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Bank Influence at a Discount

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Abstract

In a general equilibrium framework, we show that banks may "buy" political influence at a discount: They offer disproportionately small campaign contributions compared to the influence they exert, thus generating abnormal returns. We distinguish between the direct effect of contributions which, as a cost, reduce bank returns, and the indirect effect of contributions which boost returns via inducing bank-favoring policies. Therefore, abnormal returns may or may not increase with the amount of contributions, depending on which effect dominates: Stricter capital requirements decrease contributions and abnormal returns. When politicians attach more weight to households' welfare, contributions increase and abnormal returns decrease.

I. Introduction

Conventional wisdom suggests a profound influence of banks on political decisions. An interpretation of the seminal work by Grossman and Helpman (1994) in the context of banking offers a mechanism through which this influence is exerted: Bankers can "protect" their returns by "buying" favorable regulations from politicians in exchange for campaign contributions. Indeed, there is ample empirical evidence that banks successfully exert political influence (Kroszner and Stratmann (1998), Igan, Mishra, and Tressel (2011), Blau, Brough, and Thomas (2013), Igan and Mishra (2014), Kostovetsky (2015), Agarwal, Amromin, Ben-David, and Dinc (2018), and Lambert (2019)).

Yet, the amount of money spent by banks to influence political decisions, though substantial in nominal terms, appears too small compared to bank revenues or banks' value added (Igan and Lambert (2019)).[1] This invigorates Tullock's (1972) paradox in the context of banking: Banks offer comparatively little

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[1]This observation pertains to both campaign contributions and lobbying expenses. Our article focuses on campaign contributions in the spirit of Grossman and Helpman (1994).

when so much is at stake. Our article presents a framework within which this paradox can be studied: What does it take for banks to influence politicians? If it takes too little, why is that so? Do low contributions imply small influence and less severe inefficiencies?

To this end, we develop a setup that links the theory of special interest groups with general equilibrium models of banking. Specifically, in a two-period model, households can invest directly in a safe sector, but they can only indirectly invest in a risky sector. Banks are the intermediaries between households and the risky sector: They raise capital by issuing bank equity and deposits to households, and grant loans to the risky sector.

Returns on deposits are guaranteed by the government.[2] Deposit guarantees cause distortions because they make deposits risk-free, which enhances the banks' capability to raise capital, increases investments in the risky technology via banks, and boosts bank equity returns. This generates an abnormal level of risk-taking insofar that investments in the risky technology are above the level that maximizes social welfare. To correct the guarantees-driven distortion, politicians, who run the government, can impose a bank tax.[3] Indeed, we show that there exists an optimal level of a bank tax that fully internalizes the distortion of guarantees, thus yielding optimal risk-taking.

Bankers, who benefit from abnormal risk-taking since it increases bank equity returns, are harmed by the bank tax. They can influence politicians' decision about the bank tax via campaign contributions, specified as a fraction of bank revenues offered to politicians. We refer to this fraction as the "contribution rate." Politicians aim to maximize a weighted sum of households' utility and campaign contributions, as in Grossman and Helpman (1994). Should the campaign contributions be zero, politicians choose the optimal bank tax that eliminates abnormal risk-taking, and thus maximizes social welfare.

We show, however, that by offering a strictly positive contribution rate, bankers make politicians benefit from higher risk-taking in the economy. The politicians' response is to decrease the bank tax as the contribution rate increases. By doing so, they shift capital from the safe technology to the risky technology, and thus they boost bank revenues from which they increasingly benefit. In equilibrium, bankers offer the contribution rate that elicits a zero bank tax from politicians. This yields an equilibrium risk-taking that is strictly greater than the

[2]Guarantees are a standard friction introduced in general equilibrium banking models (Allen, Carletti, and Marquez (2015), Gersbach, Haller, and Muller (2015), and Carletti, Marquez, and Petriconi (2020)). Since 1933, when the Federal Deposit Insurance Corporation was created in the aftermath of the Great Depression in the United States, deposit guarantees have been an entrenched feature of the banking system, typically justified on grounds of financial stability concerns (see, among others, the recent work by Allen, Carletti, Goldstein, and Leonello (2018), and Diamond and Dybvig (1983) for a classical reference).

