial k_G} = \underbrace{-\frac{\partial w^L}{\partial k_G} \left(p - r_D - \frac{(a - r_D)^2}{2} - \Pi^W \right)}_{\text{more entrepreneurs, less worker}} + \underbrace{r_D(r_D - \chi)(1 - \gamma)(1 - \theta_G)}_{\text{public good provision}} > 0.$$

Thus, increasing the capital requirements for sovereign bonds via k_G always improves social welfare because of two effects. The first term captures the net utility from more production of the consumption good X . Since total production of X is inefficiently low due to financial constraints, an increase in production is always welfare enhancing. Production is strictly increasing in k_G . The last term reflects the positive effect of k_G on the provision of the public good. As the society does not internalize all costs when the politician supplies government bonds, $k_G < 1$, this leads to an overprovision of the public good. This means that the marginal utility of the last unit of the public good is lower than the marginal utility of the last unit of consumption of Y_1 and Y_2 . Efficiency increases in k_G .

In a politically homogenous society without lobbying it is therefore optimal to implement $k_G = 1$ and to abstain from financial repression.

Appendix 4D: Proof of Proposition 2 (Rent-Creation)

In this Proof we determine the size of the group of supporters who benefit from financial repression. The provision of the public good affects citizens, irrespective of their wealth, in the same way. Hence the direct effects of sovereign bonds do not have any rent-shifting effects within the electorate and are therefore ignored. Inserting (4.2), (4.3) and (4.4) in (4.1), we can derive the indirect utility function for every citizen. Intuitively, utility is a positive function of individual wealth w^i and a negative function of the price of the entrepreneurial good p that is given by

$$V^i = \begin{cases} (w^i - I^i) \left(a - \frac{w^i - I^i}{2} \right) + \frac{(a-p)^2}{2} + \Pi^i - T & \text{if } w^i - I^i \leq a - r_D \\ \frac{(a-r_D)^2}{2} + \frac{(a-p)^2}{2} + \Pi^i + r_D(w^i - I^i) - T & \text{if } w^i - I^i > a - r_D. \end{cases}$$

Next, it is useful to distinguish two social groups: (1) workers and (2) entrepreneurs. In each group there is a critical threshold of wealth w_i from where the citizen will start to deposit money at a bank.

1. **Workers** ($w_i \in [0, w^L]$)

We start by analyzing the effects of k_G on the utility of workers. They have an initial wealth that is distributed in the interval $[0, w^L]$. Hence, some workers do not have sufficient wealth to save in the first period, $w_i \in [0; a - r_D]$, but consume their complete wealth $Y_1 = w_i$. We arrive at their their indirect utility by substituting Y_1, Y_2 and X into (4.6):

$$V^i = w^i \left(\frac{a - w^i}{2} \right) + \frac{(a - p)^2}{2} + \Pi^W - T,$$

where only p is a function of k_G , as shown in Appendix A. Taking the partial derivative with respect to k_G yields:

$$\frac{\partial V^i}{\partial k_G} = -(a - p) \cdot \underbrace{\frac{\partial p}{\partial r_D} \cdot \frac{\partial r_D}{\partial k_G}}_{\text{competitive effect}} > 0.$$

We see that a decrease in the minimum capital regulation of government bonds is unambiguously negatively associated with the utility of workers because of the competitive effect that captures the increasing price of the consumption good because of less competition in the market for X .

However, if the worker is sufficiently wealthy, $w_i \in [w^S; w^L]$, he will save part of his wealth in the first period $S_i = w_i - (a - r_D)$ such that he benefits from increasing deposit rates. Thus, there is an opposing effect that mitigates the competitive effect. To see this, consider the indirect utility of a wealthy worker:

$$V^i = \frac{(a - r_D)^2}{2} + \frac{(a - p)^2}{2} + r_D w_i + \Pi^W - T,$$

where r_D and p are functions of k_G . Taking the partial derivative with respect to k_G shows the main trade-off:

$$\frac{\partial V^i}{\partial k_G} = \left(\underbrace{w_i - (a - r_D)}_{\text{savings effect (+)}} \quad \underbrace{-n \cdot \frac{\partial p}{\partial r_D}}_{\text{competitive effect (-)}} \right) \cdot \frac{\partial r_D}{\partial k_G}.$$

The opposing savings effect increases in the wealth of the worker, thus decreasing the capital ratio for government bonds becomes more attractive. However, for sufficiently low deposit rates, i.e. $r_D < a - w^L + n \frac{\partial p}{\partial r_D}$, the savings effect will be dominated such that the overall utility is negative from lower k_G . Henceforth, we assume that no worker has an advantage of financial repression.

2. Entrepreneurs ($w_i \in [w^L, \bar{w}]$)

Entrepreneurs have a gain from a policy that reduces k_G since this increases the entry barrier in the product market and hence the price the entrepreneur can charge. Thus, there is a rent-enhancing competitive effect for all entrepreneurs. In addition, we do have a refinancing effect and the savings-effect that will again depend on the initial wealth of the entrepreneur.

Consider first entrepreneurs who cannot save in the first period. Endowed with $w_i \in [w^L; 1]$ they put their complete wealth into their own firm in order to get a loan from the bank and become a bank-financed entrepreneur. Their indirect utility function is given by:

$$V^i = \frac{(a-p)^2}{2} + p - r_D(1-w_i) - T.$$

Taking the partial derivative with respect to k_G we can determine the effect of capital requirements on a bank-financed entrepreneur's utility:

$$\frac{\partial V^i}{\partial k_G} = \frac{\partial r_D}{\partial k_G} \left(\underbrace{-\frac{\partial p}{\partial r_D} \cdot (a-p) + 1}_{\text{competitive effect}} \underbrace{-(1-w_i)}_{\text{refinancing effect}} \right).$$

The effect of capital requirements is ambiguous. For bank-financed entrepreneurs there is, on the one hand, the competitive effect that improves the entrepreneurial rent because of higher prices of the consumption good X , which is unaffected by the individual wealth of citizens. On the other hand, the refinancing effect reduces the gains from financial repression because of higher interest rates for loans. The impact of this effect decreases with initial wealth of entrepreneurs. If we look at the utility of the less and most wealthy bank-financed entrepreneur, we see that $\frac{\partial V^i(w_i=w^L)}{\partial k_G} > 0$, whereas $\frac{\partial V^i(w_i=1)}{\partial k_G} < 0$. In other words, there exists a critical wealth level \hat{w} where the bank-financed entrepreneur is indifferent on changes of the capital ratio for government bonds, $\frac{\partial V^i(w_i=\hat{w})}{\partial k_G} = 0$. The following condition gives the threshold under which the competitive effect overcompensates the refinancing effect:

$$\hat{w} > 1 - \frac{\partial p}{\partial r_D}(1 - (a-p)) \quad (.11)$$

From this equation we know that all bank-financed entrepreneurs with wealth $w_i > \hat{w}$ benefit from financial repression.

To show that this is also true for self-financed entrepreneurs with $w_i \in [1; \bar{w}]$ we again distinguish the two cases of entrepreneurs who saves an amount of wealth

and those who do not. Thus, consider the indirect utility of an entrepreneur who cannot save, i.e. with wealth $w_i \in [1; w^{\bar{S}}]$:

$$V^i = \frac{(a-p)^2}{2} + p + (w_i - 1)\left(a - \frac{(w_i - 1)}{2}\right) - T.$$

Taking the partial derivative with respect to k_G yields:

$$\frac{\partial V^i}{\partial k_G} = \frac{\partial p}{\partial r_D} \cdot \frac{\partial r_D}{\partial k_G} \underbrace{(1 - (a-p))}_{\text{competitive effect}} < 0.$$

Self-financed entrepreneurs without any savings benefit from the competitive effect of higher prices due to less competition. The utility rises with financial repression irrespective of their wealth. However, the gains from policy intervention become larger, if there are positive savings. The reason is that entrepreneurs with wealth $w_i \in [w^{\bar{S}}; \bar{w}]$ also gain from the savings effect described above. In this case, the indirect utility of self-financed entrepreneurs reads:

$$V^i = \frac{(a-p)^2}{2} + p + \frac{(a-r_D)^2}{2} + r_D(w_i - 1) - T.$$

Taking the partial derivative with respect to k_G yields:

$$\frac{\partial V^i}{\partial k_G} = \frac{\partial r_D}{\partial k_G} \left(\underbrace{w_i - (a - r_D) - 1}_{\text{savings effect}} + \frac{\partial p}{\partial r_D} \underbrace{(1 - (a-p))}_{\text{competitive effect}} \right) < 0.$$

Therefore we can show that there is a group of citizens with wealth $w_i > \hat{w}$ that benefit from financial repression and have a positive willingness to lobby for such a regulatory intervention. We call this group "supporters" of financial repression. The utility of the group of "supporters" is strictly decreasing in k_G , $\frac{\partial W^S}{\partial k_G} < 0$.

