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Abstract

We study the political economy of bank capital regulation from a positive and normative perspective. In a general equilibrium setting, capital requirements and lobbying contributions are determined as the outcome of bargaining between banks and politicians. We show that bankers and politicians agree on lobbying contributions and capital regulation that renders banks fragile, reducing efficiency and fairness. Consideration of all general equilibrium effects, or a bail-in provision and high capital regulation standards from international agreements eliminate lobbying incentives, yielding an efficient and fair allocation.

Keywords: Banking regulation, lobbying, regulatory capture, capital requirements, bank resolution, risk-taking

JEL Classification: D53; D72; G21; G28

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1 Introduction

Banks often lobby for laxer capital requirements on the grounds that stringent regulation reduces lending and risk-taking to inefficient levels. Drawing on the premise that legislators may indeed be influenced by lobbying, we offer an explanatory theory of the mechanism through which bankers influence banking regulation, and we study the effects of lobbying from an efficiency and distributional point of view.

The impact of lobbying on banking regulation is well-documented by an ample of empirical studies. Kroszner and Strahan (1999) and Kroszner and Stratmann (1998) have shown that special interest groups can impact the stringency of banking regulation, as well as the organization of relevant legislative bodies. In the aftermath of the global financial crisis 2007-2008, Igan et al. (2011) have argued that lobbying contributed to the crisis since active lobbying is found to be related to excessive risk-taking by banks in the US, while Claessens et al. (2008) find the same relation in Brazil. In a more recent study, Lambert (2018) shows that bankers engaging in lobbying undertake riskier decisions, while regulators are less likely to take actions against a bank that is actively lobbying.

Our contribution to the literature is threefold. First, we complement the aforementioned empirical studies by developing a theoretical framework within which the evidence on lobbying on banking regulation can be interpreted. Second, adopting a general equilibrium approach, we study the impact of lobbying on risk-taking levels, on the efficiency of production and on inequality between politicians and households with regard to consumption and utilities. Third, we offer a normative discussion on how efficiency and fairness can be enhanced.

In our model, we use attributes stemming from both the *public interest theory*, in the tradition of Pigou (1920) and Ramsey (1927), and *regulatory capture theory*, in the tradition of Stigler (1971), Peltzman (1976) and Becker (1983). That is, regulators combine two types of interest: They pursue public interest as they are affected by regulations as ordinary members of the society, whereas they also act on behalf of their narrow interests to the extent that they benefit from exchanging their regulatory power for benefits that cannot be distributed to the society as a whole.

More specifically, we consider a two-period general equilibrium model with households, bankers, and two production sectors. A fraction of households are also politicians. Households are initially endowed with physical capital and property rights of two different technologies, one for each production sector, that transform capital into consumption good in the second period. Both technologies are run by entrepreneurs who act on behalf of the owners and play an only passive role otherwise. In one sector, a risk-free technology is used in which households can invest directly via the capital market. In the other sector, entrepreneurs can only obtain funds from banks since they are subject to moral hazard. Banks intermediate between households and entrepreneurs operating a risky technology. Politicians, who run the government, set regulation and can obtain funds in the form of lobbying contributions.

Operating banks raise equity and deposits and thus, decide on banks' capital structure that must—at the same time—comply with minimum capital requirements, set by regulation. In the base model, the government also guarantees deposits by promising to bail out failed banks. A resolution regime in the form of bail-out can be understood as a subsidy to banks, which distorts returns by making deposits a risk-free asset thus reducing bank costs and raising risk-taking levels. In an extension of the base model, we study a scenario where failed banks are bailed in, i.e., bank losses are incurred by depositors rather than taxpayers.

Lobbying contributions and capital regulation are determined as the outcome of bargaining between bankers and politicians. To shed light on banks' argument that efficient bank lending levels dictate laxer regulation, we consider two types of bargaining: *General Equilibrium Bargaining*, where bankers consider all general equilibrium effects, and *Myopic Bargaining*, where bankers only consider the direct effects of regulation on returns on equity. In addition, bargaining outcomes depend on the trade-off faced by politicians between high lobbying contributions combined with lax capital regulation connected to extensive risk-taking on the one hand, and potential bail-out expenditures on the other hand.

Our positive analysis establishes three main results. First, stringent capital regulation indeed reduces bank lending, risk-taking levels and bank equity returns. The reason is that capital requirements raise the amount of equity that can absorb bank losses, thereby effectively reducing the subsidy provided to banks in the form of a bail-out clause. That, in turn, alleviates the distortion of bank costs, ultimately reducing bank equity returns and risk-taking levels.

Second, when we consider the case where bankers take into account all general equilibrium effects, lobbying incentives for laxer regulation vanish, resulting in an efficient and fair allocation in the sense that a politician obtains the same utility as a private citizen if both have the same income. The reason is that banks balance in such circumstances the gains from higher returns on equity against costs of bail-outs that arise when banks fail and have invested extensively in risky projects.

Third, we show that lax bank equity regulation occurs when bankers only consider the direct effects on returns on equity, neglecting general equilibrium effects on the economy. In that case, bankers and politicians may agree on levels of lobbying contributions and capital requirements that encourage extensive risk-taking and render banks fragile. This bargaining outcome harms efficiency of production and results in a distribution of consumption goods in the second period that benefits politicians at the expense of the rest of the households.

Our normative analysis indicates that an efficient and fair allocation cannot only be achieved by (hypothetical) general equilibrium reasoning but also by market-based policy tools, such as a bail-in provision and enhanced equity funding through sufficiently high capital regulation achieved in international agreements the government is committed to. Those tools can also eliminate lobbying incentives by making bank returns independent of capital regulation. Finally, in the absence of these market based tools, we show that higher political participation enhances efficiency and fairness since lobbying contributions are distributed among a larger fraction of the households.

The rest of the paper is organized as follows. The model setup is outlined in Section 2. The equilibrium for given levels of capital regulation and lobbying contributions is investigated in Section 3. In Section 4, we study how capital requirements and lobbying contributions are endogenously determined as the result of bargaining between bankers and politicians. Normative implications are discussed in Section 5, and we conclude in Section 6. The proofs are given in the Appendix.

2 Model Setup

We consider a two-period ($t = 1, 2$) economy with three types of agents: households, entrepreneurs and bankers. Households are initially endowed with capital $K (K > 0)$ that is invested in the first period, and property rights on technologies that produce a consumption good in the second period. A fraction of households acts as politicians running the government and determining bank equity regulation. Entrepreneurs, that run the technologies, and bankers, that intermediate between households and risky entrepreneurs, are assumed to act on behalf of the owners, i.e., households. All agents are risk-neutral and perfect competition prevails in all markets.

2.1 Technologies

There is a continuum of entrepreneurs that operate a risk-free technology (FT) and a risky technology (RT). It will be sufficient to consider two representative and price-taking entrepreneurs. FT can be interpreted as a well-established representative firm which produces a risk-free output, employing capital k_F in period $t = 1$. In the second period, the amount of $f(k_F)$ is produced with $f'(k_F) > 0$, $f''(k_F) < 0$, and the Inada conditions $\lim_{k_F \to 0} f'(k_F) = +\infty$ and $f'(K) = 0$ are assumed.

The FT entrepreneur raises capital k_F by issuing bonds B_F to households in the first period at cost R_F, where R_F denotes the returns per unit of capital invested in FT. By construction, and for the bond market to clear, $k_F \equiv B_F$ must hold with $0 \leq k_F \leq K$. The maximization of FT profits, $\Pi_F = f(k_F) - R_F \cdot k_F$, yields

$$R_F = f'(k_F), \tag{1}$$

or equivalently, $k_F = f'^{-1}(R_F)$.

