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Elites and Bank-Based Finance: A political economy model on the emergence of financial systems

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Elites and Bank-Based Finance

A political economy model on the emergence of financial systems

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Preliminary first draft

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Abstract

Why do some economic systems depend on bank financing while others rely on capital markets and bond financing? We propose a political economy model in which elites favor a bank-based system, which increases their rents due to reduced competition. If suffrage is restricted to the elite, this will result in poor corporate control rights and more reliance on banks that offer substitute mechanisms of corporate governance. The lack of legal rights in history triggers path dependencies and explains the dominance of banks until this day. We test the model's predictions by tracking the emergence and evolution of the bank-based financial system in Germany since the 19th century.

Keywords: Corporate governance · Political economy · Financial structure

JEL Classification: D72, G38, O16, P16

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1 Introduction

Why are banking systems in some societies so well developed and much less in others? Answers to this perennial question have evolved over time. A decade ago, emphasis was on the structure of legal systems that was first proposed by La Porta et al. (1998). Due to lower shareholder rights the law and economics approach states that markets of financial intermediation are significantly larger in civil-law countries compared to equity-oriented countries with common-law tradition. Recently, another strand of the literature emphasizes the role of centralization (Verdier 2004) or the design of the constitutional system (Pagano and Volpin 2005) in producing more or less developed securities markets. However, most of these rather mechanical links do not consider the fact that the supply of corporate law is rooted in the history by reflecting political majorities that have followed historical events.

Interestingly, the economic history literature shows that much of the current structure of financial institutions originates in institutions and systems of the 19th century (Grossman 2010, Fohlin 2007). There is convincing evidence that those legal and informal rules on corporate governance that have emerged in this era have a long-run effect on the formation and the design of financial institutions today. The established institutions not only persist over time because lock-in effects are at work, but there is also a form of path dependence in the political balance of power.¹ Thereby empirical evidence suggests that political power turns out to be the key factor explaining a country's financial system (Rajan and Zingales 2003, Haber et al. 2008, Barth et al. 2006). Given this path dependence, this paper takes the approach of historical legacy by looking at the political balance of power at transient events to rationalize when a society produces bank-oriented systems.

We propose a political economy model in which bank-based financial systems arise as a consequence of poor legal control rights which deters entry and benefits the industrial elite. Our theoretical argument builds on the fact that financial systems are shaped through investor and creditor rights and the effectiveness of their enforcement (La Porta et al. 1998). These legal rules measure the ease with which investors can exercise their powers against management, or vice versa how easy it is for entrepreneurs to raise external finance without prior connections or wealth. Thereby we provide a simple and tractable model to capture the idea that entry deterrence takes place via financial channels in the

¹For example, Bebchuk and Roe (1999) question the idea of convergence towards a single system of corporate governance since political and economic forces tend to promote path dependence in corporate law and business practice.

form of low legal protection of financial claimholders. The ability of firms to raise capital is impaired if institutions promote high expropriation risk for investors. This leads to an underprovision of external finance and results in a low market capitalization relative to GNP. We demonstrate that the benefits and costs of this outcome are differently distributed across interest groups in society. Restricting access to external finance via poor legal rights protects the rents of the industrial elite and thereby stabilizes the social status quo. Moreover, poor legal protection magnify the effect of heterogeneity in ability on long-run wealth inequality. If the elite has enough political power to choose the level of public protection, for example via suffrage institutions, our model predicts that the economy may be locked in an equilibrium where equity issues, bank debt, and bond financing coexist. The reason is that with low confidence and public information about an entrepreneur's repayment probability, there is a higher need for the monitoring service and information acquisition role offered by banks. Provision of funding shifts from equity to debt, and to a predominance of intermediated over market finance as a result of the lack of legal protection. The balance of political power, proxied by suffrage institutions when corporate law was established, turns out to play a central role in shaping the long-run financial structure.

The general observations our model is consistent with are that (i) 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 value-enhancing projects that benefit shareholders (La Porta et al. 2006; Shleifer and Wolfenzon 2002); (ii) the composition of bank finance and direct finance varies across firms: bank financing is found predominantly in new firms whereas incumbent firms can finance themselves via retained earnings (Aghion et al. 2007); (iii) countries where the same companies maintain in a dominant position over time have lower growth and less developed capital markets (De Serres et al. 2006; Fogel et al. 2008).

The idea that access to finance can be used by the political elite to protect rents and entrench their dominant position is not new in the literature. In line with Acemoglu and Robinson (2008) we define an existing elite as an interest group that uses the monopoly of political power for her own interests even when it is costly for the society at large. The private interest theory explains the heterogeneity of financial 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, anticompetitive objectives such that repressing financial development protects them from competition. Rajan and Ramcharan (2011) demonstrate that the emergence of formal

credit institutions across counties in the United States in the early part of the 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 in order to lock them in and charge exorbitant prices or to buy land cheaply. An economy in which the wealthy support a regime of incomplete protection of property rights is also discussed in Glaeser et al. (2003). Wealthy agents use their wealth and 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 where controlling stakeholders (the "elite") favors low investor protection to directly extract private benefits via expropriation of shareholders and may obtain it with the political support of workers. To form such a coalition, they have to make some compensation to workers which takes the form of limiting 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 alliance whereby workers trade low shareholder protection for high job security. This idea of a labor-entrepreneur alliance against non-controlling shareholders is also stressed by Hellwig (2006). However, no study, to our knowledge, explicitly compares the cases of bank-oriented and capital market-oriented economies and incorporates a comprehensive set of possible political determinants as does the model in our approach.

We therefore view our model as providing a complement to an explanation that is based entirely on legal determinants, taking market structures as given. Whereas the Pagano and Volpin framework indirectly ignores the anticompetitive nature of poor legal protection, we extend their approach by incorporating the feedback effects on entry, being the central channel for rent-creation within our economy. We thus show that a ruling elite can use investor and creditor rights in order to maximize their own regulatory rent. The elite can take many forms, either being a wealthy upper-class, well-endowed with human capital or a union of workers. Hence, our model highlights the role of political majorities that shape the financial system at transient events. The central argument is that political majorities are historically determined by voting rights. The variation of how votes are cast may have a fundamental impact on policy choices that elected representatives make when there is a need of a reform due to an exogenous shock.

In this context, our first contribution is to provide microeconomic and political foundations for why some societies have produced weak legal protection. Our second contribution

is to point out the potential link between the political system and the structure of the financial system. In contrast to Pagano and Volpin (2005) we analyze how creditor *and* investor rights shape financial systems, thereby allowing for different ways of refinancing. The model rationalizes the empirical finding that countries with a lack of legal protection develop substitute mechanisms of corporate governance, most importantly services offered by monitoring banks like proxy voting. We predict that the share of bank-financed firms rises with lower legal protection. Bank-orientation thus may be a reflection of poor investor protection.

The plan of the paper is as follows: In Section 2 we set up and solve the basic model where low legal protection is a channel to create rents for the elite. The political equilibrium then depends on the suffrage institutions that implicitly affect the structure of financial systems. Section 3 illustrates some evidence supporting the predictions of the model and tests the model's predictions by tracking the emergence and evolution of the bank-based financial system in Germany since the 19th century. We show that our elite-dominated model mechanism indicates a possible reason why Germany has developed such a unique universal bank-dominated financial system in the last century. Section 4 concludes.

2 The Economic Model

2.1 Structure of the Model

We consider an economy with a population normalized to one, consisting of a continuum of risk-neutral citizens. There are two types of citizens: a fraction $m < \frac{1}{2}$ has the human capital to open a firm and is called entrepreneurs, the rest $1 - m$ are consumers. For simplicity, consumers are endowed with equal wealth denoted by $w = \underline{w}$, whereas entrepreneurs differ in initial wealth which is uniformly distributed in the interval (\underline{w}, I) . In our economy a single entrepreneur can found a firm and produces one unit of a consumption good y to earn an entrepreneurial rent π_i . We conceptualize entry in a two stage process in which every firm incurs an upfront set up cost I and once this cost is sunk, she competes for business. If the citizen's initial wealth is not sufficient to finance the firm's foundation by herself, $w_i < I$, she needs external finance.