Appendix 4E: Proof of Proposition 3 (Financial repression)

The proof of financial repression through lobbying strongly follows Persson and Tabellini (2001). Accordingly, the probability for an electoral victory of politician A is given by

$$p_A = \frac{1}{2} + \psi [W[k_G^A] - W[k_G^B] + h(C_A - C_B)],$$

where $W[k_G^A] = \lambda^O \cdot W^O[k_G^A] + \lambda^S \cdot W^S[k_G^A]$ is the welfare function of the electorate. The group size of supporters S and opponents O is labeled by λ , with $\lambda^S = \frac{\bar{w} - \hat{w}}{\bar{w}}$

and $\lambda^O = \frac{\hat{w}}{\bar{w}}$. The first order condition is:

$$\frac{\partial p_A}{\partial k_G} = \underbrace{\psi \left(\lambda^S \cdot \frac{\partial W^S}{\partial k_G} \right) + \psi \left(\lambda^O \cdot \frac{\partial W^O}{\partial k_G} \right)}_{\frac{\partial W}{\partial k_G}},$$

where W^S denotes the average utility of a member of the group of supporters and W^O denotes the average utility of a member of the group of opponents. We can see nicely that without any lobby it is optimal for each politician to maximize the welfare function of the electorate (W). This term is equal to the solution of the utilitarian social welfare maximisation derived in Appendix 4C with one exception: there is an additional distortion, namely the externalized fraction of the cost of providing the public good financed by deposit insurance that is reflected in the missing term of $r_D(a - r_D\chi)$. Hence the welfare function of the electorate is given by

$$\begin{aligned} W = & \frac{1}{\bar{w}} \left\{ \int_0^{w^S} \left[w_i \left(a - \frac{w_i}{2} \right) + \Pi^W \right] dw^i + \int_{w^L}^{w^S} \left[\frac{(a - r_D)^2}{2} + \Pi^W + r_D w^i \right] dw^i \right. \\ & + \int_{w^L}^1 [p - r_D(1 - w^i)] dw^i + \int_1^{w^S} \left[(w_i - 1) \left(a - \frac{w_i - 1}{2} \right) + p \right] dw^i \\ & \left. + \int_{w^S}^{\bar{w}} \left[\frac{(a - r_D)^2}{2} + p + r_D(w^i - 1) \right] dw^i \right\} + \frac{(a - p)^2}{2} + \frac{a^2 - (r_D\chi)^2}{2}. \end{aligned}$$

The partial derivative with respect to k_G of this function generates Lemma 3, suggesting that financial repression is feasible when the externality is sufficiently severe.

If only the "supporters" are organized in a lobby group, the first order condition reduces to

$$\begin{aligned} \frac{\partial p_A}{\partial k_G} &= \psi \left(\lambda^S \frac{\partial W^S}{\partial k_G} + \lambda^O \frac{\partial W^O}{\partial k_G} \right) + \psi^2 h^2 \lambda^S \frac{\partial W^S}{\partial k_G} = 0 \\ &= \psi \frac{\partial W}{\partial k_G} + \underbrace{\psi^2 h^2 \lambda^S \frac{\partial W^S}{\partial k_G}}_{<0} = 0 \end{aligned} \quad (.12)$$

Following Persson and Tabellini (2001, p. 381) we can now rewrite the welfare function of each member of the "supporters" as the sum of the average welfare of

the electorate plus the average rent of each supporter relative to the electorate.

$$W^S = W + \underbrace{\overbrace{p(1-n)}^{\text{competition effect}} + \overbrace{r_D(S^S - S)}^{\text{savings effect}} - \overbrace{r_D(L^S - L)}^{\text{refinancing effect}}}_{R^S}$$

where

$$S^S = \left(\underbrace{\frac{\bar{w} - \bar{w}^S}{\bar{w} - \hat{w}}}_{\text{fraction of supporter}} \right) \cdot \left(\underbrace{\frac{S}{(\bar{w} - \bar{w}^S) + (w^L - w^S)}}_{\text{average effect for savers}} \right)$$

$$L^S = \left(\underbrace{\frac{1 - \hat{w}}{\bar{w} - \hat{w}}}_{\text{fraction of supporter}} \right) \cdot \left(\underbrace{\frac{L}{1 - w^L}}_{\text{average effect for borrowers}} \right).$$

The first term represents the average welfare of the electorate. The second term measures the competitive effect for the supporters, each producing one unit, relative to the average citizen in the economy, producing n units. The third and fourth term quantify the impact of the change of deposit rate on the supporters relative to the average within the electorate.

We can then substitute p and n with (.4) and (.3) into (.12) to see that:

$$\frac{\partial p_A}{\partial k_G} = \psi \left[\frac{\partial W}{\partial k_G} + \psi h^2 \left(\frac{\bar{w} - \hat{w}}{\bar{w}} \right) \left(\frac{\partial W}{\partial k_G} + \frac{\partial R^S}{\partial k_G} \right) \right] = 0. \quad (.13)$$

Rearranging yields $\frac{\partial W}{\partial k_G} = -\frac{h^2 \cdot \psi \frac{\bar{w} - \hat{w}}{\bar{w}}}{1 + h^2 \psi \frac{\bar{w} - \hat{w}}{\bar{w}}} \cdot \frac{R^S}{k_G}$ which can be written as:

$$\begin{aligned} \frac{\partial W}{\partial k_G} = & -\frac{h^2 \cdot \psi \frac{\bar{w} - \hat{w}}{\bar{w}}}{1 + h^2 \psi \frac{\bar{w} - \hat{w}}{\bar{w}}} \cdot \left[\underbrace{\frac{\partial p}{\partial k_G} (1 + a - 2n)}_I + \underbrace{\frac{\partial r_D}{\partial k_G} (S^S - S) + r_D \frac{\partial S^S}{\partial k_G}}_{II} \right. \\ & \left. - \underbrace{\frac{\partial r_D}{\partial k_G} (L^S - L) - r_D \frac{\partial L^S}{\partial k_G}}_{III} \right] + \underbrace{-\frac{h^2 \cdot \psi}{1 + h^2 \psi \frac{\bar{w} - \hat{w}}{\bar{w}}} \frac{\partial \hat{w}}{\partial k_G} W^S}_{IV} > 0 \quad (.14) \end{aligned}$$

(.14) suggests that the optimal policy is characterized by a level of capital requirements k_G that is set inefficiently low, since welfare would increase with higher requirements. We can sign (.14) due to the fact that $\frac{\partial R^S}{\partial k_G} < 0$.

However, the degree of deviation from the socially optimal $k_G = 1$ critically depends on the relative strength of different effects within the lobby group: While the deviation decreases in the total number of active entrepreneurs (first effect), it increases with the concentration of savings within the lobby group (second effect). Further, lobbying effort and thus the degree of the distortion decreases in the amount of loans taken by members of the lobby group (third effect). The

lobbying effort also decreases in the amount of bank financed entrepreneurs within the group of supporters, as the decrease in k_G then leads to an exit of some lobby group members due to increased financial constraints (fourth effect).

Appendix of Chapter 5

Appendix 5A: Proof of Proposition 1 (Cost minimization)

The regulator may stabilise the opaque banking sector via a production function with two input factors. Both instruments - capital standards k and supervision θ - reduce market inefficiencies that are caused by goofy banks. The regulator considers only the rent of efficient banks as goofy banks strictly reduce welfare. The regulator thereby places a weighting factor ϕ on the profit of efficient banks and maximises her utility subject to the monitoring incentive-constraint of the efficient banks, the participation constraint of efficient banks, and the participation-constraint of depositors.

Assume that θ is a linear increasing function of effort; thus, effort can be simplified to $e = \theta$, $c[\theta] = \frac{c}{2} \cdot \theta^2$. The maximisation problem of the regulator can be written as

$$\max_{e,k} U = \phi \cdot (p_H (R - r_D [\theta] (1 - k)) - m - \rho \cdot k) - (1 - \phi) \cdot \frac{c}{2} \cdot \theta^2$$

s.t.

$$\begin{aligned} r_D [\theta] &= \frac{\gamma}{p_L + \theta \Delta p}, \\ k &\geq 1 - \frac{r_D}{\left(R - \frac{m}{\Delta p}\right)}, \\ k &\leq \frac{p_H(R - r_D) - m}{\rho - p_H r_D} \\ 0 &\leq k \leq 1, \quad 0 \leq \theta \leq 1. \end{aligned}$$

The first optimality condition with respect to the capital standard is

$$\frac{\partial U}{\partial k} = \left[\phi \cdot \{p_H \cdot r_D [\theta] - \rho\} < 0 \mid \rho > \frac{p_H}{p_L} \gamma \right],$$

The first term captures the marginal benefit of an increase in capital standards resulting from the decreasing cost of deposits (decreasing refinancing rate and decreasing amount of deposits), whereas the second term ρ is simply the marginal cost of capital. Because equity funding is assumed to be costly, the marginal benefit of lower deposit costs never outweighs the marginal cost. Therefore, the second constraint is binding - the regulator tries to reduce costly capital require-

ments to a minimum and simply requires banks to refund their investments with a minimum requirement that ensures that the monitoring incentive constraint holds.