The RT entrepreneur raises capital k_R in period $t = 1$. For the capital market to clear, RT capital is determined according to

$$k_R = K - k_F. \tag{2}$$

At the beginning of $t = 2$, either the *good state* or the *bad state* of the world occurs with probability σ and $1 - \sigma$ $(0 < \sigma < 1)$, respectively. The returns per unit of investment are $\overline{R}$ in the good state, and $\underline{R}$ in the bad state of the world, respectively, where $0 < \underline{R} < \overline{R}$. The expected returns of investing one unit of capital in RT are thus

$$\mathbb{E}[\widetilde{R}] = \sigma\overline{R} + (1 - \sigma)\underline{R}. \tag{3}$$

The RT entrepreneur raises k_R at state-contingent returns $\overline{R}_R$ in the good state and $\underline{R}_R$ in the bad state of the world, respectively. Therefore, RT profits in the good state and the bad state of the world, denoted by $\overline{\Pi}_R$ and $\underline{\Pi}_R$, respectively, read as follows

$$\overline{\Pi}_R = \left(\overline{R} - \overline{R}_R\right) \cdot k_R, \tag{4}$$

$$\underline{\Pi}_R = \left(\underline{R} - \underline{R}_R\right) \cdot k_R. \tag{5}$$

We next determine the equilibrium rates $\overline{R}_R$ and $\underline{R}_R$. Due to the linearity of RT profits with regard to k_R, the RT entrepreneur would demand either an infinite amount of capital or zero, if $\overline{R} - \overline{R}_R$ and/or $\underline{R} - \underline{R}_R$ were non-zero. Given that the total amount of initial capital is finite, this would result in either zero or all capital being invested in FT. Due to the Inada conditions in FT, this would yield either infinite or zero risk-free returns. Both constellations cannot hold in equilibrium. Thus, we obtain

$$\overline{R}_R = \overline{R}; \tag{6}$$

$$\underline{R}_R = \underline{R}. \tag{7}$$

Because RT output is state-contingent, total production—i.e., the sum of FT and RT output—is state-contingent as well. The expected total production, that is equal to the expected total income, is denoted by $\mathbb{E}[Y]$ and is defined as follows:

$$\mathbb{E}[Y] = \sigma \cdot \overline{Y} + (1 - \sigma) \cdot \underline{Y} \ , \tag{8}$$

where $\overline{Y}$ and $\underline{Y}$ denote total production in the good state and the bad state of the world, respectively, and read as follows

$$\overline{Y} = f(k_F) + (K - k_F) \cdot \overline{R}; \tag{9}$$

$$\underline{Y} = f(k_F) + (K - k_F) \cdot \underline{R}. \tag{10}$$

2.2 Banks

We assume that the RT entrepreneur is subject to moral hazard such that he can only pledge a fraction of returns $\overline{R}_R$ and $\underline{R}_R$ to investors. Thus, RT entrepreneur can only raise funds via financial intermediaries that possess a monitoring technology through which contractual obligations can be enforced. We consider that a continuum of banks operated by bankers are endowed with such monitoring skills. For simplicity, we assume that banks can completely eliminate moral hazard in contracting and that monitoring costs are zero.

Bankers raise funds by issuing deposits, D, and equity, E, to households in period $t = 1$. The entire amount of raised funds is invested in RT in the form of loans, denoted by $L_R \equiv D + E$. For the loan market to clear, loans have to satisfy $L_R = k_R$. Thus, and because of (6) and (7), we know that in period $t = 2$, bank revenues in the good state and the bad state of the world, denoted by $\overline{\mathrm{BR}}$ and $\underline{\mathrm{BR}}$, respectively, read as follows

$$\overline{\mathrm{BR}} = (D + E) \cdot \overline{R} = (K - k_F) \cdot \overline{R}; \tag{11}$$

$$\underline{\mathrm{BR}} = (D + E) \cdot \underline{R} = (K - k_F) \cdot \underline{R}. \tag{12}$$

We further assume that there exists a *Bank Association* that can lobby on behalf of banks. Specifically, bankers representing their shareholders form the Bank Association and contribute a fraction λ ($\lambda \in [0, 1]$) of bank revenues to this organization. Therefore, the Bank Association receives

$$\overline{\Lambda} = \lambda \cdot \overline{\mathrm{BR}} = \lambda \cdot (K - k_F) \cdot \overline{R}; \tag{13}$$

$$\underline{\Lambda} = \lambda \cdot \underline{\mathrm{BR}} = \lambda \cdot (K - k_F) \cdot \underline{R}, \tag{14}$$

in the good state and the bad state of the world, respectively, at its disposal for lobbying in exchange for regulatory provisions that better serve bankers' mandate. We call λ the *lobbying intensity*, whereas we call $\overline{\Lambda}$ and $\underline{\Lambda}$ the *lobbying contributions* in the good state and the bad state of the world, respectively. We will see in Section 4 that lobbying intensity, λ, is a decision variable, whereas lobbying contributions, $\overline{\Lambda}$ and $\underline{\Lambda}$, are determined in equilibrium. Moreover, banks are contractually obliged to repay their depositors with R_D per unit of deposit in period $t = 2$. Therefore, bank costs in the good state and the bad state of the world, denoted by $\overline{\mathrm{BC}}$ and $\underline{\mathrm{BC}}$, respectively, read as follows

$$\overline{\mathrm{BC}} = D \cdot R_D + \overline{\Lambda}; \tag{15}$$

$$\underline{\mathrm{BC}} = D \cdot R_D + \underline{\Lambda}. \tag{16}$$

Bank profits, i.e., bank revenues net of bank costs, are distributed proportionally among equity-holders that are protected by limited liability. That is,[1]

$$\overline{R}_E = (\overline{\mathrm{BR}} - \overline{\mathrm{BC}})/E = \big((1-\lambda)(K-k_F)\overline{R} - DR_D\big)/E; \tag{17}$$

$$\underline{R}_E = \max\left\{0, (\underline{\mathrm{BR}} - \underline{\mathrm{BC}})/E\right\}, \tag{18}$$

where $\overline{R}_E$ and $\underline{R}_E$ are the returns on equity in the good state and the bad state of the world, respectively. The expected returns on equity are given by

$$\mathbb{E}[R_E] = \sigma\overline{R}_E + (1-\sigma)\underline{R}_E. \tag{19}$$

In period $t = 1$, bankers decide on bank's equity-to-debt ratio representing banks' capital structure denoted by

$$\Theta \equiv \frac{E}{D}. \tag{20}$$

Assumption 1. *If the representative banker is indifferent among a continuum of capital structures* $[\Theta_{\text{low}}, \Theta_{\text{high}}]$*, then he chooses* $\Theta = \Theta_{\text{low}}$.

Assumption 1 reflects the banker's preference for deposits over equity.[2] The bank's capital structure determines whether a bank is *resilient* or *fragile*. In particular, a bank is resilient if it can withstand the bad state of the world, i.e., $\underline{\mathrm{BR}} - \underline{\mathrm{BC}} \geq 0$, which is equivalent to satisfying the following condition

$$\Theta \geq \bar{\Theta} = \frac{R_D - (1-\lambda)\cdot\underline{R}}{(1-\lambda)\cdot\underline{R}}. \tag{21}$$

Otherwise, the bank is fragile, implying that bank profits are negative in the bad state of the world. That means the bank cannot meet its obligation to fully repay depositors the amount of DR_D and fails, while shareholders receive nothing, in line with (18).

2.3 Banking Regulation

Banks operate within the framework defined by banking regulation in terms of capital requirements and resolution regime. We assume that politicians run the legislative branch of the government, thus being endowed with the right to determine banking regulation. We further assume that decisions of the legislature

[1] In equilibrium, it turns out that bank profits are non-negative in the good state of the world.

[2] Arbitrarily small, but positive equity issuance costs, which are not formally modeled in this paper, could justify such a preference.

are implemented consistently by the executive branch of the government. That is, we assume no time inconsistency problems with regard to the implementation of banking regulation, thus focusing on the political economy of the design of banking regulation.[3] All banking regulation provisions become publicly known in period $t = 1$, namely, before the state of the world is realized and in advance of production. We now further elaborate on the two dimensions of banking regulation.

Capital Requirements

Capital requirements set the minimum level of the equity-to-debt ratio to which a bank must adhere. They are described by

$$\Theta \geq \Theta_{\text{reg}} \geq \vartheta, \tag{22}$$

where ϑ is a *floor* capital regulation with which the government itself needs to comply. ϑ is a strictly positive parameter and can be interpreted as internationally agreed minimum standards comparable to the Basel III framework.[4] It will turn out that the capital requirement is binding in equilibrium, i.e., $\Theta = \Theta_{\text{reg}}$. Thus, and because of (21), capital requirements play a crucial role as to whether banks fail in the bad state of the world or not.

Resolution Regime

If banks are fragile, i.e., if they fail in the bad state of the world, they are resolved according to the resolution regime. In the base model, we assume that the resolution regime is exogenously given in the form of a *bail-out* clause according to which equity wipes out, the liquidation value of the bank, i.e., $\underline{\text{BR}} - \underline{\Lambda}$, is distributed proportionally among depositors, and the remaining promised returns on deposits are covered by the government.[5] Government raises funds to reimburse depositors by imposing a lump sum taxation on households. These funds, denoted by T, are called *bail-out costs* and read as follows

$$T = \max\left\{0, DR_D - (\underline{\text{BR}} - \underline{\Lambda})\right\}. \tag{23}$$

[3] At a conceptual level, our focus on the design of banking regulation can be seen as complementary to the consideration of political interference in the form of time inconsistency problem by Rochet (2008).

[4] This assumption also ensures that equity, E, is strictly positive, which is a common practice from a legal point of view (see, for example, Article 12 Directive 2013/36/EU).

[5] In Subsection 5.3, we examine a *bail-in* clause according to which if a bank fails, then equity wipes out and depositors become equity-holders among which only the bank liquidation value is distributed.