We consider three potential sources for external finance: finance through equity, bonds (uninformed lenders) or bank loans (informed lenders).² However expropriation risks - due to insufficient legal investor and creditor rights - and asymmetric information force

²We will use the terms of informed lenders and banks interchangeably throughout the paper.

both investors and lenders to ask for collateral. When the pledgeable wealth of individual citizens is insufficient to obtain a financial contract, the firm's market entry choice is constrained. Therefore the citizen's initial wealth becomes a binding constraint, preventing less rich citizens from entry which effectively reduces the number of firms. Throughout the paper we assume that there is competition in the capital market such that investors and banks make zero expected profits $r = 0$. Due to risk neutrality this implies the lack of time preferences.

Figure 1 illustrates the sequence of events.

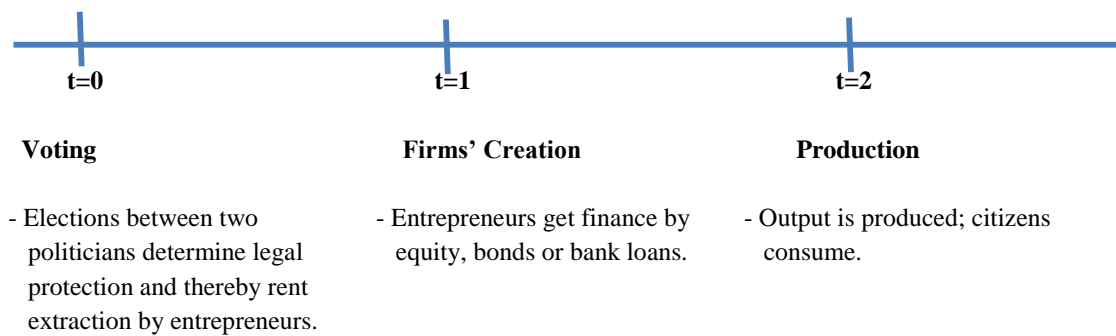


Fig. 1: Timeline

At the initial date $t = 0$, elections are held in which citizens choose between two politicians. 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 private benefits B is limited through legal rules that corporate law or legal enforcement allows the entrepreneur to extract. A high expected expropriation through private benefits reduces the availability of external finance.

At $t = 1$ the market structure materializes where every firm produces exactly one unit of a consumption good y . A firm's entry takes place if an individual citizen sets up a firm with a fixed amount of up-front entry cost I , which can be interpreted as necessary capital investment. Citizens who cannot pay entry costs out of their own pocket, can raise finance from banks, bonds or by selling shares. Thus, the availability of finance determines the number of entrepreneurs and therefore the market structure.

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

In the next sections we solve the model by backwards induction to find the subgame perfect Nash Equilibrium.

2.2 Market Equilibrium (stage 2)

At $t = 2$, citizens choose their consumption bundle. They face the choice between the consumption of the produced good y and a numeraire X . Each citizen i maximizes her quasi-linear utility function as follows.³

$$U(X_i, y_i) = X_i + a \cdot y_i - \frac{1}{2}y_i^2, \quad (1)$$

given her individual budget constraint depending on the expected rents and the initial wealth. The budget constraint can therefore be written as $p \cdot y_i + X_i \leq w_i + \pi_i$, where p denotes the price for the consumption good and π_i denotes the entrepreneurial rent of those citizens that succeed to become an entrepreneur.

Inserting the budget constraints and deriving the first order conditions we get:

$$y_i = y = a - p \quad X_i = w_i + \pi_i - (a - p) \cdot p;$$

which yields the standard result that, due to the quasi-linearity of the utility function, the consumption of the subsistence good y is equal for all citizens and completely inelastic in income. In contrast, the consumption of the numeraire good is increasing in each citizen's disposable wealth.⁴

Before clearing the market, we need to look at the aggregate supply of the consumption good. Due to the symmetry of firms, we abstract from the production decision of each active firm and concentrate on the equilibrium number of firms. Therefore, our industry sector consists of n firms, each producing one unit of the homogenous good y . Market equilibrium now requires a price for the consumption good that is equal to $p = a - n$. The utility function of a pure consumer is then given by $H_i^C = w_i + \frac{1}{2}n^2$; the utility of an active entrepreneur by $H_i = \pi_i + w_i + \frac{1}{2}n^2$

In the next subsection, we formalize the entry decision at the first stage to endogenize the number of firms n .

³The specific functional form of the utility function used in equation 1 simplifies the analysis and is widely used in the literature (see Krugman 1992, Perotti and Volpin 2012). However, the specific form is not crucial for our results. We get the same qualitative results for any quasi-linear utility function in the numeraire.

⁴The variation in the consumption level of X can be also interpreted as a measure of inequality since it reflects the difference in income among citizens at $t = 2$.

2.3 Firms' Creation (stage 1)

At $t = 1$ each citizen 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, citizens may raise external capital $I - w_i$ in addition to their own wealth w_i . There are three different ways of external finance: They can raise funds (1) on the capital market by selling shares of their firm, or they can alternatively (2) lend bonds or (3) credit from a bank as debt. In all cases the participation constraint of financial claimholders determines the amount of wealth that is necessary for a citizen to set up a firm and, hence, the resulting market structure with n entrepreneurs.

Thereby, financial claimholders have to deal with two sources of inefficiency when investing their money. As the key mechanisms 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 the risk of rent extraction by the entrepreneur as the founder of the firm. Insufficient legal rules reduce expected returns on investments. The level of legal protection that is determined at stage $t = 0$ reduces possible expropriation by entrepreneurs and thus can enhance the investor's confidence.

The second threat for claimholders' returns stems from moral hazard incentives for entrepreneurs due to the limited liability regime. If the production of the consumption good fails, the entrepreneur is only liable for the own investment in the company. This can lead to excessive risk-taking by the entrepreneurs. To capture in a simple way the notion that limited liability creates moral hazard incentives for entrepreneurs, we assume that the entrepreneur can affect the risk-return profile of the production by choosing the corporate strategy. More precisely, suppose that a safe strategy offers a return of $p - \psi - I > 0$.

By contrast, a risky corporate strategy offers an expected return of $\theta \cdot p - I < 0$ with $\theta < 1$ being the probability of success. In this case, entrepreneurs may have incentives to select the risky strategy that can jeopardize the payment of interest and principal to lenders.

Equity financed firms

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

In the first step the entrepreneur raises external capital by selling her firm at the

firm's market value A .⁵ 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 that is available for equityholders as residual claimants, is reduced by the amount of private benefits that corporate law allows the entrepreneur to extract.⁶ Thus, corporate law constrains the scope of rent extraction by setting a limit B to the resources that the entrepreneur can divert from the company in $t = 2$. Rational investors know that they can only prevent private benefits in so far as legal rules hold and can be enforced. Therefore they expect entrepreneurs to pay only the minimum fraction of their output in the form of dividends. As a result, when they decide to invest in a firm's shares, potential investors will take this form of moral hazard into account and expect profits of $p - B - \psi$ in case of the safe strategy and $\theta(p - B)$ otherwise.

Shareholders maximize the firm's market value A for a given minimum level of private entrepreneurial rent that they cannot prevent. It directly follows that shareholders decide for the safe strategy as long as it offers higher returns, that is 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 $t = 1$ is:

$$A^* = \begin{cases} p - \psi - B & \text{if } B \leq \bar{B} = p - \frac{\psi}{1-\theta} & \text{(safe strategy)} \\ \theta(p - B) & \text{if } B > \bar{B} = p - \frac{\psi}{1-\theta} & \text{(risky strategy)} \end{cases} \quad (2)$$

The entrepreneur can raise external finance up to the outside equity capacity A^* . As initial owners of the company, entrepreneurs bear the agency cost of weak control rights in the form of reduced availability of equity capital. The entrepreneur's minimal investment to provide equityholders with proper incentives to invest therefore amounts to $I - A^*$.⁷

⁵At this stage the firm is equivalent to the business idea and further human capital possessed by the entrepreneur.

⁶This setting is in line with standard corporate finance models, see Pagano and Volpin (2005), Perotti and Von Thadden (2005) or Perotti and Volpin (2012).

⁷You can re-interpret this condition as a situation where it is optimal to let the entrepreneur enjoy a share of the rent in order to discourage him from diverting output to private consumption (Lacker and Weinberg 1989, Holmstrom and Tirole 1997). Note that A^* ensures that entrepreneurs chose the socially optimal corporate strategy independently of the level of legal private benefits, 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. Thereby

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.*

The availability of equity capital for the entrepreneur is effectively constrained by the equityholders' willingness to invest, i.e. their participation condition, as a function of legal private benefits B . With lower B , entrepreneurs can raise more external capital and need less personal wealth to set up a firm. This means that the number of firms that are active in the market for consumption goods is a decreasing function of the degree of the scope of rent extraction 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 that want to finance their production with debt is constrained by very similar mechanisms. First, the willingness of debtholders to borrow money, denoted by R_K , is again a decreasing function of the rent expropriated by the entrepreneur that is allowed by corporate law. Accordingly, the participation constraint by bond lenders is equal to $p - \psi - B \geq R_K$ in 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, $R_K = I_K$.