The optimality condition with respect to supervisory effort is

$$\begin{aligned} \frac{\partial U}{\partial \theta} &= -\phi p_H \frac{\partial r_D[\theta]}{\partial \theta} (1-k) - (1-\phi) \cdot c \cdot \theta. \\ &= \phi \left(\frac{p_H \Delta p \cdot \gamma (1-k)}{(p_L + \theta \Delta p)^2} \right) - (1-\phi) \cdot c \cdot \theta \\ &= \phi \left(\frac{p_H \Delta p \cdot r_D[\theta] \cdot (1-k)}{(p_L + \theta \Delta p)} \right) - (1-\phi) \cdot c \cdot \theta. \end{aligned}$$

The first two terms capture the benefits of increased enforcement: the former reflects the induced increase in efficient banks' rent (marginal increase of the number of efficient banks in the pool of the domestic banking sector multiplied with their expected profit); the latter describes the cost-savings of refinancing as a consequence of a higher fraction of efficient banks. Therefore, more supervisory effort - a higher pool quality - will always improve the profitability of efficient banks. Comparing the increase in marginal profits (weighted with ϕ) with the marginal costs of supervision, the regulator selects an optimal level of enforcement. If the regulator does not consider the profits at all, ($\phi = 0$), the optimal effort spent is zero.

If the participation constraint of banks is non-binding, there exists a unique interior solution for the optimal level of supervisory effort if effort costs are sufficiently high. Using the binding monitoring constraint $1-k = \frac{(R-\frac{m}{\Delta p})}{r_D[\theta]}$, gives:

$$\frac{\partial U}{\partial \theta} = \phi p_H \left(\frac{R \cdot \Delta p - m}{p_L + \theta \Delta p} \right) - (1-\phi) \cdot c \cdot \theta.$$

We define $A_1[\theta] = \phi p_H \left(\frac{R \cdot \Delta p - m}{p_L + \theta \Delta p} \right)$ and $A_2[\theta] = (1-\phi) \cdot c \cdot \theta$. Without any efficient banks $A_1[0] = \phi \frac{p_H}{p_L} (R \cdot \Delta p - m) > 0 = A_2[0]$. Note that A_1 is continuously decreasing $\frac{\partial A_1}{\partial \theta} < 0$, while A_2 is continuously increasing $\frac{\partial A_2}{\partial \theta} > 0$ in θ . Therefore, if $A_1[1] = \phi (R \cdot \Delta p - m) < (1-\phi) \cdot c = A_2[1]$, there is a unique value $\theta^* \in (0, 1)$ that fulfils the first order condition.

In particular, if $(1-\phi) \cdot c > \phi (R \cdot \Delta p - m)$. For a given level of effort cost, the first order condition then implicitly defines a unique optimal supervisory level:

$$\theta^* = \frac{1}{2} \left(\frac{\sqrt{(1-\phi)^2 \cdot p_L^2 - \phi \cdot \frac{4 \cdot p_H \cdot \Delta p (R \cdot \Delta p - m)}{c}}}{(1-\phi) \cdot \Delta p} - \frac{p_L}{\Delta p} \right).$$

This implies a capital requirement level

$$k[\theta^*] = 1 - \frac{1}{\gamma} (p_L + \theta^* \Delta p) \left(R - \frac{m}{\Delta p} \right).$$

Taking the partial derivative of the regulator's optimal supervisory effort with respect to k , yields

$$\frac{\partial^2 U}{\partial k \partial \theta} = -\phi \left(\frac{p_H \Delta p \gamma}{(p_L + \theta \Delta p)^2} \right) < 0.$$

It follows that capital standards and supervision behave as substitutes for the regulator.

References

- Abrams, Lynn**, *Bismarck and the German Empire: 1871–1918*, Routledge, 2006.
- Acemoglu, Daron and James Robinson**, “Persistence of power, elites, and institutions,” *American Economic Review*, 2008, 98 (1), 267–93.
- , **Simon Johnson, Amir Kermani, James Kwak, and Todd Mitton**, “The value of political connections in the United States,” 2010.
- , – , and **James Robinson**, “Institutions as a fundamental cause of long-run growth,” *Handbook of economic growth*, 2005, 1, 385–472.
- Acharya, Sankarshan and Jean-Francois Dreyfus**, “Optimal bank reorganization policies and the pricing of federal deposit insurance,” *Journal of Finance*, 1989, 44 (5), 1313–1333.
- Acharya, Viral**, “Is the international convergence of capital adequacy regulation desirable?,” *Journal of Finance*, 2003, 58, 2745–82.
- and **Raghuram Rajan**, “Sovereign debt, government myopia, and the financial sector,” *Review of Financial Studies*, 2013, 26 (6), 1526–60.
- and **Sascha Steffen**, “The ”greatest” carry trade ever? Understanding eurozone bank risks,” *Journal of Financial Economics*, 2014, *forthcoming*.
- and **Tanju Yorulmazer**, “Too many to fail – An analysis of time-inconsistency in bank closure policies,” *Journal of Financial intermediation*, 2007, 16 (1), 1–31.
- , **Deniz Anginer, and Joseph Warburton**, “The end of market discipline? Investor expectations of implicit state guarantees,” 2013.
- , **Philipp Schnabl, and Gustavo Suarez**, “Securitization without risk transfer,” *Journal of Financial Economics*, 2013, 107 (3), 515–536.
- , **Robert Engle, and Diane Pierret**, “Testing macroprudential stress tests: The risk of regulatory risk weights,” *Journal of Monetary Economics*, 2014, 65, 36–53.
- , **Thomas Cooley, Matthew Richardson, and Ingo Walter**, *Regulating Wall Street: The Dodd-Frank Act and the new architecture of global finance*, John Wiley & Sons, 2010.
- , **Tim Eisert, Christian Eufinger, and Christian Hirsch**, “Real effects of the sovereign debt crises in Europe: evidence from syndicated loans,” 2014.

- Admati, Anat and Martin Hellwig**, *The bankers' new clothes: What's wrong with banking and what to do about it*, Princeton University Press, 2013.
- Adrian, Tobias, Paolo Colla, and Hyun Song Shin**, "Which financial frictions? Parsing the evidence from the financial crisis of 2007-9," 2012.
- Aghion, Philippe and Patrick Bolton**, "Incomplete social contracts," *Journal of the European Economic Association*, 2003, 1 (1), 38–67.
- , **Thibault Fally, and Stefano Scarpetta**, "Credit constraints as a barrier to the entry and post-entry growth of firms," *Economic Policy*, 2007, 22 (52), 731–79.
- Akerlof, George**, "The Market for Lemons: Quality Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, 1970, 84 (3), 488–500.
- Alesina, Alberto and Guido Tabellini**, "Bureaucrats or politicians? Part II: Multiple policy tasks," *Journal of Public Economics*, 2008, 92 (3), 426–447.
- Alessandri, Piergiorgio and Andrew Haldane**, *Banking on the State*, Bank of England London, UK, 2009.
- Allen, Franklin and Douglas Gale**, *Comparing financial systems*, Vol. 1, the MIT Press, 2001.
- and – , "Competition and financial stability," *Journal of Money, Credit and Banking*, 2004, 36 (3), 453–80.
- and **Elena Carletti**, "New theories to underpin financial reform," *Journal of Financial Stability*, 2013, 9 (2), 242–249.
- Andritzky, Jochen**, *Government bonds and their investors: What are the facts and do they matter?*, International Monetary Fund, 2012.
- Anginer, Deniz, Asli Demirgüç-Kunt, and Min Zhu**, "How does deposit insurance affect bank risk? Evidence from the recent crisis," *Journal of Banking & Finance*, 2014.
- Arcand, Jean-Louis, Enrico Berkes, and Ugo Panizza**, *Too much finance?*, International Monetary Fund, 2012.
- Arslanalp, Serkan and Takahiro Tsuda**, "Tracking global demand for advanced economy sovereign debt," 2012.
- Auerbach, Alan, Michael Devereux, and Helen Simpson**, "Dimensions of tax design: The mirrlees review," *Institute for Fiscal Studies, (IFS), editor, Dimensions of Tax Design*, 2010, pp. 837–904.