[3]We interpret the bank tax as a generic policy that can internalize distortions in banking. Different forms of a bank tax are discussed in the report prepared by the International Monetary Fund at the request of G20 leaders (Claessens, Keen, and Pazarbasioglu (2010)). See Keister (2016) for a recent paper that formally justifies (distortionary) guarantees through bailouts accompanied by a (corrective) Pigouvian tax. As we will explain below, while capital regulation can also play this role, the choice of the bank tax as politicians' decision variable facilitates the exposition without consequences on our conclusions.

optimal risk-taking. That is, as empirical evidence suggests, bankers do exert political influence via campaign contributions, thus causing abnormal risk-taking in the economy.

Do more contributions aggravate abnormal risk-taking? The answer is not trivial.

The reason is that campaign contributions have a direct (negative) effect on risk-taking, beyond the above-described indirect (boosting) effect on risk-taking via inducing a zero bank tax. Specifically, the contribution rate is a bank expense that decreases bank returns, and thus harms the banks' capability to raise capital from households and channel it to the risky technology. In fact, we show that there is a high enough "benchmark rate" that could fully eliminate abnormal risk-taking, essentially replacing the optimal bank tax.[4]

We refer to the difference between the benchmark rate and the contribution rate banks offer in equilibrium as the "discount" at which banks buy influence. The larger the discount, the less the contribution rate internalizes the effect of inducing a zero bank tax. Hence, the discount at which banks exert influence, not the mere offer of campaign contributions, is the cause of abnormal risk-taking. In other words, the optimal solution of an ideal world without influence via contributions can also be reached in a world where banks exert influence "at the right price"; it is not reached because banks pay too little compared to the influence they buy.

This means that the relationship between the amount of contributions, the exerted influence (measured by the difference between the benchmark rate and the equilibrium bank tax), and the resulting abnormal risk-taking is ambiguous. To illustrate this, let us consider three examples. In a parameterization where the exerted influence is large, abnormal risk-taking may nonetheless be small if the amount of contributions is high enough to internalize a large part of the distortion that results from inducing a zero bank tax. Or, abnormal risk-taking may remain small in a configuration where both the amount of contributions and the exerted influence are small. Or, in a manifestation of the Tullock paradox in our banking setup, large influence may be generated by small contributions, thus causing large abnormal risk-taking. In all these cases, it is crucial to understand how the factor that determines the amount of contributions impacts the discount at which banks buy influence.

We show that the distribution of political power between banks and households is a factor that impacts the discount at which banks exert influence and the resulting abnormal risk-taking. As politicians attach more weight to households' welfare vis-à-vis banks' contributions, politicians require a larger contribution rate to set the bank tax at zero. This means that politicians sell and bankers buy influence at a higher rate, closer to the benchmark rate. We thus conclude that when large contributions are driven by political competition, abnormal risk-taking becomes small.

While the above formalizes the verbal reasoning of Tullock (1972), we also show that the discount and abnormal risk-taking are not bound to be large in an

[4]What we call the benchmark rate in our setup would result in what Tullock (1972) calls the "competitive rate of return [in political favors]" in his seminal contribution to the Western Agora.

environment where bankers' political power is too large compared to households'. We show that, no matter how political power is distributed, abnormal risk-taking converges to zero as capital regulation becomes stricter.[5] When the minimum equity-to-deposit ratio is high, the distortion of guarantees becomes less severe since the repayment of depositors depends to a smaller extent on the government. This induces bankers to decrease the contribution rate they offer to achieve a zero bank tax, because achieving this has less value for them when their leverage is small. Yet, at the same time, the (hypothetical) benchmark rate (that could fully eliminate abnormal risk-taking) decreases even further, thus decreasing both the discount at which banks exert influence and the resulting abnormal risk-taking. Hence, contrary to the case with political power as the driving factor, we obtain that when small (large) contributions are driven by strict (loose) capital regulation, abnormal risk-taking becomes smaller (larger).