The most important distinction between debtholders and shareholders is their return structure, i.e. participation on a firm's corporate strategy and their control rights. While shareholders with their convex claim benefit from increased risk and are in control of the business decisions (unlimited liability), debtholders, with their concave claim, are hurt from increased risk due to limited liability. They have no control of the firm's corporate strategy and therefore rely on incentive-compatible contracts.⁸

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

we abstract from the influences of the shareholder's structure on monitoring explained in Shleifer and Vishny (1986).

⁸As firms 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. This means that a firm maximizing its profits shows an asymmetric risk-behavior resulting from the limited liability (see Jensen and Meckling 1976; Sinn 1982).

entrepreneur will be diligent and selects the safe strategy if and only if $p - \psi - R_K - w_i \geq \theta(p - R_K) - w_i$ for all $p - \psi - B \geq R_K$. Therefore if the participation constraint holds, it follows that $R_K \leq p - \psi \cdot \frac{1}{1-\theta}$

Now we have derived a participation (PC) and an incentive constraint (IC) which both must hold for access to debt finance. Which constraint is binding depends on the value of private benefits 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 losses due to expropriation at a certain split-off point. Thus, we conclude that if $B \geq \hat{B}$ the participation constraint is binding and for all $B < \hat{B}$ the incentive constraint is binding. This allows us to compute the necessary returns bond lenders will require:

$$R_K = \begin{cases} p - \frac{\psi}{1-\theta} & \text{if } B < \hat{B} = \frac{\theta}{1-\theta} \cdot \psi & \text{(IC)} \\ p - \psi - B & \text{if } B \geq \hat{B} = \frac{\theta}{1-\theta} \cdot \psi & \text{(PC)} \end{cases} \quad (3)$$

This expression shows us that the borrowing constraint must be satisfied for entrepreneurs to raise funds. Therefore, 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 get finance which can be translated into a number of active firms n financed by bonds.

Let us now concentrate on entrepreneurs with wealth below w_K who do not have a sufficient amount of own capital at stake; lenders need an additional share of production surplus to invest. A natural way of attracting investments is to substitute the lack of control rights via forms of private arrangements, thereby reducing the scope of rent expropriation by entrepreneurs. A less wealthy entrepreneur can turn to an intermediary that has monitoring expertise. We call this intermediary a "bank". A simple way to model monitoring is to enable the bank to place constraints on an entrepreneurs' behavior that reduce B to $f(B) = B - \Phi$ for monitoring cost c .⁹

With monitoring expertise the participation constraint by banks changes to $p - \psi - (B - \Phi) \geq R_L - c$. As a consequence, the threshold at which the PC becomes binding \tilde{B} increases such that the necessary and sufficient amount of expected returns for the bank

⁹Loan 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).

is

$$R_L = \begin{cases} p - \frac{\psi}{1-\theta} & \text{if } B < \tilde{B} = \frac{\theta}{1-\theta} \cdot \psi + \Phi & \text{(IC)} \\ p - \psi - (B - \Phi) & \text{if } B \geq \tilde{B} = \frac{\theta}{1-\theta} \cdot \psi + \Phi & \text{(PC)}. \end{cases} \quad (4)$$

The bank's zero-profit condition is $R_L = I_L + c$. Then the required wealth for entrepreneurs to gain access to finance via bank loans is given by $w_i \geq w_L = I - R_L + c$.

We can now distinguish two types of firms financed by debt and competing in the product market. More wealthy citizens with $w_i > w_K$ can finance the necessary fraction of their production with bonds. On the other hand, entrepreneurs with $w_K > w_i > w_L$ are financed by bank loans. This allows us to state the following Lemma.

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

If $B \leq \check{B}$ citizens with wealth $w_i \geq w_K = I - R_K$ can set up a firm financed by bonds. If $B > \check{B}$ 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.

Proof: *The derivation for the critical level of rent extraction \check{B} that enables access to finance by bank loans is derivated in Appendix A.*

Equilibrium market structure

Based on the scope of expropriation risk and limited liability we have developed three constraints, i.e. entry barriers for citizens to open a firm. Figure 2 plots the resulting financing constraints that automatically determine the number of citizens that succeed to produce the consumption good in $t = 2$.

The figure illustrates how the entry costs in the form of higher initial wealth by citizens are increasing in the scope of rent expropriation B that is possible due to poor legal corporate control. The market structure is endogenous and responds to the degree of legal protection against expropriation. It is easy to see that the number of entrepreneurs decreases with B . The intuition is as follows.

Without any expropriation risk, there is no entry barrier and all citizens can open a firm, as there is certainty that owners will get their investments back. 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 get finance either by equity or

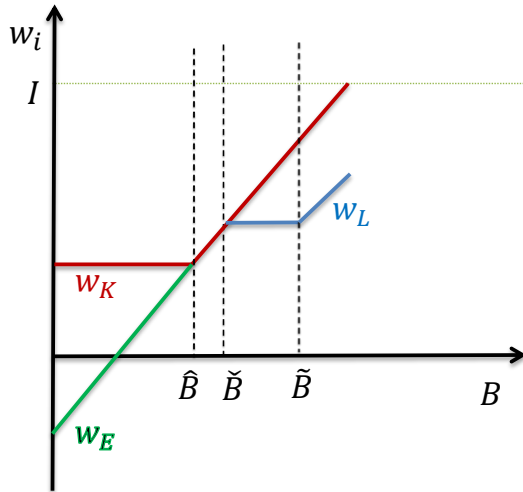


Fig. 2: Control rights and the financial structure (for $\tilde{B} < \bar{B}$)

bonds, being indifferent between both forms. Interestingly, only the wealthy citizens have access to the bond market; the reason is that due to limited liability debtholders will ask for compensation in the form of higher pledgeable wealth. The required wealth reflects the debtholders' expected loss in case of default. However, from the expropriation level \hat{B} onwards, both wealth barriers coincide, since then the expropriation risk 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 get access to external finance shrinks. Entry deterrence takes place through financial channels. Interestingly, a mixed financing structure results.

The cut-off level \check{B} provides us with two important insights. First, this threshold gives us the minimum scope of expropriation that establishes the existence of banks as provider of credit. Banks provide monitoring services only when the expected return is sufficiently high to compensate them for 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 rent extraction, the wealth barrier for firms with a bank loan drops. It is straightforward that bank financing is less attractive than equity financing. This is because the resulting entrepreneurial rent being lower, as ex-post 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, 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 single 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. Then it turns out that the bank barrier w_L gets binding for the equilibrium number of firms.

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

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

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

Proof: *in Appendix B.*

The logic of our result is straightforward. The scope of possible rent extraction by the entrepreneur that is allowed by corporate law will affect the willingness to provide funds to entrepreneurs. In effect, entry deterrence of investors occurs by changing their participation constraint towards firm financing. The necessary wealth of the marginal entrepreneur goes up and the number of firms drops. In other words, a high risk of rent extraction induces a decrease in the lending capacity in our economy. A legal regime producing such a risk turns out to be anticompetitive, since $\frac{\partial n}{\partial B} < 0$ if $B > \underline{w}$ and $B \neq [\check{B}, \tilde{B}]$. As we are interested in the financial structure of the entrepreneurs that succeeds to open a firm, we can also 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 arises because financial institutions offer a monitoring device as a substitute for weak legal protection. This is why external finance becomes available for less wealthy entrepreneurs. As one would expect, we see that the number of entrepreneurs funded with bank loans increases with B . Now, we can turn to the political equilibrium at the first stage to find the optimal legal framework for a politician to be elected.

2.4 Voting (stage 0)

The timing of events at the voting stage is as follows: (1) At the beginning of period $t = 0$, two office-seeking politicians, 1 and 2, simultaneously and non-cooperatively, commit to a value of 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 effectively, citizens 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. Then $\Omega \in [0, 1]$ identifies the fraction of voters who have the right to vote.