- Badinger, Harald and Volker Nitsch**, “National representation in supra-national institutions: The case of the European Central Bank,” *Journal of Comparative Economics*, 2014, 42 (1), 19–33.
- Bagehot, Walter**, “Lombard Street [1873],” *Kegan Paul, London*, 1906.
- Bârsan-Pipu, Nicolae and Ileana Tache**, “An analysis of EU voting procedures in the enlargement context,” *International Advances in Economic Research*, 2009, 15 (4), 393–408.
- Barth, James, Gerard Caprio, and Ross Levine**, *Rethinking bank regulation: Till angels govern*, Cambridge University Press, 2006.
- , – , and – , “The evolution and impact of bank regulations,” 2012.
- Bayer, Walter and Mathias Habersack**, *Aktienrecht im Wandel*, Mohr Siebeck, 2007.
- Bebchuk, Lucian and Mark Roe**, “A theory of path dependence in corporate ownership and governance,” *Stanford Law Review*, 1999, 52 (1), 127–70.
- Beck, Thorsten and Olivier De Jonghe**, “Lending concentration, and its implications for systemic risk and public policy,” *Background paper for the World Development Report*, 2014.
- , **Asli Demirgüç-Kunt, and Ross Levine**, “Finance, inequality and the poor,” *Journal of economic growth*, 2007, 12 (1), 27–49.
- , – , and – , “A new database on financial development and structure (updated November 2013),” *World Bank Economic Review*, 2010, 24 (1), 77–92.
- , – , and **Vojislav Maksimovic**, “Financing patterns around the world: Are small firms different?,” *Journal of Financial Economics*, 2008, 89 (3), 467–87.
- , **Ross Levine, and Norman Loayza**, “Finance and the sources of growth,” *Journal of financial economics*, 2000, 58 (1), 261–300.
- Becker, Gary**, “A theory of competition among pressure groups for political influence,” *Quarterly Journal of Economics*, 1983, 98 (3), 371–400.
- Benmelech, Efraim and Tobias Moskowitz**, “The political economy of financial regulation: evidence from US state usury laws in the 19th century,” *Journal of Finance*, 2010, 65 (3), 1029–73.
- Bennedsen, Morten, Sven Feldmann, and David Dreyer Lassen**, “Lobbying and bribes: A survey-based analysis of the demand for influence and corruption,” 2011.

- Berger, Allen and Sally Davies**, “The information content of bank examinations,” *Journal of Financial Services Research*, 1998, 14 (2), 117–144.
- , **Richard Herring, and Giorgio Szegö**, “The role of capital in financial institutions,” *Journal of Banking & Finance*, 1995, 19 (3), 393–430.
- Berglöf, Erik and Enrico Perotti**, “The governance structure of the Japanese financial keiretsu,” *Journal of Financial Economics*, 1994, 36 (2), 259–284.
- Besley, Timothy and Andrea Prat**, “Handcuffs for the grabbing hand? Media capture and government accountability,” *American Economic Review*, 2006, 96 (3), 720–36.
- and **Stephen Coate**, “Centralized versus decentralized provision of local public goods: A political economy approach,” *Journal of Public Economics*, 2003, 87 (12), 2611–37.
- Black, Fischer and Myron Scholes**, “The pricing of options and corporate liabilities,” *Journal of Political Economy*, 1973, 81 (3), 637–54.
- Blanchflower, David, Andrew Oswald, and Peter Sanfey**, “Wages, profits, and rent-sharing,” *Quarterly Journal of Economics*, 1996, 111 (1), 227–51.
- Blau, Benjamin, Tyler Brough, and Diana Thomas**, “Corporate lobbying, political connections, and the bailout of banks,” *Journal of Banking & Finance*, 2013, 37 (8), 3007–3017.
- Bloomberg View**, “Why Should Taxpayers Give Big Banks 83 Billion a Year?,” *Bloomberg*, (February 20), 2013.
- Boelcke, Willi**, *Krupp und die Hohenzollern in Dokumenten: Krupp-Korrespondenz mit Kaisern, Kabinettschefs und Ministern, 1850-1918*, Athenaion, 1970.
- Boot, Arnoud and Anjan Thakor**, “Financial system architecture,” *Review of Financial Studies*, 1997, 10 (3), 693–733.
- Bordo, Michael**, “The Lender of Last Resort: Alternative Views and Historical Experience,” *Economic Review*, 1990.
- Born, Karl Erich**, *Vom Beginn des Ersten Weltkrieges bis zum Ende der Weimarer Republik (1914-1933)*, Knapp, 1983.
- Boyd, John and Gianni De Nicrolo**, “The theory of bank risk taking and competition revisited,” *Journal of Finance*, 2005, 60 (3), 1329–1343.
- Brands, Henry**, *Andrew Jackson: His life and times*, Random House LLC, 2006.

- Braun, Matías and Claudio Raddatz**, “Banking on politics: when former high-ranking politicians become bank directors,” *The World Bank Economic Review*, 2010.
- Brewer, Elijah and Julapa Jagtiani**, “How much did banks pay to become Too-Big-To-Fail and to become systemically Important?,” *Journal of Financial Services Research*, 2013, 43 (1), 1–35.
- Brown, Craig and Serdar Dinc**, “The politics of bank failures: Evidence from emerging markets,” *Quarterly Journal of Economics*, 2005, 120 (4), 1413–44.
- Brunnermeier, Markus and Isabel Schnabel**, “Bubbles and central banks: Historical perspectives,” 2014.
- **and Yuliy Sannikov**, “Monetary analysis: price and financial stability,” 2014.
- **, Andrew Crockett, Charles Goodhart, Avi Persaud, and Hyun Shin**, “The fundamental principles of financial regulation,” *Geneva London: International Center for Monetary and Banking Studies Centre for Economic Policy Research*, 2009.
- Brutti, Filippo and Philip Sauré**, “Repatriation of debt in the euro crisis. Evidence for the secondary market theory,” *Center for Institutions, Policy and Culture in the Development Process Working Paper*, 2013, (109).
- Buch, Claudia and Gayle DeLong**, “Do weak supervisory systems encourage bank risk-taking?,” *Journal of Financial Stability*, 2008, 4 (1), 23–39.
- **, Björn Hilberg, and Lena Tonzer**, “Taxing banks: An evaluation of the German bank levy,” 2014.
- Buck, Florian**, “Financial Regulation and the Grabbing Hand,” *CESifo DICE Report*, 2013, 11 (4), 03–13.
- **and Darko Jus**, “Liability regimes, deposit insurance and the subprime crisis,” *Economic Policy and Global Recession*, 2009, 2, 13–23.
- **and Eva Schliephake**, “The regulators trade-off: Bank supervision vs. minimum capital,” *Journal of Banking & Finance*, 2013, 37 (11), 4584–98.
- **and Nikolaus Hildebrand**, “Elites and bank-based finance,” 2014.
- Butlin, Sydney, Ross Hall, and Ronald White**, *Australian banking and monetary statistics, 1817–1945*, Sydney: Reserve Bank of Australia, 1971.
- Cabral, Luis and Jose Mata**, “On the evolution of the firm size distribution: Facts and theory,” *American Economic Review*, 2003, 93 (4), 1075–1090.

- Calomiris, Charles**, “Deposit insurance: lessons from the record,” *Economic Perspectives*, 1989, 13 (3), 10–30.
- **and Berry Wilson**, “Bank capital and portfolio management: The 1930’s capital crunch and scramble to shed risk,” 1998.
 - **and Charles Kahn**, “The role of demandable debt in structuring optimal banking arrangements,” *American Economic Review*, 1991, 81, 497–513.
 - **and Eugene White**, “The origins of federal deposit insurance,” in “The regulated economy: a historical approach to political economy,” University of Chicago Press, 1994, pp. 145–88.
 - **and Joseph Mason**, “Contagion and bank failures during the Great Depression: The June 1932 Chicago banking panic,” *American Economic Review*, 1997, 87 (5), 863–83.
 - **and Stephen Haber**, *Fragile by design: banking crises, scarce credit, and political bargains*, Princeton University Press, 2014.
- Caprio, Gerard**, “Financial regulation after the crisis: How did we get here, and how do we get out?,” 2013.
- **and Daniela Klingebiel**, *Bank insolvencies cross-country experience*, World Bank Publications, 1996.
- Carbo-Valverde, Santiago, Edward Kane, and Francisco Rodriguez-Fernandez**, “Evidence of regulatory arbitrage in cross-border mergers of banks in the EU,” 2009.
- Carney, Richard**, “The political economy of financial systems,” 2001.
- Castro, Rui, Gian Luca Clementi, and Glenn MacDonald**, “Investor protection, optimal incentives, and economic growth,” *Quarterly Journal of Economics*, 2004, 119 (3), 1131–75.
- Chan, Yuk-Shee, Stuart Greenbaum, and Anjan Thakor**, “Is fairly priced deposit insurance possible?,” *Journal of Finance*, 1992, 47 (1), 227–245.
- Chari, Varadarajan and Patrick Kehoe**, “Bailouts, time inconsistency, and optimal regulation,” 2013.
- Chetty, Raj, Adam Looney, and Kory Kroft**, “Salience and taxation: Theory and evidence,” *American Economic Review*, 2009, 99 (4), 1145–77.
- Claessens, Stijn, Geoffrey Underhill, and Xiaoke Zhang**, “The political economy of Basle II: The costs for poor countries,” *The World Economy*, 2008, 31 (3), 313–44.