$T = 0$ means that banks do not fail. This can be the case either because the good state of the world has been materialized, or because banks are resilient and therefore they can repay their depositors, even if the bad state of the world has been materialized, i.e., (21) is fulfilled.

2.4 Households

We assume a continuum of risk-neutral households. An initial amount of capital K and technology property rights are evenly distributed among households. It thus suffices to consider a representative household. A fraction of households η ($\eta \in [0, 1]$) is *politicians.* We call η the *level of political participation* and treat it as a given parameter until Subsection 5.2. For the sake of distinction, we call the fraction $1 - \eta$ *ordinary households*, and we define the *ratio of ordinary households to politicians*, denoted by H, as follows

$$H \equiv \frac{1 - \eta}{\eta}. \tag{24}$$

The set of *households* therefore comprises *politicians* and *ordinary households.* All households make an investment decision in their capacity as investors and consume in the second period. Politicians may have an additional source of consumption—from lobbying contributions—as compared to ordinary households. The investment decision is outlined below and we will then describe how the output of production in the form of consumption goods is distributed among ordinary households and politicians.

Investment

In period $t = 1$, both politicians and ordinary households can invest in a portfolio that is composed of three assets: B_F, D and E. The returns on equity are state-contingent, whereas the returns on FT capital and deposits are risk-free.[6]

In period $t = 2$, households—in their capacity as investors—use the returns on their investment in bank equity, bank deposits and bonds plus the profits from FT and RT, net of any bail-out cost they may incur according to (23), for consumption that has been produced by the two technologies. They consume $\overline{c}^i$ and $\underline{c}^i$ in the good state and the bad state of the world, respectively. Hence, households in their

[6]Deposits are risk-free because of the bail-out clause as described in Subsection 2.3.

capacity as investors solve the following problem:

$$\max_{\gamma,\nu} \left\{ \sigma \cdot \overline{c}^i + (1-\sigma) \cdot \underline{c}^i \right\}, \tag{25}$$

where

$$\overline{c}^i = \left(\gamma\nu \cdot R_F + \gamma(1-\nu) \cdot R_D + (1-\gamma) \cdot \overline{R}_E\right) \cdot K + \Pi_F + \overline{\Pi}_R, \tag{26}$$

$$\underline{c}^i = (\gamma\nu \cdot R_F + \gamma(1-\nu) \cdot R_D + (1-\gamma) \cdot \underline{R}_E) \cdot K + \Pi_F + \underline{\Pi}_R - T, \tag{27}$$

with $\gamma\nu$, $\gamma(1-\nu)$ and $1-\gamma$ denoting the fraction of households' endowment invested in B_F, D and E, respectively. Specifically, $\gamma\nu \cdot K = B_F$, $\gamma(1-\nu) \cdot K = D$ and $(1-\gamma) \cdot K = E$. We also note that $\overline{\Pi}_R = \underline{\Pi}_R = 0$ in equilibrium due to conditions (6) and (7).

Because of the linearity of households' objective function with regard to the expected returns, households invest in the asset with the highest expected returns. Households are indifferent among multiple assets that are associated with the highest expected returns.[7]

Consumption

Total consumption of households, i.e., ordinary households plus politicians, in the good state and the bad state of the world, reads as follows:

$$\overline{C}^h = \overline{C}^{\text{oh}} + \overline{C}^{\pi}, \tag{28}$$

$$\underline{C}^h = \underline{C}^{\text{oh}} + \underline{C}^{\pi}, \tag{29}$$

where $\overline{C}^{\text{oh}}$ and $\underline{C}^{\text{oh}}$ denote the aggregate amounts of consumption allocated to ordinary households in the good state and the bad state of the world, respectively, and $\overline{C}^{\pi}$ and $\underline{C}^{\pi}$ denote the aggregate amounts of politicians' consumption in the good state and the bad state of the world, respectively.

For the consumption goods market to clear in both states of the world, the following holds:

$$\overline{C}^h - \overline{Y} = 0, \tag{30}$$

$$\underline{C}^h - \underline{Y} = 0. \tag{31}$$

[7] Note that the representative household only decides on γ and ν and cannot influence the aggregate variables Π_F, $\overline{\Pi}_R$, $\underline{\Pi}_R$ and T that are determined in equilibrium.

Out of the total production, i.e., $\overline{Y}$ and $\underline{Y}$ in the two states of the world, the amounts of $\overline{\Lambda}$ and $\underline{\Lambda}$, as given by (13) and (14), are exclusively consumed by politicians. The rest is proportionally distributed among ordinary households and politicians. Therefore, at the aggregate level, we obtain:

$$\overline{C}^{\pi} = \eta \cdot \left(\overline{Y} - \lambda \cdot (K - k_F) \cdot \overline{R}\right) + \lambda \cdot (K - k_F) \cdot \overline{R}, \tag{32}$$

$$\underline{C}^{\pi} = \eta \cdot \left(\underline{Y} - \lambda \cdot (K - k_F) \cdot \underline{R}\right) + \lambda \cdot (K - k_F) \cdot \underline{R}, \tag{33}$$

$$\overline{C}^{\mathrm{oh}} = (1-\eta) \cdot \left(\overline{Y} - \lambda \cdot (K - k_F) \cdot \overline{R}\right), \tag{34}$$

$$\underline{C}^{\mathrm{oh}} = (1-\eta) \cdot \left(\underline{Y} - \lambda \cdot (K - k_F) \cdot \underline{R}\right). \tag{35}$$

In expected terms, politicians consume $\mathbb{E}[C^{\pi}] = \sigma \cdot \overline{C}^{\pi} + (1-\sigma) \cdot \underline{C}^{\pi}$, while ordinary households consume $\mathbb{E}[C^{\mathrm{oh}}] = \sigma \cdot \overline{C}^{\mathrm{oh}} + (1-\sigma) \cdot \underline{C}^{\mathrm{oh}}$.

The setup of the model is graphically presented in Figure 1.

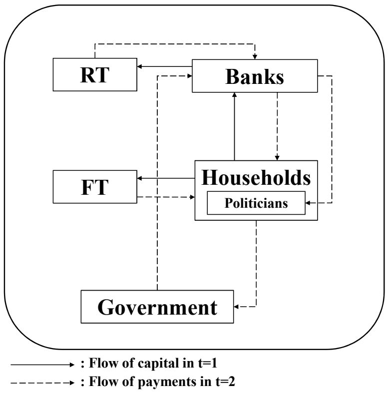


Figure 1: Model setup

3 Competitive Equilibrium

In a competitive equilibrium, the returns are such that ordinary households and politicians maximize expected returns on their investments, entrepreneurs maximize their expected profits, bankers maximize expected returns on equity, and all markets clear. All agents are price takers. In this section, we characterize the returns that prevail in a competitive equilibrium for any given lobbying intensity and capital regulation,[8] and then investigate the conditions that generate an efficient and fair equilibrium. For the ease of notation we define

$$\mathcal{J}(\Theta) \equiv \frac{1+\Theta}{\sigma+\Theta}. \tag{36}$$

3.1 Equilibrium Returns

For any given level of lobbying intensity and capital requirements we obtain a unique equilibrium as presented in the following proposition.

Proposition 1. *For any given level of lobbying intensity λ, and capital requirements Θ_{reg}, banks choose $\Theta = \Theta_{\text{reg}}$ and there exists a unique competitive equilibrium where*

$$R_F = R_D = \mathbb{E}[R_E] =: R^*, \tag{37}$$

with

$$R^*(\Theta, \lambda) = \begin{cases} (1-\lambda) \cdot \mathcal{J}(\Theta) \cdot \sigma \overline{R} & \forall \Theta \in \big(0, \bar{\Theta}\big) \\ (1-\lambda) \cdot \mathbb{E}[\widetilde{R}] & \forall \Theta \in \big[\bar{\Theta}, +\infty\big) \end{cases} \tag{38}$$

and

$$\bar{\Theta} = \frac{\sigma \cdot (\overline{R} - \underline{R})}{\underline{R}}. \tag{39}$$

The proof of Proposition 1 is given in the Appendix. We call R^* the *"equilibrium returns"*. Equilibrium returns reflect the banks' ability to raise funds and also determine the extent to which banks are lending to the entrepreneur operating a risky technology. Therefore, the higher the equilibrium returns, the higher the level of risk-taking. Since the banks always choose the minimal possible capital requirement the regulatory capital requirements are always binding. This is the consequence of the following observations. If banks are fragile at $\Theta = \Theta_{\text{reg}}$ in equilibrium, returns on equity strictly increase when E can be lowered for a given amount of deposits if $\Theta > \Theta_{\text{reg}}$. If banks are resilient at $\Theta = \Theta_{\text{reg}}$, banks are indifferent between capital structures in $[\Theta_{\text{reg}}, \infty)$ and, according to Assumption 1, will choose Θ_{reg}. Since in the next section bargaining will take place over the levels of capital requirements and lobbying intensity, it is important to shed light on the impact of Θ_{reg} and λ on the equilibrium returns. That would ultimately explain

[8] Lobbying intensity and capital regulation will be endogenously determined in Section 4, where the bargaining process between bankers and politicians is described.