In our economy, there are three distinct groups of voters $h \in \{E, L, C\}$: entrepreneurs financed by equity or bonds, entrepreneurs financed by bank loans and consumers. Political preferences are shaped purely by economic motives such that each voter's objective is to maximize its 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 open a firm being either equity or bank financed.

According to section 2.2 we can write the utility of consumers as $H_i^C = w_i + \frac{1}{2}n^2$. It is clear that consumers strictly prefer the maximum number of firms, since $\frac{\partial H^C}{\partial n} > 0$. Thus every consumer's utility peaks when the number of firms in the market up to the maximum $n = m$.¹⁰

Entrepreneurs are supposed to maximize their utility by solving $H_i^E = w_i + a - n - \psi - I + \frac{1}{2}n^2$ if they are equity-financed and $H_i^L = w_i + a - n - \psi - I + \frac{1}{2}n^2 - c$, if they are financed via bank loans. Every entrepreneur strictly prefers to open a firm instead of just being a consumer, but once being active on the product market, she wants the lowest number of firms, $\frac{\partial H^E}{\partial n} < 0$, $\frac{\partial H^L}{\partial n} < 0$. 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 build a "financial barrier to entry" in the product market in order to exclude access of

¹⁰For ease of exposition, suppose further that $m = a - \Psi - I$. This means, that the number of entrepreneurs and thus the maximum possible number of firms (if financial constraints do not bind) leads to 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 large enough to support perfect competition. Then the human capital constraint is never binding. However his assumption is not necessary for our results which hold for any $m \leq 1$.

less wealthy entrepreneurs. As there is heterogeneity in wealth w_i among entrepreneurs it follows that every entrepreneur has a distinct ideal point. The utility functions of each voter thus can be thought of as mountains with peaks at each voter's ideal point. Hence the balance of power between consumers and the entrepreneurs as well as the balance of power inside the group of entrepreneurs determines the political outcome.

To determine the political equilibrium, we use of a model of electoral competition between two office-seeking candidates under probabilistic voting. Both candidates $j \in 1, 2$ credibly commit to a value of B_j . 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 the differences in utilities promised by the two candidate's platforms:

$$\theta_i = \frac{1}{2} + H_i(B_1) - H_i(B_2) \quad (5)$$

Both politicians seek to maximize their expected number of votes and these in turn are simply the sum of the probabilities that each citizen will vote for the politician. The competition for votes between both politicians drives them to the peak of the probability mountain. Following Persson and Tabellini (2001) we define EV_1 as the expected votes of politician 1.

$$EV_1 = \int_0^1 \theta_i di = \int_0^1 \frac{1}{2} + [H_i(B_1) - H_i(B_2)] di \quad (6)$$

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

The solution of this maximization problem: $\max_{B_j} EV_1 = \max_{B_j} \int_0^1 \frac{1}{2} + [H_i(B_1) - H_i(B_2)] di$ is described in the following Proposition. It is interesting to note that the aggregate utility function that is maximized is equivalent to the utilitarian welfare function of all eligible voters. Therefore any solution of the political game is a welfare optimizing for the eligible voters.

Proposition 2 (Political equilibrium under elite domination): *Let $c \rightarrow 0$, $c \neq 0$ and $0 < \Phi < \frac{\psi}{1-\theta} - \psi - \underline{w}$, then $\forall \Omega \in [0, 1]$, both politicians select a policy with B^* , enabling access to finance for $n^*(\Omega) = \min \left\{ \Omega, \frac{a-\psi-I}{2-\Omega} \right\}$ entrepreneurs.*

Proof: *in Appendix C.*

When the politician chooses high values of B , she reduces the number of entrepreneurs that succeed to open up a firm $n^*(B)$. If the number of citizens that are entitled to vote is restricted, it becomes optimal for the politician to select a policy with higher rent extraction 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. Intuitively, 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, we argue that low levels of legal protection can be incentive-compatible for politicians in elite-dominated political systems in order 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.

The main message of the theoretical model is thus that the allocation of political power can play a significant role in shaping the regulatory environment in finance. A society where the political power is in the hand of very few wealthy producers protects their rents by erecting significant financial entry barriers through low levels of legal protection. The elite does not want to guarantee enforcement of legal protection. The reason is simple: Poor legal protection is an indirect way to increase entry costs for potential entrepreneurs since liable wealth is a substitute for legal certainty. The elite wants to "tax" potential investors in order to impoverish them and consolidate their own political power.

This is a new form of entry deterrence which has not previously been considered in a microfounded model, but which is nonetheless potentially important in times when funding opportunities are relatively scarce.

However, entry deterrence can also occur when the political system is characterized by other political majorities. The next subsection will show that pro-labor rights can affect the credit market behavior of investors towards entrant firms. Since legal systems of codetermination enables rent extraction by workers, the same mechanisms of our baseline model are at work under such a political regime.

2.5 Extension: Labor unions as political monopolist

The above analysis characterized the equilibrium under a set of political institutions that gave all political power to the industrial elite. An alternative is to have a system in which the working class makes the key policy decisions. In this subsection we therefore change our baseline model to establish a new pivotal interest group: labor as a second input factor dictates the policy. As a result, the political debate is likely to extend to labor issues, such as labor rights for workers that are employed in the firms in our economy.

Accordingly, we model the legal framework as centered on two sets of laws that affect corporate governance of incorporated firms: corporate law, insofar as it sets the degree of possible rent extraction by entrepreneurs and labor rights, insofar it determines the stake workers get of a firm's profit.¹¹ Effectively, both rules reduce the control-rights of shareholders. Without loss of generality, suppose that the society now votes for a combination of possible rent extraction B and labor rights $1 - \alpha$ in the election in $t = 0$.

To avoid repetition, we will not provide a full analysis, but focus on the main differences compared to the previous subsection. The firm's profits $\pi(n)$ are now shared among the entrepreneur and the δ workers in the form of a collective wage agreement where workers are represented by a labor union. In other words, in contrast to the baseline model the surplus of the firm $\pi(n)$ can be extracted by workers and by the entrepreneur.

Hence, we now consider a situation in which workers, organized in unions have a dominant position in the political system. The legal framework is centered on two sets of laws: corporate law and labor law. In this context, labor rights can be interpreted as measures of codetermination whereby the employees have a role in management of a company provided by law. In systems with codetermination 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.¹² Thereby these labor rights impose an extra cost on firms and dilute the control-rights of shareholders that provide external finance.

In this extension a labor union serves as a political player, trying to maximize its member's utility. Doing so she has to consider two constraints: (I) to determine the economic policy at the voting stage, she needs to win an absolute majority in votes. As the union maximizes its members' utility at the expense of all other voters' utility, the majority of the electorate must be organized in unions. This constraint can be interpreted as a political power constraint. (II) As human capital is concentrated in the hands of entrepreneurs the union has to make sure that they are willing to open firms. Therefore their participation constraints $\alpha \cdot \pi(n) \geq 0$ must hold.

We model aggregate wages as the Nash bargaining solution of negotiations between entrepreneurs and unions, where the level of labor rights $1 - \alpha$ is interpreted as the relative

¹¹This extension is in the spirit of the corporatism literature by Pagano and Volpin (2005) who model employee protection against dismissal and shareholder protection in a joint political economy framework. However, their focus is on the impact of different political systems showing that proportional electoral systems are conducive to weaker investor protection and stronger employment protection than majoritarian systems.

¹²The first serious codetermination laws began in Germany. At first there was only worker participation in management in the coal and steel industries (see Section 3 for a case study of Germany).

bargaining power of unions. It follows that the aggregate rent of all workers is given by $\pi^{Union} = (1 - \alpha) \cdot n \cdot \pi_i(n)$ where $n \cdot \pi_i$ is the aggregate profit of the industry. Furthermore the union's utility is assumed to be equivalent to the utility of its representative member, $U^{Union} = \frac{\pi^{Union}}{\delta \cdot n} + H(n)$ where δ are the workers per firm that get access to external finance. Then, the union solves the following maximisation problem:

$$\begin{aligned} \max \quad & \frac{(1 - \alpha)\pi(n)}{\delta} + \frac{1}{2}n^2 \\ \text{s.t.} \quad & n \cdot \delta \geq \frac{1}{2} \\ & \alpha \cdot \pi(n) \geq 0. \end{aligned} \tag{7}$$

The following result, whose proofs appear in the Appendix, demonstrates that the political equilibrium is characterized by similar implications on the market structure like a political system with elite domination.