We also obtain that the discount and the resulting abnormal risk-taking are single-peaked in the probability of bank solvency, whereas the amount of contributions is monotonically decreasing with respect to this likelihood. When bank insolvency is too likely, the distortion of guarantees is crucial because it will take effect almost with certainty. This makes the exerted influence significant, but, at the same time, it makes bankers willing to pay a high contribution rate to exert influence. As a result, both the discount and the resulting abnormal risk-taking are small. The same is true when the likelihood of bank solvency is high, though for a strikingly different reason. The guarantees-driven distortion is now insignificant since it is almost certain that government will not step in. This makes bankers unwilling to pay a high contribution rate, but at the same time, the exerted influence is insubstantial.

We also consider two regulatory tools that aim at reducing distortions: a contribution tax and a contribution cap. We show that both can decrease abnormal risk-taking, albeit via different mechanisms. A contribution tax increases the cost at which banks exert influence, while leaving the exerted influence intact. This decreases the discount enjoyed by banks. A contribution cap, on the other hand, decreases the exerted influence, which, in turn, decreases the contribution rate banks offer. But since the exerted influence is now smaller, the required benchmark rate to internalize this influence is also smaller. As a result, the discount enjoyed by banks again decreases. In both cases, our core conclusion is underlined: It is the discount at which banks exert influence that causes abnormal risk-taking.

Moreover, we consider a setup where the bank tax can be negative, subject to a constitutional limit. This induces bankers to offer more contributions in order to

[5]We treat capital regulation, which is largely agreed at the international level within the framework of the Basel Committee on Banking Supervision, as an exogenous parameter. In an earlier version of this article, capital regulation is determined endogenously as the outcome of the domestic political process. In this version, we use the bank tax as the endogenously determined policy. While the mechanism through which banks exert political influence remains the same, introducing an endogenously determined bank tax facilitates the exposition. See Section IV.B for comparative statics and further discussion of the role of capital regulation.

elicit a subsidy (negative bank tax) from politicians. In turn, this exacerbates risk-taking and necessitates a higher benchmark rate to neutralize both the direct subsidy obtained by banks and the indirect subsidy in the form of deposit guarantees. That is, larger contributions imply higher abnormal risk-taking when politicians are allowed to offer a subsidy to banks.

Finally, we explain how attaching more weight to deposit returns makes it cheaper for bankers to exert influence, thus generating higher abnormal risk-taking. On the contrary, bank influence becomes more expensive, and abnormal risk-taking decreases in case of a utility loss when raising taxes to finance guarantees. Notably, if politicians do not value the overall output of the banking sector as much as they value the safe sector's output, the influence exerted by banks can even be welfare-enhancing: Politicians would set an inefficiently high bank tax in the absence of contributions, whereas the bank tax may be set closer to the efficient level if banks exert influence on politicians via contributions.

We now discuss the related literature. The observation of comparatively low campaign contributions has been explained as the result of a coordination failure (Rasmusen and Ramseyer (1994)) or of competition (Helpman and Persson (2001)) among legislators, of committees being prone to manipulation (Dal Bó (2007)), and of proximity between interest groups' and legislators' positions (Denzau and Munger (1986), Leaver and Makris (2006)). These articles offer insights into the interaction between contributions and supply-side regulation, and they explain how this interaction shapes the amount of contributions. We illustrate how demand-side considerations shape contributions and regulation.

To do so, we follow the tradition of Grossman and Helpman (1994), but deviate in two respects. First, we allow for the direct (negative) effect of contributions on risk-taking, besides the indirect (boosting) effect, and thus obtain a nuanced relationship among the amount of contributions, the exerted influence and the resulting abnormal risk-taking. This generates a rich set of results: Small contributions yielding small influence result in small abnormal risk-taking, large influence accompanied by large contributions also results in small abnormal risk-taking, whereas large influence via small contributions generates large abnormal risk-taking. Second, we consider a banking setup, and identify how banking-specific factors (such as deposit guarantees, capital regulation, and the likelihood of bank solvency) shape contributions and abnormal returns, and how these interact with nonbanking factors (such as the distribution of political power, and campaign finance regulation).