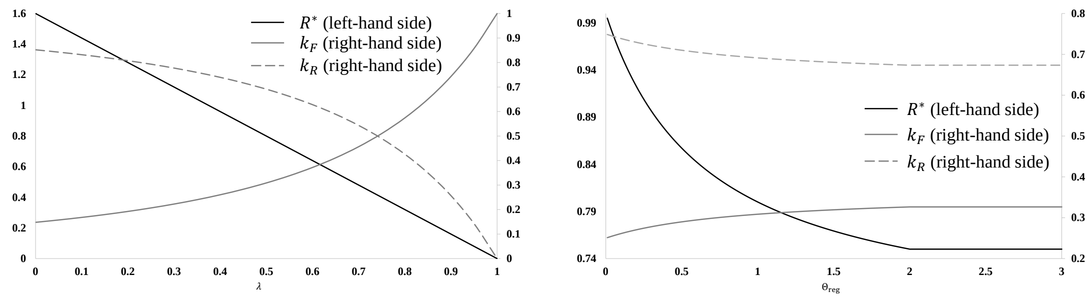
the potential effect of the bargaining process on risk-taking and the allocation of resources. To that end, calculating $\partial R^*/\partial \Theta_{\text{reg}}$ and $\partial R^*/\partial \lambda$, we obtain:

Corollary 1. *Ceteris paribus,*

(i) R^* *is continuous and monotonically decreasing in* λ *for all* $\lambda \in [0, 1]$, *and*

(ii) R^* *is continuous and monotonically decreasing in* Θ_{reg} *for all* $\Theta_{\text{reg}} < \bar{\Theta}$ *and independent of* Θ_{reg} *for all* $\Theta_{\text{reg}} \geq \bar{\Theta}$.

Figure 2 illustrates the effects of lobbying intensity and capital requirements on equilibrium returns, and ultimately on the allocation of capital between the risky and the risk-free technology for a given parameterization.[9] Figure 2a illustrates the equilibrium effects of lobbying intensity for a given level of capital requirements, whereas Figure 2b shows the equilibrium effects of capital requirements for a given level of lobbying intensity.[10]



(a) Lobbying intensity

(b) Capital requirements

Figure 2: Equilibrium effects

Lobbying intensity affects the equilibrium returns via its impact on bank costs. As shown by (13)–(18), lobbying intensity raises lobbying contributions and therefore bank costs. That, in turn, diminishes bank revenues, reducing bank profits and equity returns. Thus, higher lobbying intensity, ceteris paribus, compromises banks' ability to raise funds due to lower equilibrium returns, thereby decreasing lending to the risky sector.

The impact of capital requirements on equilibrium returns is explained in view of the effect of the bail-out clause. More specifically, such a clause is a distortion that can be understood as a subsidy to banks, since it makes deposits free of risk,

[9] $\vartheta = 0.01$, $\sigma = 2/3$, $\underline{R} = 1/2$, $\overline{R} = 2$, $K = 1$, and $f(k_F) = 2\sqrt{k_F} - k_F$.

[10] Capital requirements level in Figure 2a is fixed at $\Theta_{\text{reg}} = 1$, whereas lobbying intensity in Figure 2b is fixed at $\lambda = 0.1$.

therefore reducing deposit returns and bank financing costs, as shown by (15) and (16). This distortion is relevant if banks are fragile, but remains irrelevant if banks are resilient because in that case, deposits are risk-free irrespective of the resolution regime. The measure of this subsidy is the bail-out cost. It increases when the equity-to-debt ratio is lower, as can be seen by dividing (23) by D. The consequent reduction of bank costs boosts bank profits, ultimately increasing risk-taking through higher equilibrium returns.

3.2 Welfare Analysis

We now investigate how the allocation of capital affects production and distribution of consumption. Regarding the former, we define the *efficient* allocation, whereas we define the *fair* allocation with respect to the latter.

We define the efficient allocation as follows:

Definition 1. *An allocation is efficient if it maximizes the expected production.*

From the First Order Condition (FOC) of (8) with respect to k_F, we obtain:

$$R_F \equiv \mathbb{E}[\widetilde{R}]. \tag{40}$$

Hence, efficiency requires that the safe return is equal to the expected return in the risky sector. Using (38) and $R^* = \mathbb{E}[\widetilde{R}]$ yields

Lemma 1.

(i) An equilibrium yields the efficient allocation in the case of fragile banks if and only if

$$\lambda \equiv \dot{\lambda}(\Theta_{\text{reg}}) = \frac{\mathcal{J}(\Theta_{\text{reg}}) \cdot \sigma\overline{R} - \mathbb{E}[\widetilde{R}]}{\mathcal{J}(\Theta_{\text{reg}}) \cdot \sigma\overline{R}}. \tag{41}$$

(ii) An equilibrium yields the efficient allocation in the case of resilient banks if and only if $\lambda = 0$.

We call $\dot{\lambda}$ the *efficient lobbying intensity.* Figure 3 illustrates $\dot{\lambda}$ for a given parameterization.[11] The intuition runs as follows. The efficient allocation of resources

[11] The parameters are $\vartheta = 0.01$, $\sigma = 2/3$, $\underline{R} = 1/2$, $\overline{R} = 2$, $K = 1$ and $f(k_F) = 2\sqrt{k_F} - k_F$.

between FT and RT requires $R^* = \mathbb{E}[\widetilde{R}]$. If Θ_{reg} is sufficiently high such that banks are resilient, i.e., $\Theta_{\text{reg}} \geq \bar{\Theta}$, the efficient allocation can be achieved if and only if $\lambda = 0$. Any strictly positive λ reduces equilibrium returns below the efficient level, thus resulting in under-investment in risky technologies.

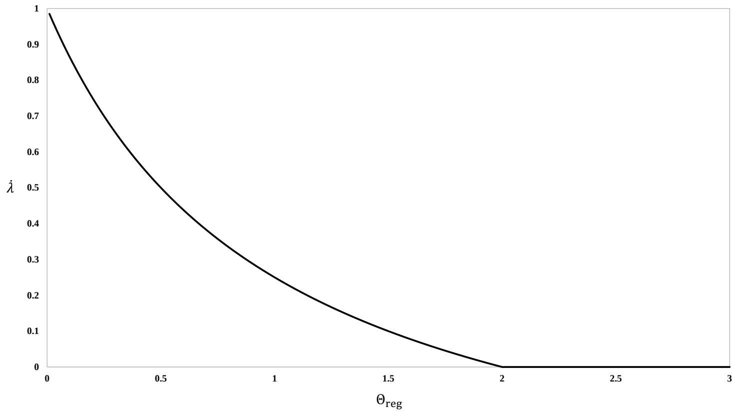


Figure 3: Efficient lobbying intensity

If $\Theta_{\text{reg}} < \bar{\Theta}$, the efficient allocation requires a strictly positive λ, i.e., $\lambda = \dot{\lambda}$, for the increase of equilibrium returns due to laxer capital regulation to be canceled out by a decrease of equilibrium returns due to shift of revenues from bankers to politicians. Any $\lambda > \dot{\lambda}$ yields $R^* < R_F$ and thus, an over-investment in FT, whereas any $\lambda < \dot{\lambda}$ results in $R^* > R_F$ and thus, in over-investment in RT.

An efficient allocation need not be fair in terms of the following definition:

Definition 2. *An allocation is said to be fair if an ordinary household and a politician consume the same amount.*

Formally, for all $\eta \in (0, 1)$[12] a fair allocation requires

$$\frac{\mathbb{E}[C^{\text{oh}}]}{1 - \eta} = \frac{\mathbb{E}[C^{\pi}]}{\eta}. \tag{42}$$

From (34)-(33), we know that this condition is satisfied if and only if lobbying contributions—that are only shared among politicians—are zero. Therefore, we obtain

Lemma 2. *Let $\eta \in (0, 1)$. An equilibrium yields a fair allocation of resources if and only if $\lambda = 0$.*

[12] For $\eta = 0$ or $\eta = 1$, all allocations are obviously fair, regardless of λ.

Hence, we have shown that the levels of capital requirements and lobbying intensities crucially impact efficiency of production and distribution of consumption. We thus turn our focus on how these levels are endogenously determined as the result of bargaining between bankers and politicians.