Proposition 3 (Political equilibrium under worker domination): *Both politicians select a policy with $1 - \alpha = \frac{3}{4}$, enabling access to finance for $n = \frac{1}{2}m$ entrepreneurs.*

Proof: *in Appendix D.*

Proposition 3 states that a political system with universal suffrage and powerful unions leads to high labor rights and low property rights. As a result, the number of firms in the political equilibrium is such that the firms aggregate profits are maximized. This solution is equivalent to the solution of one monopolistic producer who maximizes her profit by choosing her individually optimal level of output $\frac{1}{2}m$.

Further the willingness to finance an entrepreneur is a decreasing function of labor rights. Labor friendly laws like codetermination therefore in turn affects the entrepreneur's ability to get funding and generates a crowding out effect. Intuitively, stronger labor rights causes labor to crowd out finance.

The comparison to the model of elite domination shows that only if $\Omega \leq \frac{1}{2}m$ the system of elite domination produces lower property rights. Otherwise, a shift in political power towards workers leads to higher financial entry barriers and hence to bank-oriented financial systems. This prediction is in line with recent empirical findings by Degryse et al. (2013). They provide panel data evidence covering 1830-1999 that the introduction of universal suffrage was associated with greater banking sector development and smaller stock markets. Their findings emphasize the central role played by suffrage institutions in determining a country's financial system and the persistent effects that these institutions

produce.

2.6 Policy implications

Our approach makes the point that corporate law and the structure of financial systems must be endogenous to the evolving political majority. Therefore we develop a political-economy model to study the welfare effects of corporate control rights on the electorate.

In our model the creation of financial barriers and bank-orientated financial systems go hand in hand and are the result of 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 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 rent extraction by entrepreneurs) or directly by dictating systems of codetermination by the creation of supervisory boards where worker and stakeholders have influence. Both types of rules induce uncertainty for investors and discourage equity market development such that banking becomes attractive.

Societies with elite or worker domination thus support regulatory structures that restrict the role for market investors and enhance the banks' power. An interesting knock-on effect is that codetermination and a high risk of rent extraction may also make concentrated ownership more attractive. Consistent with this insight, La Porta et al. (1998) find that ownership concentration is extremely high in regions with weak legal protection. Intuitively, ownership concentration becomes a substitute for legal protection, because only large shareholders can hope to receive a return. This is in line with empirical evidence: corporatist societies appear to discourage firm entry and favor interests of producers and hence stakeholder rents over those of consumers.

Our model therefore produces two testable predictions: First, if policy is controlled by the elite, i.e. suffrage is restricted to wealthy individuals or workers at transient events, society produces institutions with low legal protection. Second, with low protection bank-dominated systems arise.

3 Historical Perspective

In this section we discuss the historical evidence related to the development of bank- and equity-oriented financial systems. The evidence suggests that the institutional and economic development during the 19th century is 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 19th century. Following Bebchuk and Roe (1999, p. 23) corporate rules are themselves path dependent: the rules that an economy has at any given point in time depend on, and reflect, the governance structures that the economy had initially.

In our model the level of investor and creditor protection turns out to be the key parameter shaping the financial system. This builds on the recent empirical literature which examines the relative use of equity and debt as a function of the quality of legal systems. There is immense empirical evidence that being a shareholder or a creditor in different legal jurisdictions entitles an investor to very different bundles of rights, however, this heterogeneity seems to be persistent.

3.1 Persisting cross-country differences

Our model predictions are consistent with theories that explain the composition of external finance with institutional and legal factors. Crucial for this mechanism is a link to the financial structure of firms. In fact, there is clear empirical evidence for this argument.

La Porta et al. (1998, henceforth LLSV) analyze the choice between debt and equity funding of corporate firms, and show that common law countries (such as the United States and the United Kingdom) protect both shareholders and creditors more than civil law countries (such as Germany and other European countries whose legal system is based on Roman law). Most importantly, they find that countries with poor investor protection indeed have significantly smaller debt and equity markets. Consistently with their findings, the plot in Figure 3 suggests that better investor protection is linked with a larger relative size of the stock market.¹³ Bottazzi et al. (2009) provide empirical support for the idea that the investor's legal system is more important than that of the company in explaining the behavior of investors by affecting the practices adopted by financial intermediaries. Better legal systems are associated with more investor involvement and more downside protection for investors.

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

¹³The data on stock market capitalization are taken from the 2013 update of the database on Financial Development and Structure by Beck et al. (2000).

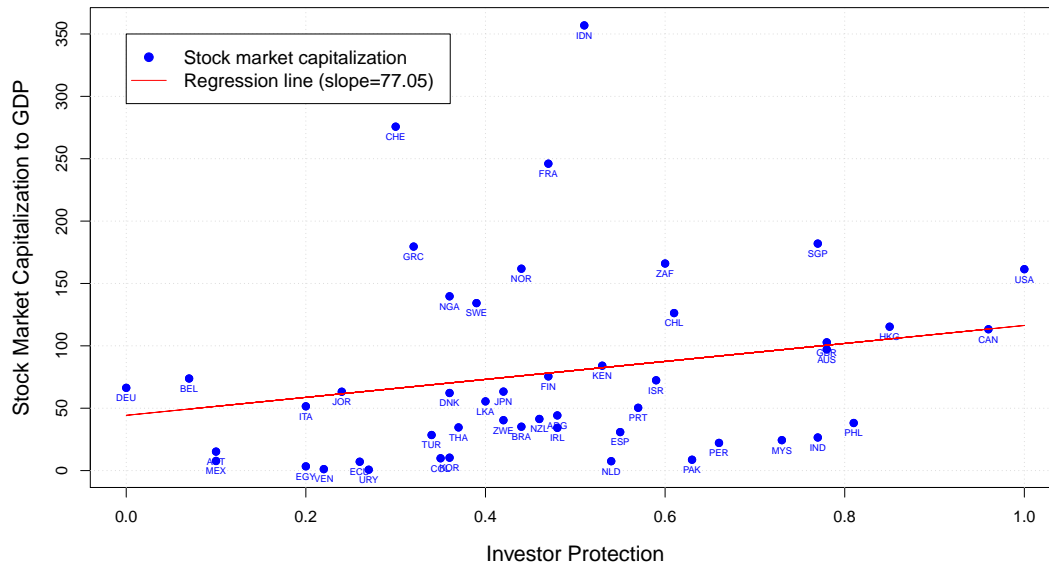


Fig. 3: Investor protection and financial structure from a cross-section of 48 countries

United States firms on financing through equity rather than debt. Thus, cross-country data suggest that our simple model can describe a general pattern.

Interestingly, we see a certain degree of path dependence, especially in the case of Germany. If the LLSV index is an adequate measure of investor protection, the rights of minority shareholders today are largely a product of rules enacted in the late 19th century and early 20th century. The score of 1 was reached with the introduction of the Common Commercial Code in 1861. The private enforcement index is 0.21 today and in 1900 it was zero. It remained at zero until 1987 when new prospectus requirements were introduced (Franks et al. 2006). Labor-friendly structures persist also over time, which is again an important dimension of current international differences. Labor is involved in the control of German corporations through the legal regime of codetermination, but does not have such direct influence in corporations in other countries. Initially introduced in the 1920s, the regime of codetermination appears to have significant persistence power (Bebchuk and Roe 1999).

Thus it might be worth looking in detail why does Germany have such a small stock market but also maintain so many powerful banks in a labor-friendly environment? As we will see in the next subsection, our political-economy model based on elite-domination can rationalize why the elite in Germany has created a persistent corporate governance system with poor legal protection in the late 19th century providing the ground for a bank-oriented financial system.

3.2 Structure and regulation of German financial market

Corporate governance institutions remained quite underdeveloped in Germany until the last quarter of the 19th century. Many early corporations had no supervisory board at all, and the rights of shareholders as well as the responsibilities of entrepreneurs were poorly defined. However, as a result of 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 codetermination in the 1920s and its re-implementation after WW2. Interestingly, the first reform took place during times of elite domination, where in the German case the elite corresponds to segments of industrialists with a monopoly position.