- Clementi, Gian Luca and Hugo Hopenhayn**, “A theory of financing constraints and firm dynamics,” *Quarterly Journal of Economics*, 2006, 121 (1), 229–65.
- Collins, Michael**, *Money and Banking in the UK: A History*, Routledge, 2012.
- Cordella, Tito and Eduardo Levy Yeyati**, “Bank bailouts: moral hazard vs. value effect,” *Journal of Financial Intermediation*, 2003, 12 (4), 300–30.
- Cotula, Franco, Tullio Raganelli, Valeria Sannucci, Stefania Alieri, and Elio Cerrito**, *I bilanci delle aziende di credito, 1890–1936*, Rome: Editori Laterza, 1996.
- Crosignani, Matteo**, “Why are banks not recapitalized during crises? A political economy explanation,” 2014.
- Curry, Timothy and Lynn Shibut**, “The Cost of the Savings and Loans Crisis: Truth and consequences,” *FDIC Banking Review*, 2000.
- Curtis, Clifford, Kenneth Austin, and Humfrey Michell**, *Statistical contributions to Canadian Economic History*, Toronto: The Macmillan Company of Canada, Limited, 1931.
- Danmarks Statistik**, *Kreditmarkedsstatistik: Statistiske Undersogelser Nr. 24*, Copenhagen: Danmarks Statistik, 1969.
- Davies, Richard and Belinda Tracey**, “Too big to be efficient? The impact of implicit subsidies on estimates of scale economies for banks,” *Journal of Money, Credit and Banking*, 2014, 46 (1), 219–253.
- DeAngelo, Harry and Rene Stulz**, “Why high leverage is optimal for banks,” 2013.
- Dell’Arricia, Giovanni and Robert Marquez**, “Competition among regulators and credit market integration,” *Journal of Financial Economics*, 2006, 79, 401–430.
- Demirgüç-Kunt, Asli and Enrica Detragiache**, *Financial liberalization and financial fragility* number 1917, World Bank Publications, 1998.
- **and Ross Levine**, *Bank-based and market-based financial systems: Cross-country comparisons*, Vol. 2143, World Bank Publications, 1999.
- **, Edward Kane, and Luc Laeven**, “Determinants of deposit-insurance adoption and design,” *Journal of Financial Intermediation*, 2008, 17 (3), 407–38.
- Deutsche Bundesbank**, *Deutsches Geld- und Bankwesen in Zahlen, 1876–1975*, Frankfurt: Knapp, 1975.

- Dewatripont, Mathias and Jean Tirole**, *The prudential regulation of banks*, MIT Press, 1994.
- Diamond, Douglas**, “Financial intermediation and delegated monitoring,” *Review of Economic Studies*, 1984, 51 (3), 393–414.
- **and Philip Dybvig**, “Bank runs, deposit insurance, and liquidity,” *Journal of Political Economy*, 1983, 91 (3), 401–19.
- Dincer, Nergiz and Bilin Neyapti**, “What determines the legal quality of bank regulation and supervision?,” *Contemporary Economic Policy*, 2008, 26 (4), 607–22.
- Disli, Mustafa, Koen Schoors, and Jos Meir**, “Political connections and depositor discipline,” *Journal of Financial Stability*, 2013, 9 (4), 804–19.
- Djankov, Simeon, Rafael La Porta, Florencio Lopez de Silanes, and Andrei Shleifer**, “The regulation of entry,” *Quarterly Journal of Economics*, 2002, 117 (1), 1–37.
- Dorsch, Michael**, “Bailout for sale? The vote to save Wall Street,” *Public Choice*, 2013, 155 (3-4), 211–28.
- Drechsler, Itamar, Thomas Drechsel, David Marques-Ibanez, and Philipp Schnabl**, “Who borrows from the lender of last resort?,” 2013.
- Dübel, Hans-Joachim**, “Creditor participation in banking crisis in the eurozone—a corner turned?,” *Study commissioned by Bundestagsfraktion Bündnis90/Die Grünen and ”The Greens/European Free Alliance”*, 2013, 28.
- Dyck, Alexander, David Moss, and Luigi Zingales**, “Media versus special interests,” 2008.
- Easterly, William, Roumeen Islam, and Joseph Stiglitz**, *Shaken and stirred: Explaining growth volatility*, Vol. 191 2001.
- Eisert, Tim and Christian Eufinger**, “Interbank network and bank bailouts: Insurance mechanism for non-insured creditors?,” 2013.
- Engineer, Merwan, Paul Schure, and Mark Gillis**, “A positive analysis of deposit insurance provision: Regulatory competition among European Union countries,” *Journal of Financial Stability*, 2013, 9 (4), 530–44.
- Englmaier, Florian and Till Stowasser**, “Electoral cycles in savings bank lending,” 2013.
- European Commission**, “Impact assesment: Accompanying document to the Proposal for a Directive, SEC(2010) 834/2,” 2010.

- Evans, David and Boyan Jovanovic**, “An estimated model of entrepreneurial choice under liquidity constraints,” *Journal of Political Economy*, 1989, 97 (4), 808.
- Faccio, Mara, Ronald Masulis, and John McConnell**, “Political connections and corporate bailouts,” *Journal of Finance*, 2006, 61 (6), 2597–2635.
- Farhi, Emmanuel and Jean Tirole**, “Collective moral hazard, maturity mismatch, and systemic bailouts,” *American Economic Review*, 2012, 102 (1), 60–93.
- Favero, Carlo and Alessandro Missale**, “Sovereign spreads in the eurozone: which prospects for a Eurobond?,” *Economic Policy*, 2012, 27 (70), 231–73.
- Finkelstein, Amy**, “E-ztax: Tax salience and tax rates,” *Quarterly Journal of Economics*, 2009, 124 (3), 969–1010.
- Fiore, Fiorella De and Harald Uhlig**, “Bank finance versus bond finance,” *Journal of Money, Credit and Banking*, 2011, 43 (7), 1399–421.
- Flannery, Mark, Simon Kwan, and Mahendrarajah Nimalendran**, “The 2007–2009 financial crisis and bank opaqueness,” *Journal of Financial Intermediation*, 2013, 22 (1), 55–84.
- Fogel, Kathy, Randall Morck, and Bernard Yeung**, “Big business stability and economic growth: Is what’s good for General Motors good for America?,” *Journal of Financial Economics*, 2008, 89 (1), 83–108.
- Fohlin, Caroline**, “Regulation, taxation and the development of the German universal banking system, 1884–1913,” *European Review of Economic History*, 2002, 6 (2), 221–54.
- , *Finance capitalism and Germany’s rise to industrial power*, Vol. 42, Cambridge University Press, 2007.
- Freixas, Xavier and Jean-Charles Rochet**, *Microeconomics of banking*, MIT Press, 2008.
- Friedman, Milton and Anna Schwartz**, *A Monetary history of the United States 1867-1960* 1963.
- Gennaioli, Nicola, Alberto Martin, and Stefano Rossi**, “Sovereign default, domestic banks, and financial institutions,” *Journal of Finance*, 2014, 69 (2), 819–866.
- Gerschenkron, Alexander**, “Economic backwardness in historical perspective,” *Economic backwardness in historical perspective*, 1962.