4 Bargaining

Capital requirements and lobbying intensity are endogenized as an agreed contract $(\mathit{\Theta}_{\text{reg}}, \lambda)$ which results from bargaining between politicians and bankers. We first describe the bargaining setting. In a second step, we investigate the equilibrium that occurs in two different types of bargaining:[13] *General Equilibrium Bargaining*, where bankers take all general equilibrium effects of bargaining outcome into consideration,[14] and *Myopic Bargaining*, where bankers only consider the direct effects of bargaining outcome on the returns on equity.[15]

4.1 Bargaining Setting

Bargaining outcome, namely, $\mathit{\Theta}_{\text{reg}}$ and λ, is determined in period $t = 1$ before the capital is allocated among FT and RT. At the beginning of the bargaining process, which takes place in two sub-periods, *floor* capital regulation and bank resolution regime are publicly known. We now further elaborate on the two sub-periods of the bargaining process.

First Sub-period

In the first sub-period, politicians, aiming to maximize their expected consumption, let bankers know the level of lobbying intensity required for any given level of capital requirements. From (32) and (33), and taking (3) into account, politicians' objective function reads as follows:

$$v^{\pi} = \eta \cdot \Big(f(k_F) + (1-\lambda) \cdot (K - k_F) \cdot \mathbb{E}[\widetilde{R}] \Big) + \lambda \cdot (K - k_F) \cdot \mathbb{E}[\widetilde{R}]. \tag{43}$$

It is evident that politicians' interests remain partially aligned with the ordinary

[13] The terminology draws on Gersbach and Schniewind (2011), who analyze wage bargaining.

[14] A theoretical framework within which considerations that reach beyond shareholders' interests are justified has been developed by Magill et al. (2015).

[15] A degenerate case of Myopic Bargaining, where neither bankers nor politicians consider general equilibrium effects is also discussed in Subsection 4.3.

households' interests to the extent that they share $f(k_F) + (1-\lambda) \cdot (K - k_F) \cdot \mathbb{E}[\widetilde{R}]$. Yet, politicians' interests are not fully aligned with those of ordinary households because lobbying contributions are only distributed among politicians.

From the FOC of (43) with respect to k_F, the allocation that maximizes v^π requires:

$$R^* = \left(1 - \lambda + \frac{\lambda}{\eta}\right) \cdot \mathbb{E}[\widetilde{R}]. \tag{44}$$

Substituting for R^* as given by (38), we obtain

Lemma 3. *Politicians demand*

$$\lambda = \max\left\{0, \frac{\mathcal{J}(\Theta_{\text{reg}}) \cdot \sigma\overline{R} - \mathbb{E}[\widetilde{R}]}{\mathcal{J}(\Theta_{\text{reg}}) \cdot \sigma\overline{R} + H \cdot \mathbb{E}[\widetilde{R}]}\right\}, \tag{45}$$

for any given level of capital requirements, Θ_{reg}.

Note that λ, as given by (45), is decreasing in Θ_{reg} for all $\Theta_{\text{reg}} < \bar{\Theta}$.[16] In other words, Lemma 3 reflects the trade-off faced by politicians who lessen capital regulation only to the extent that lobbying contributions are high enough to outweigh potential bail-out expenditures. Moreover, since λ becomes zero for all $\Theta_{\text{reg}} \geq \bar{\Theta}$, a bargaining outcome that includes $\lambda = 0$ and $\Theta_{\text{reg}} \geq \bar{\Theta}$, which according to Lemmata 1 and 2 yields an efficient and fair allocation, can be interpreted as the disagreement outcome of bargaining.

Second Sub-period

In the second sub-period, bankers decide on the level of lobbying intensity, λ, by setting their preferred level of capital requirements, Θ_{reg}, in line with (45), thus finalizing the contract $(\Theta_{\text{reg}}, \lambda)$. Bankers' decision aims at maximizing their bargaining objective function, which is denoted by v^b, and will be specified in the following subsections, depending on whether general equilibrium effects are taken into consideration or not.

We assume that both politicians and bankers perceive the agreed contract as fully enforceable. While concerns as to the credibility of bankers' promise to offer a fraction λ of their revenues in the second period are legitimate, our assumption on the enforceability of the contract is reasonable since in reality, bargaining between bankers and politicians is a repeated game which eliminates cheating incentives.[17]

[16] Indeed, $\partial\lambda/\partial\Theta_{\text{reg}} = -(1-\sigma)\sigma\overline{R}(1+H)\mathbb{E}[\widetilde{R}]/((1+\Theta_{\text{reg}})\sigma\overline{R} + H\mathbb{E}[\widetilde{R}](\sigma + \Theta_{\text{reg}}))^2 < 0$.

[17] Theoretical foundations of that issue are discussed by Grossman and Helpman (1994) in a

Note, moreover, that since all decisions in our model are made in period $t = 1$ based on expected values, our results depend on the *perception* that the contract is enforceable and not on its *actual* enforcement.

4.2 General Equilibrium Bargaining

In this type of bargaining, bankers take into consideration all general equilibrium effects on their principals' consumption, namely, households' consumption in their capacity as investors. Therefore, and because of (32)-(31), bankers aim at maximizing the following objective function

$$v^b = \mathbb{E}[Y] - \lambda \cdot (K - k_F) \cdot \mathbb{E}[\widetilde{R}]. \tag{46}$$

FOC with respect to k_F implies that (46) is maximized if the following holds

$$R^* = (1 - \lambda) \cdot \mathbb{E}[\widetilde{R}]. \tag{47}$$

From (38) we know that (47) holds if and only if $\Theta_{\text{reg}} \geq \bar{\Theta}$. Substituting for $\Theta_{\text{reg}} \geq \bar{\Theta}$ into (45) and taking (22) into consideration, we obtain

Proposition 2. *General Equilibrium Bargaining results in $\Theta_{\text{reg}} \geq \bar{\Theta}$ for all $\vartheta \leq \bar{\Theta}$ and $\Theta_{\text{reg}} \geq \vartheta$ for all $\vartheta > \bar{\Theta}$, and $\lambda = 0$.*

The proof of Proposition 2 is given in the Appendix. Considering the efficiency and fairness of General Equilibrium Bargaining, we readily obtain from Lemmata 1 and 2:

Corollary 2. *General Equilibrium Bargaining yields an efficient and fair allocation.*

General Equilibrium Bargaining should be interpreted as an ideal scenario since it requires full awareness of general equilibrium effects, as well as commitment for considering these effects. Against this benchmark scenario, we study a more realistic scenario in the following subsection, according to which consideration of these effects is limited, if any.

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different setting, who study lobbying with regard to trade policy.

4.3 Myopic Bargaining

We assume now that bankers in this type of bargaining only consider the direct effects of λ and Θ_{reg} on returns on equity. That is, bankers aim at maximizing the following objective function:

$$v^b = \mathbb{E}[R_E]. \tag{48}$$

Proposition 1 and Corollary 1 reveal the trade-off faced by bankers. Namely, they can only offer a λ that is low enough such that gains from laxer capital regulation, as reflected by higher equilibrium returns, exceed the cost of lobbying contributions.

Substituting for λ, as given by (45), into (48), and showing that v^b is decreasing in Θ_{reg}, we obtain

Proposition 3. *Myopic Bargaining results in $\Theta_{\text{reg}} = \vartheta$ for all $\vartheta \leq \bar{\Theta}$ and $\Theta_{\text{reg}} \geq \vartheta$ for all $\vartheta > \bar{\Theta}$, and*

$$\lambda = \max\left\{0, \frac{\mathcal{J}(\Theta_{\text{reg}}) \cdot \sigma\overline{R} - \mathbb{E}[\widetilde{R}]}{\mathcal{J}(\Theta_{\text{reg}}) \cdot \sigma\overline{R} + H \cdot \mathbb{E}[\widetilde{R}]}\right\}. \tag{49}$$

The proof of Proposition 3 is given in the Appendix. We note that a sufficiently high *floor* capital regulation, i.e., $\vartheta \geq \bar{\Theta}$, yields no lobbying contributions. The reason is that such a *floor* capital regulation renders politicians' authority to set capital requirements worthless from bankers' perspective since for such constellation returns on equity do not depend on capital requirements—as shown by Corollary 1. In contrast, bankers are willing to offer strictly positive lobbying contributions for all $\vartheta < \bar{\Theta}$ because the costs incurred by banks in the form of lobbying contributions are outweighed by gains in the form of higher returns due to laxer regulation. In other words, bankers achieve $R^* > R_F$, because $\lambda < \dot{\lambda}$ for any given $\Theta_{\text{reg}} < \bar{\Theta}$ and $\eta < 1$. Thus, and taking Lemmata 1 and 2 into consideration, we conclude

Corollary 3. *Let $\eta < 1$. Myopic Bargaining yields*

(i) an inefficient and unfair allocation if $\vartheta < \bar{\Theta}$;

(ii) an efficient and fair allocation if $\vartheta \geq \bar{\Theta}$.