Specifically, the political system in the late 19th century (Bicameralism in the German Empire) was characterized by huge political distortions and electoral power of the industrial elite. The regime featured a three-class voting system and was controlled initially by Junker landlords, and after the 1870s by the coalition of "iron and rye". Although after 1870 all adults over the age of 25 had the right to vote, voting was controlled in rural areas by the landlords; or in the words of Abrams (1995, 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.¹⁴

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 (Aufsichtsrat) 	Elite domination under German Bicameralism
1884	Improvement of legislation	<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	Codetermination	<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"> Revision of Stock Corporation Act 	Dictatorship
1952	Codetermination	<ul style="list-style-type: none"> Re-introduction and extension of codetermination 	Democracy

Tab. 1: Main legislative changes relating to German joint-stock corporations

¹⁴There is a division of men by their direct tax revenue into three classes. Every class 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), in the second class there was the same principle. 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.

The first wave of financial regulation was a period of fast innovation and upsurges in productivity during industrialization in the 1870s. The elite needed finance to satisfy the growing needs of manufacturing. In other words, financial development responded to massive industrial boom and institutions evolved providing credit mainly to the industry (Fohlin 2007). However, the elite had an interest to block new entrants and to shape regulation to increase entry costs by reducing corporate control to a minimum that guarantees their own access to finance.

Table 1 provides an overview of the development of joint-stock company legislation in Germany. In 1870, with the introduction of the Corporate Law, 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 increased 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 lead to nearly 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). As a consequence of 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.¹⁵

Largely due to the huge population of outside shareholders and the threat of a social turmoil, in 1884 - after a 11-year ongoing debate - the elite agreed on a modification of Corporate Law. Most importantly, the second joint-stock modification (Zweite Aktiennovelle) increased the financial entry barrier to found a joint-stock corporation and replaced large sections of the Commercial Code ("Handelsgesetzbuch") focussing on the incorporation process, establishing legal liability for fraud, strenghtening the supervisory board and requiring firms to file annual balance sheet statements. The Act is widely regarded as the foundation of modern German corporation law and it remained largely unchanged until 1937. However, the new regulation affected only entrepreneurs who succeeded to use the legal structure of a joint-stock company (AG) whereby the entry cost, i.e. the minimum capital to found an AG, was increased from 30 to 1000 M. Com-

¹⁵Contemporary commentators demanded clearer and stronger rights of representation and protection. For example, Johann Tellkamp (1876, p. 5), 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" (p. 14).

plementary, the conservative elite succeeded to increase the statutory minimum par value for shares from 150M to 1000M, in the words of Sattler (1890) "to stabilize the current status of stockholders". Thus, despite the investor rights are rising moderately in this era, entry deterrence occurred directly by restricting external access to finance 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 predominant legal structure of the elite.¹⁶

What was the induced implication of this legal development on the financial structure of joint stock companies in Germany? Data shows that, as a byproduct of this pattern of institutional evolution, the regulation encouraged the dependence on and the expansion of universal banking systems in Germany. 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 nearly tripled between 1860-80 and 80-1913 and universal banks evolved into their full-fledged form during the Kaiserreich (Fohlin 2007). Proxy-voting turned out to be the most prominent monitoring device in this context.¹⁷ The rationale is straight forward: In line with our model-predictions private arrangements substituted the lack of corporate control. Because of 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. Norbert Reich (1979, p. 266) argues that in the context of the 1884 law, the placement of the same individual in multiple board positions - particularly directors of banks or friendly companies - increased the tendency for industrial concentration. Harold James (1992) point out that the involvement of banks in the management of companies lead to a cartelization of the industry. Thereby the influence of the largest banks was confined primarily to the mining, transport and electrotechnical industries where they promote mergers.¹⁸ This was the emergence of the bank-oriented system that still characterizes Germany today - which went hand in hand with a process of industrial concentration.¹⁹

¹⁶Quite as an anachronism, the number of public limited companies (AG) expanded to more than 2,000 in 1886 and 3,000 at the beginning of the 1890's (Fohlin 2007).

¹⁷Proxy 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. Big banks began to incorporate statements about deposited shares voting rights in their general terms of business and their use is first documented by Deutsche Bank in 1900.

¹⁸Oscar Schlitter, director of the Deutsche Bank argued that bank were to create a "bank-bloc" the power of which would govern the German market (Born 1983, p. 81).

¹⁹In the remainder, the German Exchange Act of 1896 reinforced the control of the banks over German Securities markets. Companies became dependent on banks for access to securities markets. Since banks

WWI, along with the abdication of the Kaiser was a structural break and 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 consisted of economic dislocation 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. Thereby the political climate in the 1920s was strongly dominated by left-wing coalitions with a strong focus on labor rights where the social-democratic party provided most of the German chancellors.

As a consequence, the German model of codetermination was introduced in 1920 where employees have a role in management of a company.²⁰ 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 enormous upswing in corporations at the end of WWI and during inflation, banks boosted 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, out of which 1,785 (70 percent) were in industry and infrastructure. Industry concentration continued as well; as an illustration, individual firms, such as Siemens and AEG in the electrical industry built up enormous concerns and 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 1930's and Hitler came to power. During the 1920's the principle of the "company in itself" first formulated by Walter Rathenau already began to appear. According to this principle, the company had the social objective to preserve jobs and to serve the needs of the state. This concept 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, which stated that: "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

acted as custodians of minority investor shares, they could also in principle encourage firms to uphold minority shareholder as well as their own interests.

²⁰Some companies also issued shares to workers or unions bought shares in order 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 not given directly to workers, but rather distributed in the workers' name to the "Krupp'sche Treuhand", which represented the workers' shares at the general meetings.

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 legal framework had moved significantly against the interests of the individual investor.²¹

After WWII the 1965 reform bill abolished the *Fuehrerprinzip* and, while retaining important powers for the management board, imposed a norm of 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. Concerning 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 German financial market in the 19th century illustrates a basic pattern of our theory. The industrial elite coincided with the political elite when the German Empire was founded and the very first corporate law was formulated as a result of the "Founders' Scam". Thereby the elite had an incentive to create a regulatory environment, a financial entry barrier via poor legal protection for investors, to open a channel for possible rent extraction. The regulatory rent created is later shared with the workers, for example by establishing the principle of codetermination in the 1920s. However, as a byproduct and maybe unintendently from the perspective of the elite, the provision of funding shifted from equity to debt, and to a predominance of banks. The reason was that banks succeeded to develop substitute mechanisms of corporate governance, most importantly proxy voting and monitoring via taking positions on the supervisory boards of corporate firms. Indeed, this was the advent of relationship banking in Germany which stabilized the market power of universal banks. Due to sunk adaptive costs, endowment effects or simply "rent-protection" considerations, structures that have been in place gained persistence power. Therefore this episode shows that the lack of legal rights in the late 19th century formulated by the political majority has triggered path dependence and is a possible explanation of why the German financial system is bank-dominated today.

²¹Under 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.

4 Preliminary conclusion

This paper studies the effect of the allocation of political power on the emergence of financial systems. We show in a simple microfounded model that low investor and creditor rights create a financial entry barrier inducing low levels of competition in the product market. Entry is simply monopolized by a social group: the industrial elite. With this anticompetitive feedback effect, poor legal rights increase their rents and vis-a-vis gives room for a bank-oriented system where private arrangements substitute the lack of legal control. Our model therefore predicts that the share of bank-financed firms increases with lower investor and creditor rights.

The elite tries to capture the regulatory rent by reducing competition via an inadequate legal investor and creditor protection, thereby inducing bank dominance. If suffrage is thus restricted to the elite, society shapes institutions with low levels of control rights and more reliance on banks. A lack of legal rights in history then triggers path dependencies and can explain the dominance of banks until this day. We test the model's predictions by tracking the emergence and evolution of the bank-based financial system in Germany since the 19th century and find support for our model mechanism. Thus, our findings indicate that it is worth looking at cross-country differences in suffrage institutions in the 19th and beginning 20th century to explain the long-run structure of today's financial systems.

References

- [1] Abrams, L. (1995), "Bismarck and the German Empire. 1871-1918", New York: Routledge.
- [2] Acemoglu, D. and J. Robinson (2008), "Persistence of power, elites, and institutions", *American Economic Review* 98, pp. 267-93.
- [3] Aghion, P., Fally, T. and S. Scarpetta (2007), "Credit constraints as a barrier to the entry and post-entry growth of firms", *Economic Policy* 22, pp. 731-779.
- [4] Barth, J., Caprio Jr., G. and Levine, R. (2006), "Rethinking bank regulation: till angels govern", Cambridge: Cambridge University Press.
- [5] Bebchuk, L. and M. Roe (1999), "A theory of path dependence in corporate ownership and governance", *Stanford Law Review*, pp. 127-70.