Our article is also related to three recent theoretical papers (Friedman and Heinle (2020), Rola-Janicka (2020), and Thakor (2021)) on the political economy of financial regulation. The main difference between the work by Thakor (2021) and our article pertains to the direction and the means of influence. In our setting, banks aim to influence politicians' decision about a bank tax via contributions, whereas Thakor (2021) allows for legislators to influence banks' decision about lending via regulation. The works by Friedman and Heinle (2020) and Rola-Janicka (2020) are complementary to ours insofar that different stages of the political process are endogenized: Rola-Janicka (2020) studies how a given level of regulatory capture impacts the behavior of voters, while we treat the voting process as given and focus on how banks influence regulation. Friedman and Heinle (2020) endogenize a different part of the influence mechanism, compared to our work: They study how heterogeneous agents form a coalition to influence regulation, and the way this influence generates social costs. We study how the cost of influence, the exerted influence and the resulting abnormal risk-taking are determined endogenously in a simple general equilibrium setting.

Moreover, a broader interpretation of our setup offers a theoretical framework for a Game of Bank Bargains in the spirit of Calomiris and Haber (2014). In such a game, the political system protects banks in exchange for allocating credit in a way that keeps voters satisfied. Political protection in our setup is the reduction of the bank tax, but this can also be interpreted as a generic form of political favors, such as a delay to resolve a failed bank (Brown and Dinc (2005)), or the provision of deposit insurance (Calomiris and Chen (2022)). Accordingly, banks' contributions to politicians can be interpreted as the cost (or risk) incurred by banks when extending credit to firms and households based on political criteria, rather than financial ones (Khwaja and Mian (2005), Chu and Zhang (2022)).

The analogy can also be extended to the consequences of the game between bankers and politicians. In our setup, this game results in abnormal bank returns and risk-taking, and ultimately in a suboptimal capital allocation that harms social welfare. Calomiris and Haber (2014) suggest that the Game of Bank Bargains results in the fragility of the banking system, and in social costs associated with bank failures. Indeed, politically driven bank decisions have been shown to boost short-term profitability (Chu and Zhang (2022)), and increase leverage (Calomiris and Chen (2022)), echoing the conclusions by Thakor (2014) about the relationship between inefficient capital regulation, higher risk undertaken by the banking system, and greater likelihood of bank failures and bailouts.

Our analysis complements our understanding of the interaction between banks and politicians by showing how the relationship between the favors extended from bankers to politicians (Khwaja and Mian (2005), Chu and Zhang (2022)) and vice versa (Brown and Dinc (2005), Calomiris and Chen (2022)) can be a crucial determinant of the economic outcome. We thus generate hypotheses that can be tested by future empirical analyses, using data from both the political and the banking side of the game. These hypotheses are explicitly laid down in Section VI.

The remainder of the article proceeds as follows: The model setup is outlined in Section II. In Section III, we present the political economic equilibrium. We analyze the determinants of this equilibrium in Section IV, and we extend our base model in Section V. We conclude in Section VI. Proofs are given in the Appendix.

II. Model Setup

We consider a two-period $(t=0,1)$ economy with households, politicians, banks and productive technologies employed by representative firms. Households are initially endowed with capital $K>0$ and own the firms. At the beginning of $t=1$, either the *good* state or the *bad* state of the world occurs with probability σ and $1-\sigma$, respectively, where $0<\sigma<1$. All agents are risk-neutral, and perfect competition prevails in all markets. Returns refer to principal plus interest throughout the article.

A. Technologies

There exists a safe technology and a risky technology, employed by representative firms which operate in perfectly competitive markets and are run by entrepreneurs who remain passive otherwise. The output of the safe technology does not depend on the state of the world; the output of the risky technology is state-contingent. We describe the functioning of the two technology types in turn.