- Glaeser, Edward, Jose Scheinkman, and Andrei Shleifer**, “The injustice of inequality,” *Journal of Monetary Economics*, 2003, 50 (1), 199–222.
- Goldman, Eitan, Jörg Rocholl, and Jongil So**, “Do politically connected boards affect firm value?,” *Review of Financial Studies*, 2009, 22 (6), 2331–60.
- Goldstein, Itay and Ady Pauzner**, “Demand–deposit contracts and the probability of bank runs,” *Journal of Finance*, 2005, 60 (3), 1293–1327.
- Goodhart, Charles**, *The central bank and the financial system*, MIT Press, 1995.
- , *The Basel Committee on Banking Supervision - A history of the early years 1974 - 1997*, Cambridge University Press, 2011.
- and **Dirk Schoenmaker**, “Should the functions of monetary policy and banking supervision be separated?,” *Oxford Economic Papers*, 1995, 47 (4), 539–60.
- , **Philipp Hartmann, David Llewellyn, and Liliana Rojas-Suárez**, *Financial regulation: Why, how and where*, Routledge London, 2013.
- Gorton, Gary and George Pennacchi**, “Financial intermediaries and liquidity creation,” *Journal of Finance*, 1990, 45 (1), 49–71.
- Griffith-Jones, Stephany and Avinash Persaud**, “The pro-cyclical impact of Basel II on emerging markets and its political economy,” *Capital Market Liberalization and Development*, 2008, pp. 262–88.
- Gropp, Reint, Hendrik Hakenes, and Isabel Schnabel**, “Competition, risk-shifting, and public bail-out policies,” *Review of Financial Studies*, 2011, 24 (6), 2084–120.
- Gros, Daniel**, “Banking union with a sovereign virus,” *Intereconomics*, 2013, 48 (2), 93–7.
- Grossman, Gene and Elhanan Helpman**, “Protection for sale,” *American Economic Review*, 1994, 84 (4), 833–50.
- Grossman, Richard**, *Unsettled account: the evolution of banking in the industrialized world since 1800*, Princeton University Press, 2010.
- Guiso, Luigi, Paola Sapienza, and Luigi Zingales**, “The role of social capital in financial development,” *American Economic Review*, 2004, 94 (3), 526–556.
- Haber, Stephen**, “Industrial concentration and the capital markets: A comparative study of Brazil, Mexico, and the United States, 1830–1930,” *Journal of Economic History*, 1991, 51 (03), 559–80.

- , *How Latin America fell behind: essays on the economic histories of Brazil and Mexico, 1800-1914*, Stanford University Press, 1997.
- and **Enrico Perotti**, “The political economy of financial systems,” 2008.
- , **Douglass North**, and **Barry Weingast**, *Political institutions and financial development*, Stanford University Press, 2008.
- Hagen, Kåre**, “Default risk, homemade leverage, and the Modigliani-Miller Theorem: A note,” *American Economic Review*, 1976, 66 (1), 199–203.
- Hakenes, Hendrik and Isabel Schnabel**, “Banks without parachutes: Competitive effects of government bail-out policies,” *Journal of Financial Stability*, 2010, 6 (3), 156–68.
- and —, “Regulatory capture by sophistication,” 2013.
- Haldane, Andrew**, “Capital discipline,” in “Relazione all American Economic Association Meeting,” Vol. 9 2011.
- , “Constraining discretion in bank regulation,” *Federal Reserve Bank of Atlanta Conference on “Maintaining Financial Stability”*, 2013.
- , “On being the right size,” *Journal of Financial Perspectives*, 2014, 2 (1), 13–25.
- Hall, Peter and David Soskice**, *Varieties of capitalism: The institutional foundations of comparative advantage*, Oxford University Press, 2001.
- Hardach, Gerd**, “The Marshall Plan in Germany, 1948-1952,” *Journal of European Economic History*, 1987, 16 (3).
- Härle, Philipp, Erik Lüders, Theo Papanides, Sonja Pfetsch, Thomas Poppensieker, and Uwe Stegemann**, “Basel III and European banking: Its impact, how banks might respond, and the challenges of implementation,” 2010.
- Hause, John and Gunnar Du Rietz**, “Entry, industry growth, and the microdynamics of industry supply,” *Journal of Political Economy*, 1984, 92 (4), 733–57.
- Heider, Florian, Marie Hoerova, and Cornelia Holthausen**, “Liquidity hoarding and interbank market spreads: The role of counterparty risk,” *European Banking Center Discussion Paper*, 2008, (2009).
- Hellmann, Thomas, Kevin Murdock, and Joseph Stiglitz**, “Financial restraint: toward a new paradigm,” *The Role of Government in East Asian Economic Development: Comparative Institutional Analysis*, 1997, pp. 163–207.

- , – , **and** – , “Liberalization, moral hazard in banking, and prudential regulation: Are capital requirements enough?,” *American Economic Review*, 2000, 90 (1), 147–165.
- , – , **and** – , “Liberalization, moral hazard in banking, and prudential regulation: Are capital requirements enough?,” *American Economic Review*, 2000, 90 (1), 147–65.
- Hellwig, Martin**, “Market discipline, information processing, and corporate governance,” 2006.
- , “Capital regulation after the crisis: business as usual?,” *CESifo DICE Report*, 2010, 8 (2), 40–6.
- Herring, Richard**, “The Capital Conundrum,” *International Journal of Central Banking*, 2011, 7 (4), 171–87.
- Hildreth, Andrew and Andrew Oswald**, “Rent-sharing and wages: evidence from company and establishment panels,” *Journal of Labor Economics*, 1997, 15 (2), 318–37.
- Hillman, Arye**, “Political economy of protection,” *Fundamentals of pure and applied economics*, 1989.
- Hodson, Dermot and Deborah Mabbett**, “UK Economic policy and the global financial crisis: Paradigm lost?,” *Journal of Common Market Studies*, 2009, 47 (5), 1041–61.
- Holmstrom, Bengt and Jean Tirole**, “Market liquidity and performance monitoring,” *Journal of Political Economy*, 1993, 101 (4), 678–709.
- **and** – , “Financial intermediation, loanable funds, and the real sector,” *Quarterly Journal of economics*, 1997, 112 (3), 663–91.
- Hortlund, Per**, “The long-term relationship between capital and earnings in banking: Sweden 1870–2001,” 2005.
- Hoshi, Takeo and Anil Kashyap**, *Corporate financing and governance in Japan: The road to the future*, MIT press, 2004.
- Houston, Joel, Chen Lin, and Yue Ma**, “Regulatory arbitrage and international bank flows,” *Journal of Finance*, 2012, 67 (5), 1845–95.
- Howarth, David and Lucia Quaglia**, “Banking on Stability: The political economy of new capital requirements in the European Union,” *Journal of European Integration*, 2013, 35 (3), 333–46.
- Hughes, Joseph, William Lang, Loretta Mester, and Choon-Geol**

- Moon**, “Efficient banking under interstate branching,” *Journal of Money, Credit and Banking*, 1996, 28 (4), 1045–71.
- Iannotta, Giuliano**, “Testing for opaqueness in the European banking industry: evidence from bond credit ratings,” *Journal of Financial Services Research*, 2006, 30 (3), 287–309.
- Igan, Deniz and Prachi Mishra**, “Threes company: Wall Street, Capitol Hill, and K Street,” *IMF Working Paper*, 2011.
- , – , and **Thierry Tressel**, “A fistful of dollars: lobbying and the financial crisis,” *NBER Working Paper No. 17076*, 2011.
- International Monetary Fund**, “How big is the implicit subsidy for banks considered too important to fail?,” 2014.
- Jacewitz, Stefan and Jonathan Pogach**, “Deposit rate advantages at the largest banks,” 2013.
- Jackson, Patricia**, “Capital requirements and bank behavior: The impact of the Basel Accord,” *Basel Committee on Bank Supervision Working Paper*, 1999.
- James, Harold**, “Banks and economic development: Comments,” *Finance and Financiers in European History*, 1992, 1960 (1992), 113–118.
- Johansen, Hans Christian**, *Dansk Historisk Statistik 1814–1980*, Copenhagen: Gyldendal, 1985.
- Johnson, Simon and James Kwak**, *13 Bankers: the Wall Street takeover and the next financial meltdown*, Random House LLC, 2011.
- Jordan, John, Joe Peek, and Eric Rosengren**, “The market reaction to the disclosure of supervisory actions: Implications for bank transparency,” *Journal of Financial Intermediation*, 2000, 9 (3), 298–319.
- Kane, Edward**, *The S & L insurance mess: how did it happen?*, The Urban Institute, 1989.
- , “The importance of monitoring and mitigating the safety-net consequences of regulation-induced innovation,” *Review of Social Economy*, 2010, 68 (2), 145–61.
- Kapstein, Ethan**, “Supervising international banks: origins and implications of Basel Accord,” 1991.
- Keeley, Michael**, “Deposit insurance, risk, and market power in banking,” *American Economic Review*, 1990, 80 (5), 1183–200.