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- [6] Beck, T., Demirgüç-Kunt, A. and R. Levine (2000), "A new database on financial development and structure", *World Bank Economic Review*, pp. 597-605.
- [7] Born, K. E. (1983), "Vom Beginn des Ersten Weltkrieges bis zum Ende der Weimarer Republik (1914-1933)", Pohl, M. (ed.), *Deutsche Bankengeschichte*, Frankfurt: Fritz Knapp Verlag.
- [8] Bottazzi, L., Da Rin, M. and T. Hellmann (2009), "What is the role of legal systems in financial intermediation? Theory and evidence", *Journal of Financial Intermediation* 18, pp. 559-98.
- [9] De Fiore, F. and H. Uhlig (2011), "Bank finance versus bond finance", *Journal of Money, Credit and Banking* 43, pp. 1399-421.
- [10] Degryse, H., Lambert, T. and A. Schwienbacher (2013), "The political economy of financial systems: evidence from suffrage reforms in the last two centuries", *CESifo Working Paper* 4527.
- [11] De Serres, A., Kobayakawa, S., Slok, T. and L. Vartia (2006), "Regulation of financial systems and economic growth", *OECD Economic Department Working Paper* 506.
- [12] Fogel, K., Morck, R. and B. Yeung (2008), "Big business stability and economic growth: Is what's good for General Motors good for America?", *Journal of Financial Economics* 89, pp. 83-108.
- [13] Fohlin, C. (2007), "Finance Capitalism and Germany's Rise to Industrial Power", Cambridge University Press.
- [14] Franks, J., Mayer, C. and H. Wagner (2006), "The Origins of the German Corporation - Finance, Ownership and Control", *Review of Finance* 10, pp. 537-85.
- [15] Glaeser, E., Scheinkman, J. and A. Shleifer (2003), "The Injustice of Inequality", *Journal of Monetary Economics* 50, pp. 199-222.
- [16] Grossman, R. (2010), "Unsettled Account - The evolution of banking in the industrialized world since 1800", *Princeton University Press*, Princeton.
- [17] Haber, S., North, D. and B. Weingast (2008), *Political institutions and financial development*, Stanford University Press, Stanford.
- [18] Hardach, G. (1987), "The Marshall Plan in Germany, 1948 - 1952", *Journal of European Economic History* 16, pp. 433-85.

- [19] Hellwig, M. (2006), "Market Discipline, Information Processing, and Corporate Governance", *SFB/TR 15 Discussion Paper* 155.
- [20] Holmstrom, B. and J. Tirole (1997), "Financial Intermediation, Loanable Funds, and The Real Sector", *The Quarterly Journal of Economics* 112, pp. 663-91.
- [21] James, H. (1992), "Banks and Economic Development: Comments", Cassis, Y. (ed.), *Finance and Financiers in European History, 1880-1960*. Cambridge, Cambridge University Press, pp. 113-8.
- [22] Jensen, M. and W. Meckling(1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, pp. 305 - 60.
- [23] Krugman, P. (1992), "Regulation versus multilateralism", De Melo, J. and A. Panagariya (eds.), *New dimensions in regional integration*, Cambridge University Press, pp. 58-79.
- [24] Lacker, J. and J. Weinberg (1989), "Optimal Contracts under Costly State Falsification", *Journal of Political Economy* 97, pp. 1345-63.
- [25] La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and R. Vishny (2000), "Investor protection and corporate governance", *Journal of Financial Economics* 58, pp. 3-27.
- [26] La Porta, R., Lopez-de-Silanes, F. and A. Shleifer (2006), "What works in securities laws?", *Journal of Finance* 61, pp. 1-32.
- [27] Pagano, M. and P. Volpin (2005), "Political Economy of Corporate Governance", *American Economic Review* 95, pp. 1005-30.
- [28] Perotti, E. and E.-L. Von Thadden (2006), "The Political Economy of Corporate Control and Labor Rents", *Journal of Political Economy* 114, pp. 145-75
- [29] Perotti, E. and P. Volpin (2012), "The Politics of Investor Protection and Competition", *CEPR Discussion Paper* 4519.
- [30] Persson T. and G. Tabellini (2001), *Political economics - Explaining economic policy*, MIT Press.
- [31] Rajan, R. and R. Ramcharan (2011), "Land and Credit: A study of the political economy of banking in the United States in the early 20th century", *Journal of Finance* LXVI, pp. 1895 - 1931.

- [32] Rajan, R. and L. Zingales (2003), "The great reversals: The politics of financial development in the 20th century", *Journal of Financial Economics* 69, pp. 5-50.
- [33] Reich, N. (1979), "Auswirkungen der deutschen Aktienrechtsreform von 1884 auf die Konzentration der deutschen Wirtschaft", Horn, N. and J. Kocka (eds.), *Recht und Entwicklung der Großunternehmen im 19. Jahrhundert*, Göttingen: Vandenhoeck and Ruprecht, pp. 255-73.
- [34] Sattler, H. (1890), "Die Effektenbanken", Topos Verlag.
- [35] Shleifer, A. and R. Vishny (1986), "Large shareholders and corporate control", *Journal of Political Economy* 94, pp 461-88.
- [36] Shleifer, A. and D. Wolfenzon (2012), "Investor protection and equity markets", *Journal of Financial Economics* 66, pp. 3-27.
- [37] Sinn, H.-W. (1982), "Kinked Utility and the Demand for Human Wealth and Liability Insurance", *European Economic Review* 17, pp. 149-62.
- [38] Smith, C. and J. Warner (1979), "On financial contracting: An analysis of bond covenants", *Journal of Financial Economics* 7, pp. 117-61.
- [39] Tellkampf, J. L. (1876), "Vorschläge zur Verbesserung des Actien-Gesellschaftswesens", Springer Verlag.
- [40] Verdier, D. (2002), "Moving money - banking and finance in the industrialized world", Cambridge University Press.

5 Appendix

5.1 Appendix A: 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, this condition is not satisfied for $B < \hat{B}$ because in this case $R_L(B) = R_K(B)$. Therefore it turns out that the relevant region of B where monitoring is profitable is $B \in [\hat{B}, \tilde{B}]$. Using (3) and (4) this problem can be rewritten as $-\frac{\psi}{1-\theta} + \psi + B \geq c$. Solving for the critical threshold yields $\check{B} = c + \frac{\theta\psi}{1-\theta}$. •

5.2 Appendix B: Proof of Proposition 1: The equilibrium 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 developed in section 2.3 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, that is $n = m = a - \psi - I$.
2. For $B \in [\underline{w}, \check{B}]$ 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 A) and the bank barrier w_L turns out 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 (4), 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, but now the participation constraint becomes binding. Thus, equation (4),

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 . •

5.3 Appendix C: Proof of Proposition 2: Optimal policy and suffrage restrictions

We obtain the optimal policy of a politician that wants to be elected by a maximization problem where the candidate 1 maximizes the welfare of the electorate with respect to the number of firms that enter the product market (as a function of the level of rent extraction B that corporate law allows).

We start by analyzing the optimal policy of each politician conditional on the number of citizens that are allowed to vote. To solve for the Nash equilibrium in this subgame let $\Omega \in [0, 1]$ denote the number of persons entitled to vote. In principle, there are two possible ranges of Ω to this problem: High restrictions on suffrage $\Omega \in [0, n(\check{B})]$ or low restrictions $\Omega \in [n(\check{B}), 1]$.

1. Consider the case of low restrictions, i.e. the second range $\Omega \in [n(\check{B}), 1]$.

Let $\Omega = n(B^\Omega)$ such that $B^\Omega = n^{-1}(\Omega)$. Furthermore, recall that $\pi(n)$ is the firm's profit as a function of the number of active entrepreneurs and $H^C(n)$ the utility of a consumer: $H^C(n) = \frac{1}{2}n^2$.

Then the total utility of the electorate (consisting the interest groups) depends on the value of B . Thus, the objective function of the politician can be written as:

$$EV_1 = \begin{cases} \Omega \cdot \pi(n) + \Omega \cdot H(n) & \forall B \in [0, B^\Omega] \\ n \cdot \pi(n) + \Omega \cdot H(n) & \forall B \in [B^\Omega, \check{B}] \\ n(\check{B}) \cdot \pi(n(\check{B})) + \Omega \cdot H(n(\check{B})) - n_L(B) \cdot c & \forall B \in]\check{B}, \tilde{B}[\\ n \cdot \pi(n) + \Omega \cdot H(n) - n_L \cdot c & \forall B \in [\tilde{B}, +\infty[. \end{cases} \quad (8)$$

It is easy to see that $\forall B \in [\check{B}, \tilde{B}]$ is never optimal and the third interval can therefore be excluded as a possible solution in our political game, since $\frac{\partial \Omega \cdot H}{\partial B} = 0 - \frac{\partial n_L(B)}{\partial B} \cdot c < 0$. Obviously, $n \cdot \pi(n) + \Omega \cdot H(n)$ with $n = n(\check{B})$ is strictly larger than any n in the third interval.