Figure 4, depicting the efficient lobbying intensity, $\dot{\lambda}$ and the equilibrium lobbying

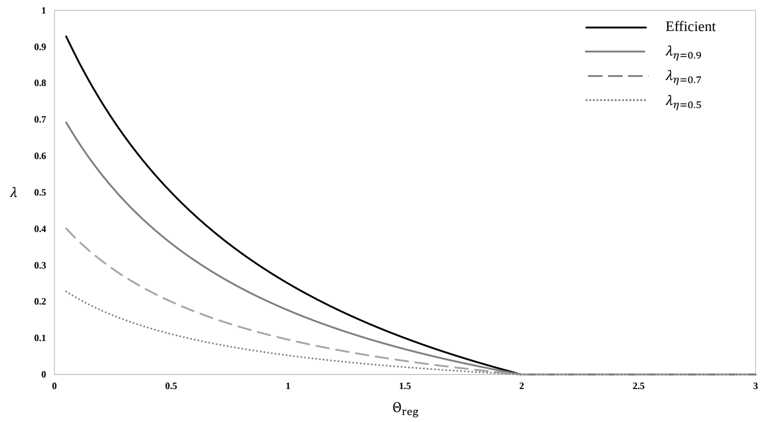

Figure 4: Myopic Bargaining lobbying intensity

intensity as given by (49), for a given parameterization[18] and different values of η, sheds light on the intuition behind Corollary 3. In particular, the allocation of resources is inefficient if $\vartheta < \bar{\Theta}$ because bankers and politicians reach an agreement that yields $\Theta_{\text{reg}} < \bar{\Theta}$ and $\lambda < \dot{\lambda}$. That, in turn, yields higher equilibrium returns compared to the efficient equilibrium returns, i.e., $R^* > R_F$.[19] This implies a shift of resources from the risk-free technology to the risky technology above the efficient level. Moreover, from Lemma 2, we know that since $\lambda > 0$, this allocation is not fair. Indeed, politicians accept λ because the resulting lobbying contributions, solely shared among politicians, cancels out the fraction η of bail-out costs incurred by politicians. That is, politicians benefit at the expense of ordinary households.

A scenario with $\eta = 0$ corresponds to a degenerate case of Myopic Bargaining in which neither bankers nor politicians consider the general equilibrium effects of bargaining. Indeed, from (43), we observe that $\eta = 0$ implies that politicians only consider the direct effects on lobbying contributions, neglecting the general equilibrium effects on households' consumption. Substituting for $\eta = 0$ into (45), we obtain that such a degenerate scenario results in $\lambda = 0$ and $\Theta_{\text{reg}} = \vartheta$ for all $\vartheta < \bar{\Theta}$, which, according to Corollary 1, implies that equilibrium returns take the highest possible value, thus maximizing risk-taking levels as well. Such a scenario is deemed, however, too pessimistic, because even if politicians' consumption was independent of general equilibrium effects, they would still consider these effects

[18] $\vartheta = 0.01$, $\sigma = 2/3$, $\underline{R} = 1/2$, $\overline{R} = 2$, $K = 1$, $f(k_F) = 2\sqrt{k_F} - k_F$.

[19] Higher expected returns on equity due to lobbying is in line with the evidence presented by Faccio (2006) who shows that the publication of firms' political connections are associated with an increase in firm's value.

as they need to secure political support from ordinary households. In Subsection 5.2, we further discuss the impact of political participation, as reflected by η, on the efficiency of production and fairness of consumption.

5 Normative Implications

The mechanism through which lobbying intensity and capital requirements are determined as the result of bargaining between bankers and politicians has been formally described in Section 4. Moreover, as shown in Section 3, lobbying intensity and capital requirements affect equilibrium returns which, in turn, determine the allocation of capital between risky and risk-free technology and ultimately, the efficiency of production and the equality of consumption. We next discuss four normative implications with regard to a more efficient and fair allocation.

5.1 Consideration of General Equilibrium Effects

Propositions 2 and 3 show that whether bankers consider general equilibrium effects or not affects the bargaining outcome, which in turn, as shown by Corollaries 2 and 3, impacts the efficiency of production and equality of consumption. Table 1 illustrates these effects for a given parameterization.[20] Note that we set $\eta = 0.5$ to facilitate the comparison with regard to distributional effects. Namely, for the given parameterization, a fair allocation would imply $\mathbb{E}[C^{\pi}] = \mathbb{E}[C^{\text{oh}}]$. Moreover, because bankers offer no lobbying contributions for all $\vartheta \geq \bar{\Theta}$ because of the independence of equilibrium returns on capital requirements within that interval, we set $\vartheta = 0.01 < \bar{\Theta} = 2$ in order to study the impact of general equilibrium effects in a scenario where bankers have incentives to lobby.

As shown by Corollary 2, General Equilibrium Bargaining yields the efficient allocation of resources, that is, the direct result of the impact of general equilibrium effects on risk-taking levels as reflected into the equilibrium returns R^{*}. The less these effects are taken into account, the larger the deviation of the equilibrium lobbying intensity and equilibrium returns from the efficient lobbying intensity, $\dot{\lambda}$, and the efficient returns R^{*}, the larger the over-investment in risky technologies, and the lower the expected production $\mathbb{E}[Y]$ is. Note that risk-taking correspond-

[20] $\eta = 0.5$, $\vartheta = 0.01$, $\sigma = 2/3$, $\underline{R} = 1/2$, $\overline{R} = 2$, $K = 1$ and $f(k_F) = 2\sqrt{k_F} - k_F$.

	Myopic	General Equilibrium
R^*	1.71	1.50
$\mathbb{E}[Y]$	1.898	1.900
$\mathbb{E}[C^\pi]$	1.040	0.950
$\mathbb{E}[C^{\text{oh}}]$	0.858	0.950

Table 1: Impact of general equilibrium effects consideration

ing to $R^* < 1.5$—which does not arise since it requires $\lambda > \dot{\lambda}$—would also be inefficient due to under-investment in risky technology.

In terms of fairness, General Equilibrium Bargaining, resulting in zero lobbying contributions, yields a fair distribution as described by Lemma 2. Contrariwise, Myopic Bargaining is unfair because it results in positive lobbying contributions which are only distributed among politicians, who therefore benefit at the expense of ordinary households.

5.2 Political Participation

It has already been shown in Subsection 4.3, and illustrated in Figure 4, that equilibrium lobbying intensity under Myopic Bargaining is increasing in η for any given $\Theta_{\text{reg}} < \bar{\Theta}$ and converges to the efficient lobbying intensity, $\dot{\lambda}$, as η converges to 1. That, in turn, implies that expected production $\mathbb{E}[Y]$ converges to its efficient level as η increases as shown in Figure 5.

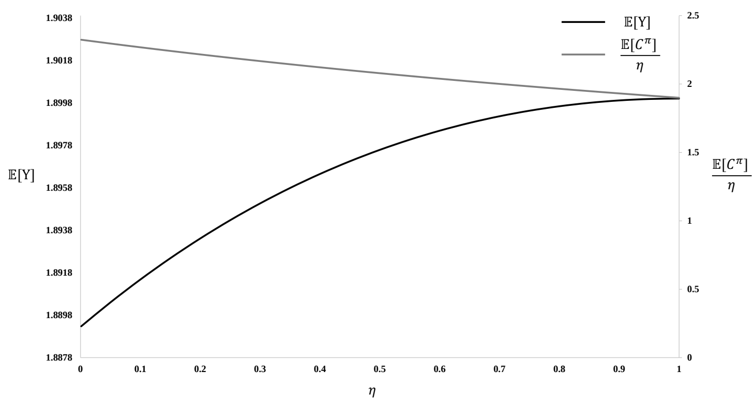

Figure 5: Efficiency and distributional effects of political participation

The intuition runs as follows. A larger η implies that lobbying contributions are shared among a larger fraction of households. That increases the level of lobbying intensity required by politicians in order for potential bail-out expenditures due to laxer regulation to be outweighed by lobbying contributions. In turn, higher lobbying intensity decreases equilibrium returns,as shown by Corollary 1, thus alleviating over-investment in risky technology.

Political participation features distributional effects as well. In fact, although a larger η induces higher lobbying contributions, these contributions are distributed among a larger fraction of households, and thus, not only is production more efficient, but the distribution of the consumption is distributed more evenly. This distributional effect is depicted in Figure 5, where $\mathbb{E}[C^{\pi}]/\eta$ is a proxy of politicians' consumption at individual level. As the fraction of households who are politicians increases, $\mathbb{E}[C^{\pi}]/\eta$ is decreasing. For $\eta = 1$, distribution of production becomes fair since all consumption including lobbying contributions, is shared among all households. This could explain reluctant attitudes to raise the level of political participation. That is, established politicians aim at keeping η as low as possible in order to keep the number of politicians, who benefit from lobbying, as small as possible.[21]

Finally, since general equilibrium effects impact politicians' bargaining utility function via $\overline{C}^h$ and $\underline{C}^h$, η can also be interpreted as a measure of the degree to which general equilibrium effects are taken into consideration by politicians. Adopting such an interpretation, one may conclude that efficiency and fairness improve the more general equilibrium effects are considered by politicians.[22]

5.3 Resolution Regime

We now investigate a scenario when resolution regime takes the form of a *bail-in* clause according to which, if a bank fails, equity wipes out and depositors become equity-holders who only receive the liquidation value of the bank. That is, while a *bail-out* clause—such as in the analysis of the base model—make deposits a safe asset shifting bank losses to taxpayers, a *bail-in* clause shifts bank losses to depositors. In that case, the returns on deposits are not risk-free anymore and

[21]The interest of initial shareholders in reducing the number of new shareholders for the revenues to be distributed among fewer beneficiaries is an interesting analogy.