- Kennickell, Arthur**, *Currents and undercurrents: Changes in the distribution of wealth, 1989-2004*, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, 2006.
- Khwaja, Asim and Atif Mian**, “Do lenders favor politically connected firms? Rent provision in an emerging financial market,” *Quarterly Journal of Economics*, 2005, 120 (4), 1371–411.
- Kilinc, Mustafa and Bilin Neyapti**, “Bank regulation and supervision and its welfare implications,” *Economic Modelling*, 2012, 29 (2), 132–41.
- Kindleberger, Charles**, “Manias, crashes and panics,” 1996.
- King, Robert and Ross Levine**, “Finance and growth: Schumpeter might be right,” *Quarterly Journal of Economics*, 1993, 108 (3), 717–37.
- Klapper, Leora, Luc Laeven, and Raghuram Rajan**, “Entry regulation as a barrier to entrepreneurship,” *Journal of Financial Economics*, 2006, 82 (3), 591–629.
- Klein, Franz**, *Die neueren Entwicklungen in Verfassung und Recht der Aktiengesellschaft*, Manz, 1904.
- Krishna, Aradhna and Joel Slemrod**, “Behavioral public finance: Tax design as price presentation,” *International Tax and Public Finance*, 2003, 10 (2), 189–203.
- Kroszner, Randall and Philip Strahan**, “What drives deregulation? Economics and politics of the relaxation of bank branching restrictions,” *Quarterly Journal of Economics*, 1999, 114 (4), 1437–67.
- and –, “Regulation and deregulation of the US banking industry: Causes, consequences and implications for the future,” in “Economic regulation and its reform: What have we learned?,” University of Chicago Press, 2013.
- and **Thomas Stratmann**, “Interest-group competition and the organization of congress: theory and evidence from financial services’ political action committees,” *American Economic Review*, 1998, 88 (5), 1163–87.
- Krueger, Anne**, “The political economy of the rent-seeking society,” *American Economic Review*, 1974, 64 (3), 291–303.
- Krugman, Paul**, “Regionalism versus multilateralism: analytical notes,” in J. De Merlo and A. Panagariya, eds., *New dimensions in regional integration*, Cambridge University Press, 1993, pp. 58–78.
- Kubelec, Chris and Filipa Sá**, “The geographical composition of national

- external balance sheets: 1980-2005,” 2010.
- Kwak, James**, “Cultural capture and the financial crisis,” *Preventing regulatory capture: Special interest influence, and how to limit it*, ed. Daniel Carpenter and David Moss. New York: Cambridge University, 2013.
- Kwiek, Max**, “Conclave,” *European Economic Review*, 2014, 70, 258–75.
- Kydland, Finn and Edward Prescott**, “Rules rather than discretion: The inconsistency of optimal plans,” *Journal of Political Economy*, 1977, 85 (3), 473–91.
- La Porta, Rafael, Florencio Lopez de Silanes, and Andrei Shleifer**, “Government ownership of banks,” *Journal of Finance*, 2002, 57 (1), 265–301.
- , – , and – , “What works in securities laws?,” *Journal of Finance*, 2006, 61 (1), 1–32.
- , – , and – , “The economic consequences of legal origins,” *Journal of Economic Literature*, 2008, 46 (2), 285–332.
- , – , – , and **Robert Vishny**, “Law and finance,” *Journal of Political Economy*, 1998, 106, 1113–55.
- Lacker, Jeffrey and John Weinberg**, “Optimal contracts under costly state falsification,” *Journal of Political Economy*, 1989, 97 (6), 1345–63.
- Laeven, Luc**, “The political economy of deposit insurance,” *Journal of Financial Services Research*, 2004, 26 (3), 201–24.
- and **Fabian Valencia**, “Systemic banking crises database,” *IMF Economic Review*, 2013, 61 (2), 225–70.
- and **Ross Levine**, “Bank governance, regulation and risk taking,” *Journal of Financial Economics*, 2009, 93 (2), 259–75.
- Laffont, Jean-Jacques and Jean Tirole**, “The politics of government decision-making: A theory of regulatory capture,” *Quarterly Journal of Economics*, 1991, 106 (4), 1089–127.
- Lall, Ranjit**, “From failure to failure: The politics of international banking regulation,” *Review of International Political Economy*, 2012, 19 (4), 609–38.
- League of Nations**, *Commercial and central banks*, Geneva: League of Nations, 1934.
- Leitner, Yaron**, “Financial networks: Contagion, commitment, and private sector bailouts,” *Journal of Finance*, 2005, 60 (6), 2925–53.

- Levine, Ross**, “Bank-based or market-based financial systems: which is better?,” *Journal of financial intermediation*, 2002, 11 (4), 398–428.
- Liedorp, Franka, Robert Mosch, Carin Van Der Cruijssen, and Jakob De Haan**, “Transparency of banking supervisors,” *IMF Economic Review*, 2013, 61 (2), 310–35.
- Lloyd-Ellis, Huw and Dan Bernhardt**, “Enterprise, inequality and economic development,” *Review of Economic Studies*, 2000, 67 (1), 147–68.
- Lockwood, Ben**, “Distributive politics and the costs of centralization,” *Review of Economic Studies*, 2002, 69 (2), 313–37.
- Maggi, Giovanni and Massimo Morelli**, “Self-Enforcing voting in international organizations,” *American Economic Review*, 2006, 96 (4), 1137–1158.
- Mariathasan, Mike and Ouarda Merrouche**, “The manipulation of Basel risk-weights,” *Journal of Financial Intermediation*, 2014.
- Martinez-Miera, David and Rafael Repullo**, “Does competition reduce the risk of bank failure?,” *Review of Financial Studies*, 2010, 23 (10), 3638–3664.
- Masciandaro, Donato, Maria Nieto, and Henriette Prast**, “Who pays for banking supervision? Principles and trends,” *Journal of Financial Regulation and Compliance*, 2007, 15 (3), 303–26.
- Maurer, Noel and Stephen Haber**, “Related lending and economic performance: Evidence from Mexico,” *Journal of Economic History*, 2007, 67 (03), 551–81.
- Mayer, Colin**, “New issues in corporate finance,” *European Economic Review*, 1988, 32 (5), 1167–83.
- McIntyre, Robert, Matthew Gardner, Rebecca Wilkins, and Richard Phillips**, “Corporate taxpayers & corporate tax dodgers,” 2011.
- McKinnon, Ronald**, *Money and capital in economic development*, Brookings Institution Press, 1973.
- Mian, Atif, Amir Sufi, and Francesco Trebbi**, “The political economy of the US mortgage default crisis,” *American Economic Review*, 2010, 100 (5), 1967–98.
- , **Kamalesh Rao, and Amir Sufi**, “Household balance sheets, consumption, and the economic slump,” *Quarterly Journal of Economics*, 2013, 128 (4), 1687–726.
- Mitchener, Kris James and Matthew Jaremski**, “The evolution of bank

- supervision: Evidence from US states,” 2012.
- Mitra, Devashish**, “Endogenous lobby formation and endogenous protection: a long-run model of trade policy determination,” *American Economic Review*, 1999, 89 (5), 1116–34.
- Modigliani, Franco and Merton Miller**, “The cost of capital, corporation finance and the theory of investment,” *American Economic Review*, 1958, 48 (3), 261–97.
- Morck, Randall and Lloyd Steier**, “The global history of corporate governance: An introduction,” in “A history of corporate governance around the world: Family business groups to professional managers,” University of Chicago Press, 2005, pp. 1–64.
- **and Masao Nakamura**, “Banks and corporate control in Japan,” *Journal of Finance*, 1999, 54 (1), 319–339.
- Morgan, Donald**, “Rating banks: Risk and uncertainty in an opaque industry,” *American Economic Review*, 2002, 92 (4), 874–88.
- Morrison, Alan and Lucy White**, “Crises and capital requirements in banking,” *American Economic Review*, 2005, 95 (5), 1548–1572.
- **and –**, “Deposit insurance and subsidized recapitalizations,” *Journal of Banking & Finance*, 2011, 35 (12), 3400–16.
- North, Douglass and Barry Weingast**, “Constitutions and commitment: the evolution of institutions governing public choice in seventeenth-century England,” *Journal of Economic History*, 1989, 49 (04), 803–32.
- Nunez, Stephen and Howard Rosenthal**, “Bankruptcy reform in congress: Creditors, committees, ideology, and floor voting in the legislative process,” *Journal of Law, Economics, and Organization*, 2004, 20 (2), 527–57.
- Olson, Mancur**, *The logic of collective action: Public goods and the theory of group*, Harvard University Press, 1965.
- Ongena, Steven, Alexander Popov, and Gregory Udell**, “When the cat’s away the mice will play: Does regulation at home affect bank risk-taking abroad?,” *Journal of Financial Economics*, 2013, 108 (3), 727–50.
- Padovani, Miret and Rajna Gibson**, “The determinants of banks’ lobbying activities,” *Swiss Finance Institute Research Paper*, 2011, (11-56).
- Pagano, Marco and Paolo Volpin**, “The political economy of finance,” *Oxford Review of Economic Policy*, 2001, 17 (4), 502–19.