Moreover it is straight forward that the optimal policy B cannot be in the first interval, since $\frac{\partial H}{\partial n} = -\Omega + \Omega \cdot n < 0$; and $\frac{\partial H}{\partial B} = \frac{\partial H}{\partial n} \cdot \frac{\partial n}{\partial B} > 0$. It follows that B^Ω is characterized by $\Omega \cdot \pi(\Omega) + \Omega \cdot H(\Omega) \geq \Omega \cdot \pi(n) + \Omega \cdot H(n) \forall B \in [0, B^\Omega]$.

Therefore we are left to solve for the optimum in the second and fourth interval. For both intervals we obtain the identical first order condition with respect to the optimal number of entrepreneurs n given by :

$$\frac{\partial EV_1}{\partial n} = a - \psi - I + n(\Omega - 2) = 0. \quad (9)$$

It follows that $n^* = \frac{a-\psi-I}{2-\Omega} = \frac{m}{2-\Omega}$. Because $\frac{\partial EV_1}{\partial n^2} = \Omega - 2 < 0$ we know that n^* is the maximum. To find the global maximum we again distinguish two cases: n^* can be in the second or fourth interval.

First, suppose $n^*(B) \rightarrow B \in [\tilde{B}, +\infty[$ which means that n^* is in the fourth interval. For a global maximum, it must hold that $n^* \cdot \pi(n^*) + \Omega \cdot H(n^*) - n_L \cdot c \geq n(\check{B}) \cdot \pi(n(\check{B}) + \Omega \cdot H(n(\check{B})))$. It follows that n^* is the global maximum, if $n^* \in [\bar{n}; 1]$. However, if $n^* \in [n(\check{B}); \bar{n}]$ then $n(\check{B})$ is the global maximum. With $n^* = \frac{m}{2-\Omega}$ we see that $n^{opt} = n(\check{B}) \forall \Omega \in [2 - \frac{m}{n(\check{B})}; 2 - \frac{m}{\bar{n}}]$ and $n^{opt} = n^* = \frac{m}{2-\Omega} \forall \Omega \in [2 - \frac{m}{\bar{n}}; 1]$.

Second, suppose n^* is in the second interval. If $\frac{\partial EV_1}{\partial n} < 0$, it follows that $n^* \geq \Omega$. In this case we have a corner solution in the second interval at B^Ω with $n^* = \Omega$. As a result, $n^{opt} = \min[\Omega, \frac{m}{2-\Omega}]$ and we can state the following Result:

Result 1: For the range $\Omega \in [n(\check{B}), 1]$: $\forall \Omega \geq n(\check{B}) : \Omega \notin [2 - \frac{m}{\bar{n}}, 2 - \frac{m}{n}]$ it is optimal to set $n^{opt}(\Omega) = \min[\Omega, \frac{m}{2-\Omega}]$, $\forall \Omega \in [2 - \frac{m}{\bar{n}}, 2 - \frac{m}{n}]$ it is optimal to set $n^{opt}(\Omega) = n(\check{B})$.

2. Now, we consider the range $\Omega \in [0, n(\check{B})]$.

Let again $\Omega = n(B^\Omega)$ such that $B^\Omega = n^{-1}(\Omega)$. Furthermore, recall that $\pi(n)$ is the firm's profit as a function of the number of active entrepreneurs and $H^C(n)$ the utility of a consumer: $H^C(n) = \frac{1}{2}n^2$. Furthermore, we know that all citizens that are allowed to vote are financed by equity, i.e. $n_E(\dot{B}) = \Omega$. Then, total utility of the electorate depends on B and is given by:

$$EV_1 = \begin{cases} \Omega \cdot \pi(n) + \Omega \cdot H(n) & \forall B \in [0, \dot{B}[\\ \Omega \cdot \pi(n) + \Omega \cdot H(n) - (\Omega - n_E) \cdot c & \forall B \in [\dot{B}, B^\Omega] \\ n \cdot \pi(n) + \Omega \cdot H(n) & \forall B \in [B^\Omega, +\infty[. \end{cases} \quad (10)$$

Again we can show that the optimal B cannot be in the first interval, since $\frac{\partial H}{\partial n} = -\Omega + \Omega \cdot n < 0$. It follows that \dot{B} with $\Omega \cdot \pi(n(\dot{B})) + \Omega \cdot H(n(\dot{B}))$ is the highest point in the first interval. Moreover, $n(\dot{B}) = \Omega + n_L$.

Now we turn to the second interval. We can ignore the corner solution if $\frac{\partial EV_1}{\partial n} < 0 \forall n \in [\Omega, n_L + \Omega]$.

With $\forall n \in [\Omega, n_L + \Omega]$: $c < \Omega(1-n)$, since $\frac{\partial EV_1}{\partial n} = -\Omega + \Omega n + c$ and $\forall n \in [\Omega, n_L + \Omega]$: $c < \Omega(1-(n_L + \Omega)) = \Omega(1-\Omega - \frac{m(\Phi-c)}{I-w+m})$. Then it follows that $c < \Omega(1-\Omega - \beta(\Phi-c)) \Leftrightarrow \Omega^2 + \Omega(-1 - \beta + \beta\Phi) + c < 0$ where $\beta \equiv \frac{m}{I-w+m}$.

The condition $\frac{\partial EV_1}{\partial n} < 0$ holds for all $c \leq \frac{1}{4}(-1 + \beta \cdot \Phi - \beta c)^2$ and $\frac{(1-\beta\Phi+\beta c)+\sqrt{(-1+\beta\Phi-\beta c)^2-4c}}{2} \leq \Omega \leq \frac{(1-\beta\Phi+\beta c)-\sqrt{(-1+\beta\Phi-\beta c)^2-4c}}{2}$.

The solution in the third interval is symmetric such that $n^{opt} = \min \frac{m}{2-\Omega}, \Omega$. In connection with the assumption of cheap monitoring $c \rightarrow 0$ and $0 < \Phi < \frac{\psi}{1-\theta} - \psi - \underline{w}$ we have the following simplification in the second interval: $\forall \Omega \in [0, 1]$: $\frac{\partial EV_1}{\partial n} < 0 \forall n \in [\Omega, n_L + \Omega]$ and without the assumption for Φ this is true for $\forall \Omega \in [0, 1 - \beta\Phi]$. If the utility function is strictly decreasing with n in the second interval, the local maximum in the third interval corresponds with the global maximum. Therefore we finally get the second Result:

Result 2: *If $c \rightarrow 0$, $c \neq 0$ and $0 < \Phi < \frac{\psi}{1-\theta} - \psi - \underline{w}$, then for the range $\Omega \in [0, n(\check{B})]$ it is optimal to set $n^{opt}(\Omega) = \min[\Omega, \frac{m}{2-\Omega}]$.*

Result 1 and 2 are summarized in Proposition 1. •

5.4 Appendix D: Proof of Proposition 3: Optimal policy under worker domination

The union maximizes her utility under two constraints: the political power restriction and the participation constraint by entrepreneurs. The Lagrangian L of this problem can be written as

$$\max L = \frac{(1-\alpha)(a-n-\psi-I)}{\delta} + \frac{1}{2}n^2 - \lambda(\alpha(a-n-\psi-I) - 0). \quad (11)$$

Taking the first order conditions with respect to the number of firms n and labor rights $1 - \alpha$ yields

$$\begin{aligned}\frac{\partial L}{\partial n} &= -\frac{1 - \alpha}{\delta} + n + \lambda \cdot \alpha = 0 \\ \frac{\partial L}{\partial \alpha} &= -\frac{1}{\delta}(a - n - \psi - I) - \lambda(a - n - \psi - I) = 0 \\ \lambda &= \frac{1}{\delta}.\end{aligned}$$

It follows that $\alpha = \frac{1}{4}$ and $n = \frac{1}{2\delta} = \frac{1}{2}m$. •