[22]Note that Subsection 5.1 shows that efficiency and equality are enhanced when general equilibrium effects are considered by bankers.

(37) becomes

$$R_F = \mathbb{E}[R_D] = \mathbb{E}[R_E] =: R^*. \tag{50}$$

The expected returns on deposits read as follows

$$\mathbb{E}[R_D] = \begin{cases} \sigma R_D + (1-\lambda)(1+\Theta_{\text{reg}})(1-\sigma)\underline{R} & \forall \Theta_{\text{reg}} \in (0, \bar{\Theta}); \\ (1-\lambda)\mathbb{E}[\widetilde{R}] & \forall \Theta_{\text{reg}} \in [\bar{\Theta}, +\infty). \end{cases} \tag{51}$$

Substituting for (51) into (50), and taking (17)-(19) into account, we obtain

$$\mathbb{E}[R_E] = (1-\lambda) \cdot \mathbb{E}[\widetilde{R}] \qquad \forall \Theta \in (0, +\infty). \tag{52}$$

That is, under a bail-in clause, equilibrium returns, as well as $\mathbb{E}[R_E]$, do not depend on capital regulation, thus eliminating bankers' lobbying incentives. Therefore, we obtain

Proposition 4. *Suppose failed banks are resolved under a bail-in provision. Then, any type of bargaining results in $\Theta_{\text{reg}} \geq \bar{\Theta}$ for all $\vartheta < \bar{\Theta}$ and $\Theta_{\text{reg}} \geq \vartheta$ for all $\vartheta \geq \bar{\Theta}$, and $\lambda = 0$.*

The proof of Proposition 4 is given in the Appendix. From Lemmata 1 and 2, we readily obtain:

Corollary 4. *Any type of bargaining under a bail-in clause yields an efficient and fair allocation.*

This results from the elimination of lobbying incentives due to the bail-in mechanism, which also eliminates the impact of politicians' decisions on resource allocation. In fact, equilibrium returns do not depend on capital regulation anymore and thus, politicians' regulatory authority is worth nothing for bankers. In other words, politicians have no valuable power to offer.

Note that, as long as bank resolution is included in the bargaining agenda, lobbying incentives exist since in Myopic Bargaining, bankers can benefit by shifting part of their revenues to politicians to choose bail-out over bail-in—making equilibrium returns dependent on capital requirements—and to reduce the capital regulation to the lowest possible level. Thus, the bail-in mechanism needs to be imposed exogenously on the political system. Two potential solutions are suggested. First, a provision that prohibits bail-outs can be introduced in the constitution. Second, the bank resolution authority could be conferred to an institution that does not depend on the political system, for example a supranational authority.[23] However, these suggestions are to be examined carefully. In particular, although constitutions are usually more stable than regulations, they can still be subject to changes. Moreover, the second suggestion bears the risk of shifting lobbying activities from the national to the supranational level.[24]

5.4 Capital Regulation

Sufficiently high *floor* capital regulation can also eliminate lobbying incentives as shown in Section 4. This happens as a result of eliminating the impact of politicians' decisions on equilibrium returns, because such a strict *floor* capital regulation, which render banks resilient, suspends the effect of bail-out mechanism on equilibrium returns, as explained in Subsection 3.1. Internationally agreed capital requirements, e.g. the requirements agreed within the framework of the Basel Committee on Banking Supervision (BCBS), can play the role of such a *floor* capital regulation with which national legislators have to comply.[25]

The suggestion of imposing high capital requirements essentially implies a strong government intervention. In other words, strict capital regulation eliminate lobbying on politicians. We have to keep in mind, however, that the role of politicians is defined by the combination of two government interventions, namely, resolution regime in the form of a bail-out clause and capital regulation. A government intervention with regard to capital regulation that renders banks resilient would efficiently suspend the first government intervention of bail-out. In other words, a strong government intervention with one tool cancels out the impact of a government intervention with regard to another tool. Inversely, a light intervention with regard to capital regulation would preserve the role of politicians in the system via

[23]The Single Resolution Mechanism within the EU can be an example of such an authority.

[24]In that case, beside lobbyists representing private interests, national governments might also be involved in lobbying aiming to achieve favorable decisions for banks operating within their jurisdiction. Furthermore, as indicated by Gadinis (2013), international standard-setting bodies evolve towards a more political character. On the other hand, one could not overlook the empirical evidence presented by Young (2012) arguing that the influence of lobbyists on another international standard-setting body, namely, the Basel Committee on Banking Supervision, has not been significant.

[25]Although agreements within the BCBS framework do not have legal force, they are mostly respected as minimum standards by national legislators due to market discipline mechanisms. Otherwise, the participation of their countries in the global financial markets would be at risk.

bail-outs.

6 Conclusions

Our study on banking regulation and lobbying stems from the well-documented premise that legislators may be influenced by lobbyists. In particular, adopting a general equilibrium approach, we have developed a theoretical framework that describes the mechanism through which bankers lobby on banking regulation. It sheds light on the respective efficiency and distributional effects. Our analysis leads to both positive and normative conclusions.

From a positive perspective, we obtain three main conclusions. First, stringent capital regulation may restrict lending and risk-taking to efficient levels. Second, when bankers consider all general equilibrium effects on the economy, incentives for lobbying to weaken capital regulation vanish, because otherwise gains in the form of higher returns on risky investments would be outweighed by excessive financial risks due to laxer regulation. Third, lobbying for laxer regulation is warranted if bankers only consider the direct effects on bank returns since, in that case, risks incurred by the society as a whole due to excessive risk-taking are neglected.

From a normative perspective, taking into account that lobbying contributions raise risk-taking to inefficient levels and benefit politicians at the expense of the society as a whole, we conclude that efficiency of production and equality of consumption can be enhanced by eliminating lobbying incentives. The consideration of general equilibrium effects and market-based policy tools, such as a bail-in provision and enhanced equity funding through sufficiently high floor capital regulation, can indeed eliminate lobbying incentives, resulting in an efficient and fair outcome. Finally, broadening of political participation would imply that the households interests' are better taken into consideration by politicians, improving both efficiency and equality.

The crucial efficiency and distributional effects of lobbying mechanisms that influence banking regulation, modeled theoretically in our paper, could foster the policy and academic debate on that issue. The diverging interests of bankers and politicians from the interests of the society as a whole, as well as the power of legislators to impact bank returns, are shown to be fundamental causes of lobbying for laxer regulation in our paper, and may therefore be included in policy measures and further research.

Appendix

Proof of Proposition 1

We know from (1) that the FT entrepreneur, aiming to maximize FT profits demands $k_F = f'^{-1}(R_F)$, where $R_F = f'(k_F)$, and for the bond market to clear, $B_F = k_F$.

For the capital market to clear $k_R = K - k_F$, as shown in (2). The RT entrepreneur raises capital k_R, borrowing loans L_R, and for the loan market to clear, $k_R = L_R$. Capital market clears if and only if returns on L_R in the good state and the bad state of the world satisfy $\overline{R}_R = \overline{R}$ and $\underline{R}_R = \underline{R}$, respectively, which yields zero expected RT profits as shown in Subsection 2.1.

Households, in their capacity as investors, invest in the asset with the highest expected returns, because their objective function, as given by (25), is linear with respect to asset expected returns.

Proof of (37):
From (22) we know that $E > 0$. Because of the Inada conditions in FT, we also know that $k_F > 0$. We are looking for equilibria with a positive amount of bank deposits. [26] Since risk-neutral households invest in the asset with the highest expected returns, it must hold that

$$\max\{R_F, R_D\} \leq \mathbb{E}[R_E], \tag{53}$$

$$\max\{R_D, \mathbb{E}[R_E]\} \leq R_F, \tag{54}$$

$$\max\{R_F, \mathbb{E}[R_E]\} \leq R_D. \tag{55}$$

(53) to (55) yield

$$R_F = R_D = \mathbb{E}[R_E]. \tag{56}$$

Proof of (38):
Taking (37) into account, we calculate the equilibrium returns in the case of a fragile banking sector and in the case of a resilient banking sector by requiring $R_D = \mathbb{E}[R_E]$, where $\mathbb{E}[R_E]$ is given by (19). We also use $\overline{R}_R = \overline{R}$ and $\underline{R}_R = \underline{R}$, which hold in equilibrium as shown by (6) and (7).