- **and** –, “The political economy of corporate governance,” *American Economic Review*, 2005, *95* (4), 1005–30.
- Pagliari, Stefano and Kevin Young**, “Leveraged interests: Financial industry power and the role of private sector coalitions,” *Review of International Political Economy*, 2014, (3), 575–610.
- Peltzman, Sam**, “Toward a more general theory of regulation,” *Journal of Law and Economics*, 1976, *19* (2), 211–40.
- Penas, Maria Fabiana and Haluk Unal**, “Gains in bank mergers: Evidence from the bond markets,” *Journal of Financial Economics*, 2004, *74* (1), 149–179.
- Perotti, Enrico and Ernst-Ludwig von Thadden**, “The political economy of corporate control and labor rents,” *Journal of Political Economy*, 2006, *114* (1), 145–75.
- **and Paolo Volpin**, “Investor protection and entry,” 2012.
- Persson, Torsten and Guido Tabellini**, *Political economics: Explaining economic policy*, MIT Press, 2002.
- Pfleiderer, Paul**, “Chameleons: The misuse of theoretical models in finance and economics,” 2014.
- Philippon, Thomas and Ariell Reshef**, “An international look at the growth of modern finance,” *Journal of Economic Perspectives*, 2013, *27* (2), 73–96.
- Popov, Alexander and Neeltje Van Horen**, “The impact of sovereign debt exposure on bank lending: Evidence from the European debt crisis,” 2013.
- Posner, Elliot and Nicolas Véron**, “The EU and financial regulation: Power without purpose?,” *Journal of European Public Policy*, 2010, *17* (3), 400–415.
- Rajan, Raghuram**, *Fault lines: How hidden fractures still threaten the world economy*, Princeton University Press, 2011.
- **and Luigi Zingales**, “Financial dependence and growth,” *American Economic Review*, 1998, *88* (3), 559–86.
- **and** –, “The great reversals: the politics of financial development in the twentieth century,” *Journal of Financial Economics*, 2003, *69* (1), 5–50.
- **and Rodney Ramcharan**, “Land and credit: A study of the political economy of banking in the United States in the early 20th century,” *Journal of Finance*, 2011, *66* (6), 1895–931.

- Reinhart, Carmen and Belen Sbrancia**, “The liquidation of government debt,” *NBER Working Paper No. 16893*, 2011.
- **and Kenneth Rogoff**, *This time is different: eight centuries of financial folly*, Princeton University Press, 2009.
- Repullo, Rafael**, “Capital requirements, market power, and risk-taking in banking,” *Journal of Financial Intermediation*, 2004, 13 (2), 156–182.
- **and Javier Suarez**, “Entrepreneurial moral hazard and bank monitoring: a model of the credit channel,” *European Economic Review*, 2000, 44 (10), 1931–1950.
- Rochet, Jean-Charles**, “Capital requirements and the behaviour of commercial banks,” *European Economic Review*, 1992, 36 (5), 1137–70.
- Rosenberg, Hans**, *Große Depression und Bismarckzeit*, de Gruyter, 1967.
- Roubini, Nouriel and Xavier Sala i Martin**, “Financial repression and economic growth,” *Journal of Development Economics*, 1992, 39 (1), 5–30.
- Salinger, Michael**, “Tobin’s q, unionization, and the concentration-profits relationship,” *Rand Journal of Economics*, 1984, 15 (2), 159–70.
- Sapienza, Paola**, “The effects of government ownership on bank lending,” *Journal of Financial Economics*, 2004, 72 (2), 357–84.
- Sattler, Heinrich**, *Die Effektenbanken*, CF Winter, 1890.
- Saunders, Anthony and Berry Wilson**, “The impact of consolidation and safety-net support on Canadian, US and UK banks: 1893–1992,” *Journal of Banking & Finance*, 1999, 23 (2), 537–71.
- Schattschneider, Elmer Eric**, “Politics, pressures and the tariff,” 1935.
- Schubert, Werner and Peter Hommelhoff**, *Hundert Jahre modernes Aktienrecht: eine Sammlung von Texten und Quellen zur Aktienrechtsreform 1884 mit zwei Einführungen*, Vol. 4, Walter de Gruyter, 1985.
- Schularick, Moritz and Alan Taylor**, “Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870–2008,” *American Economic Review*, 2012, 102 (2), 1029–61.
- Serres, Alain De, Shuji Kobayakawa, Torsten Sløk, and Laura Vartia**, “Regulation of financial systems and economic growth,” 2006.
- Shaw, Edward**, *Financial deepening in economic development*, Vol. 39, Oxford University Press, 1973.

- Sheppard, David**, *The growth and role of UK financial institutions, 1880–1962*, London: Methuen and Co., Limited, 1971.
- Shleifer, Andrei and Daniel Wolfenzon**, “Investor protection and equity markets,” *Journal of Financial Economics*, 2002, 66 (1), 3–27.
- Sinn, Hans-Werner**, *Ökonomische Entscheidungen bei Ungewißheit*, Vol. 28, Mohr Siebeck, 1980.
- , “Kinked utility and the demand for human wealth and liability insurance,” *European Economic Review*, 1982, 17 (2), 149–62.
- , “The selection principle and market failure in systems competition,” *Journal of Public Economics*, 1997, 66 (2), 247–274.
- , *The new systems competition*, Wiley-Blackwell, 2003.
- , *Casino capitalism*, Oxford University Press, 2010.
- , *The euro trap. On bursting bubbles, budgets and beliefs*, Oxford University Press, 2014.
- Smith, Clifford and Jerold Warner**, “On financial contracting: An analysis of bond covenants,” *Journal of Financial Economics*, 1979, 7 (2), 117–61.
- Spamann, Holger**, “The ”antidirector rights index” revisited,” *Review of Financial Studies*, 2010, 23 (2), 467–486.
- Stigler, George**, “The theory of economic regulation,” *Bell Journal of Economics and Management Science*, 1971, 2 (1), 3–21.
- Stiglitz, Joseph and Andrew Weiss**, “Credit rationing in markets with imperfect information,” *American Economic Review*, 1981, 71 (3), 393–410.
- Suomen Tilastokekus**, *Suomen Tilastollinen Vuosikirja*, Helsinki: Suomen Tilastokekus, various.
- Sutter, Matthias**, “Fair allocation and re-weighting of votes and voting power in the EU before and after the next enlargement,” *Journal of Theoretical Politics*, 2000, 12 (4), 433–49.
- Sveriges Riksbank**, *Statistiska Tabeller, 1668–1924*, Sveriges Riksbank, 1668–1918[–1924]. Part 5. Stockholm: Riksbankens Statistiska Avdelning, 1931.
- Tarullo, Daniel**, *Banking on Basel: The future of international financial regulation*, Peterson Institute Press, 2008.
- Tellkamp, Johann Ludwig**, *Vorschläge zur Verbesserung des Actien-Gesellschaftswesens*, J. Springer, 1876.

- Thiemann, Matthias**, “Out of the shadow? Accounting for special purpose entities in European banking systems,” *Competition and Change*, 2012, 16 (1), 37–55.
- Thornton, Henry**, *An enquiry into the nature and effects of the paper credit of Great Britain*, Vol. 595, J. Hatchard, 1802.
- Tiebout, Charles**, “A pure theory of local expenditures,” *Journal of Political Economy*, 1956, 64 (5), 416–24.
- Tirole, Jean**, “The euro crisis: some reflexions on institutional reform,” *Financial Stability Review*, 2012, 16, 225–242.
- Tollison, Robert**, “Rent seeking: A survey,” *Kyklos*, 1982, 35 (4), 575–602.
- Trebesch, Christoph, Guillermo Ordonez, and Helios Herrera**, “Political booms, financial crises,” 2013.
- Tullock, Gordon**, “Problems of majority voting,” *Journal of Political Economy*, 1959, 67 (6), 571–79.
- Ueda, Kenichi and Beatrice Weder di Mauro**, “Quantifying structural subsidy values for systemically important financial institutions,” *Journal of Banking & Finance*, 2013, 37 (10), 3830–42.
- Uhlig, Harald**, “Sovereign default risk and banks in a monetary union,” *German Economic Review*, 2014, 15 (1), 23–41.
- US Department of Commerce**, *Historical statistics of the United States*, New York: Kraus International Publications, 1989.
- van Riet, Ad**, “Financial repression to ease fiscal stress: turning back the clock in the eurozone?,” in “Banco Central do Brasil, Financial Stability and Banking, São Paulo” 2013.
- Verdier, Daniel**, *Moving money: Banking and finance in the industrialized world*, Cambridge University Press, 2002.
- White, Eugene**, “Implementing Bagehots rule in a world of derivatives,” *Monetary and Banking History: Essays in Honour of Forrest Capie*, 2011.
- Wurgler, Jeffrey**, “Financial markets and the allocation of capital,” *Journal of Financial Economics*, 2000, 58 (1), 187–214.
- Zentraler Kreditausschuss**, “Strengthening the resilience of the banking sector,” *Position Paper on the Consultative Document of the Basel Committee*, 2010.