[26] Since banks will choose $\Theta = \Theta_{reg}$, only equilibria with $D > 0$ will occur.

Proof of (39):
Using (38), we re-write (21) as follows:

$$\bar{\Theta} = \frac{R^*(\bar{\Theta}) - (1-\lambda)\underline{R}}{(1-\lambda)\underline{R}} \tag{57}$$

and yielding

$$\bar{\Theta} = \frac{\sigma(\overline{R} - \underline{R})}{\underline{R}}. \tag{58}$$

Proof of $\Theta = \Theta_{\text{reg}}$:
Given the equilibrium return condition, we next show that banks choose $\Theta = \Theta_{\text{reg}}$. First, suppose $\Theta_{\text{reg}} \geq \bar{\Theta}$, i.e., banks are resilient. From $\mathbb{E}[R_E] = R_D$, $\mathbb{E}[R_E] = R_D = (1-\lambda)(\sigma\bar{R} + (1-\sigma)\underline{R})$. Hence, the return on equity is independent of Θ and according to Assumption 1, banks choose $\Theta = \Theta_{\text{reg}}$. Let us next consider the case $\Theta_{\text{reg}} < \bar{\Theta}$, i.e., banks are fragile. According to Assumption 1, banks will choose a capital structure in $[\Theta_{\text{reg}}, \overline{\Theta}]$. Let us consider some Θ with $\Theta_{\text{reg}} < \Theta < \overline{\Theta}$. Then, $\mathbb{E}[R_E] = (1-\lambda)\mathcal{J}(\Theta)\sigma\overline{R}$. Hence, $\frac{\partial \mathbb{E}[R_E]}{\partial \Theta} < 0$ and thus $\Theta = \Theta_{\text{reg}}$.

It remains to show that consumption good market clears in the good state and the bad state of the world. According to (30), for the consumption good market to clear if the good state of the world occurs, we need to show

$$\overline{C}^{\text{oh}} + \overline{C}^{\pi} = f(k_F) + k_R \cdot \overline{R}. \tag{59}$$

Indeed,

$$\begin{aligned} \overline{C}^{\text{oh}} + \overline{C}^{\pi} =& (1-\eta) \cdot \overline{c}^i + \eta \cdot \overline{c}^i + \overline{\Lambda} \\ =& f(k_F) - k_F R_D \\ & + D R_D + \frac{E}{\Theta}\big((1-\lambda)(1+\Theta)\overline{R} - R_D\big) + k_F R_D \\ & + \lambda \cdot (D+E) \cdot \overline{R} \\ =& f(k_F) + k_R \cdot \overline{R}. \end{aligned} \tag{60}$$

According to (31), for the consumption good market to clear if the bad state of the world occurs, we need to show

$$\underline{C}^{\text{oh}} + \underline{C}^{\pi} = f(k_F) + k_R \cdot \underline{R}. \tag{61}$$

Indeed, if banks are resilient,

$$\begin{aligned}
\underline{C}^{\text{oh}} + \underline{C}^{\pi} =& (1-\eta)\cdot \underline{c}^{i} + \eta \cdot \underline{c}^{i} + \underline{\Lambda} \\
=& f(k_F) - k_F R_D \\
&+ DR_D + \frac{E}{\Theta}\left((1-\lambda)(1+\Theta)\underline{R} - R_D\right) + k_F R_D \\
&+ \lambda \cdot (D+E)\cdot \underline{R} \\
=& f(k_F) + k_R \cdot \underline{R},
\end{aligned} \tag{62}$$

and if banks are fragile,

$$\begin{aligned}
\underline{C}^{\text{oh}} + \underline{C}^{\pi} =& (1-\eta)\cdot \underline{c}^{i} + \eta \cdot \underline{c}^{i} + \underline{\Lambda} \\
=& f(k_F) - k_F R_D \\
&+ DR_D + k_F R_D \\
&- DR_D + (D+E)\cdot (1-\lambda)\cdot \underline{R} \\
&+ \lambda \cdot (D+E)\cdot \underline{R} \\
=& f(k_F) + k_R \cdot \underline{R}.
\end{aligned} \tag{63}$$

This completes the proof. □

Proof of Proposition 2

Substituting for (8)–(10), we re-write (46) as follows:

$$v^b = f(k_F) + (1-\lambda)\cdot (K - k_F)\cdot \mathbb{E}[\widetilde{R}]. \tag{64}$$

FOC with respect to k_F, along with (1) and (37), yield

$$R^* = (1-\lambda)\cdot \mathbb{E}[\widetilde{R}]. \tag{65}$$

From (38) and Corollary 1, we obtain that for any given level of λ, $R^* > (1-\lambda)\cdot\mathbb{E}[\widetilde{R}]$ for all $\Theta_{\text{reg}} < \bar{\Theta}$, and $R^* = (1-\lambda)\cdot\mathbb{E}[\widetilde{R}]$ for all $\Theta_{\text{reg}} \geq \bar{\Theta}$. Hence, bankers, maximizing (46), and taking (22) into account, pursue $\Theta_{\text{reg}} \geq \bar{\Theta}$ for all $\vartheta \leq \bar{\Theta}$ and $\Theta_{\text{reg}} \geq \vartheta$ for all $\vartheta > \bar{\Theta}$ which, according to (45), yields $\lambda = 0$. □

Proof of Proposition 3

Taking (37) into account, and substituting for (38), we re-write (48) as follows

$$v^b = \begin{cases} (1-\lambda)\cdot\mathcal{J}(\Theta_{\text{reg}})\cdot\sigma\overline{R} & \forall\Theta_{\text{reg}}\in\big(0,\bar{\Theta}\big) \\ (1-\lambda)\cdot\mathbb{E}[\widetilde{R}] & \forall\Theta_{\text{reg}}\in\big[\bar{\Theta},+\infty\big) \end{cases} \tag{66}$$

Because of (22), substituting for $\Theta_{\text{reg}} \geq \bar{\Theta}$ into (45), we obtain $\lambda = 0$ for all $\vartheta \geq \bar{\Theta}$. Substituting for (45) into (66), we obtain

$$v^b = \frac{1+\Theta_{\text{reg}}}{(1+\Theta_{\text{reg}})\sigma\overline{R} + (\sigma+\Theta_{\text{reg}})\cdot H\mathbb{E}[\widetilde{R}]}\cdot(1+H)\cdot\mathbb{E}[\widetilde{R}]\cdot\sigma\overline{R} \quad \forall\Theta_{\text{reg}} < \bar{\Theta}, \tag{67}$$

and

$$\frac{\partial v^b}{\partial\Theta_{\text{reg}}} = -\frac{H\mathbb{E}[\widetilde{R}](1-\sigma)}{\Big((1+\Theta_{\text{reg}})\sigma\overline{R} + (\sigma+\Theta_{\text{reg}})\cdot H\mathbb{E}[\widetilde{R}]\Big)^2}\cdot(1+H)\cdot\mathbb{E}[\widetilde{R}]\cdot\sigma\overline{R} < 0. \tag{68}$$

Hence, bankers pursue $\Theta_{\text{reg}} = \vartheta$ for any level of λ given by (45). □

Proof of Proposition 4

We show that bankers offer $\lambda = 0$ under both General Equilibrium Bargaining and Myopic Bargaining.

We consider first General Equilibrium Bargaining. We know from the proof of Proposition 2 that bankers maximize

$$v^b = f(k_F) + (1-\lambda)\cdot(K-k_F)\cdot\mathbb{E}[\widetilde{R}]. \tag{69}$$

FOC with respect to λ, and because $\frac{\partial f}{\partial\lambda} = R^*\cdot\frac{\partial k_F}{\partial\lambda}$, we calculate

$$\frac{\partial v^b}{\partial\lambda} = \Big(R^* - (1-\lambda)\cdot\mathbb{E}[\widetilde{R}]\Big)\frac{\partial k_F}{\partial\lambda} - (K-k_F)\mathbb{E}[\widetilde{R}] < 0 \tag{70}$$

because the first term becomes zero from (50) and (52). Hence, bankers maximizing v^b offer $\lambda = 0$, which, according to (45), implies $\Theta_{\text{reg}} \geq \bar{\Theta}$ for all $\vartheta < \bar{\Theta}$ and $\Theta_{\text{reg}} \geq \vartheta$ for all $\vartheta \geq \bar{\Theta}$.

We consider now Myopic Bargaining, where bankers aim to maximize return on equity, which are given by (52) that is decreasing in λ and independent of Θ_{reg}. Thus, bankers offer $\lambda = 0$, which, according to (45), implies $\Theta_{\text{reg}} \geq \bar{\Theta}$ for all $\vartheta < \bar{\Theta}$ and $\Theta_{\text{reg}} \geq \vartheta$ for all $\vartheta \geq \bar{\Theta}$. $\square$

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