The competitive representative firm operating the safe technology raises capital k_s at $t=0$ by issuing bonds to households at per capital unit cost (interest rate factor) r_s. Capital k_s is employed to produce $f(k_s)$ units of output in period $t=1$ with $f'(k_s)>0$, $f''(k_s)<0$, $\lim_{k_s \to 0} f'(k_s)=+\infty$, and $f'(K)=0$.[6] The representative firm's profits operating the safe technology read

$$\Pi_s = f(k_s) - r_s k_s. \tag{1}$$

There also is a competitive representative firm operating the risky technology and this firm can only raise capital via loans from banks, which we detail in the next subsection. We assume that the loan market is perfectly competitive and we thus can focus on a representative firm. Let k_r denote the capital raised at $t=0$ by the representative firm operating the risky technology. If the state of the world is good, an investment k_r will result in $k_r R$ output units at $t=1$, where $R>0$. Let $r_l \leq R$ denote the per unit loan returns paid to the bank if the good state occurs. Thus, the profits from the risky technology in the good state read

$$\Pi_r = k_r \cdot (R - r_l). \tag{2}$$

If the state is bad, the risky technology yields nothing, and therefore loan returns and profits are zero.

B. Banks

Banks are run by bankers who operate on behalf of shareholders. Throughout the article, we use the terms "banks" and "bankers" interchangeably. We consider a representative bank that raises funds by issuing deposits, d, and equity, e, to households at $t=0$. We resort to the standard setup of general equilibrium banking models where the sum of deposits and equity is invested in the risky technology (Gersbach and Rochet (2017), Carletti et al. (2020)). We thus use k_r as the measure of risk-taking in the economy. Since $k_r = d+e$, bank revenues at $t=1$ are $(d+e)r_l$ in the good state, and zero in the bad state.

Deposits are guaranteed by the government. We allow the government to correct potential distortions stemming from deposit guarantees via a bank tax.[7] Specifically, the government, which is run by politicians whom we introduce in a following subsection, imposes a nonnegative tax rate $\phi \in [0,1)$ on bank revenues. This means that the government collects

[6]See Gersbach and Rochet (2017) for the micro-foundations of a concave production function in a sector with perfect competition.

[7]See footnotes 2 and 3 for the motivation of this regulatory setup.

$$\Phi = \phi(d+e)r_l \tag{3}$$

in the good state, and nothing otherwise. The amount Φ collected from the bank tax in the good state is distributed to households.

Bankers form an interest group through which they can offer campaign contributions to politicians.[8] Let $\rho \in [0,1)$ denote the contribution rate that determines campaign contributions as a fraction of bank revenues. This means that the amount of campaign contributions equals

$$P = \rho(d+e)r_l \tag{4}$$

in the good state, and zero otherwise.

Note that bankers' contribution to politicians is not conditional on policy choices. This is a deviation from Grossman and Helpman (1994), who consider contribution schedules that are conditional on the politicians' decisions. While such schedules can take place implicitly, they are illegal nonetheless. A contribution that is not contingent on politicians' choice is a subtler way of modeling influence via campaign finance.

For bankers to make an unconditional commitment (to be legal) but, at the same time, to relate campaign contributions to the politicians' decision, they express campaign contributions as a fraction of their financial position. Bank revenues are the measure we use, but other measures (e.g., bank shareholders' value, bank balance-sheet size) can be used as well. Note finally that both the bank tax and the contribution rate are set as fractions of bank revenues. Our analysis holds under different specifications, for example, when the bank tax is imposed on the raised capital at $t=0$, or on bank profits at $t=1$. The common base to which the two rates apply will facilitate the exposition.

We turn to the description of the repayments made by the representative bank at $t=1$. Let r_d denote the (per unit) contractual repayment obligation of the representative bank to depositors. Therefore, bank expenses in the good state read $dr_d + P + \Phi$. Bank revenues net of bank expenses are distributed proportionally among equity-holders, who are protected by limited liability. We denote by r_e the return on equity in the good state, where

$$r_e = \max\left\{0, \frac{(1-\rho-\phi)(d+e)r_l - dr_d}{e}\right\}. \tag{5}$$

In the absence of revenues, and because of limited liability, bank return on equity is zero in the bad state. Maximizing expected returns on equity is the objective function of banks.[9]

[8] Studying the formation of an interest group lies beyond the scope of this paper. See Mitra (1999), Bombardini (2008) and, more recently, Friedman and Heinle (2020) for analyses on this topic. In the spirit of Grossman and Helpman (1994), we make the assumption that bankers are able to organize themselves and solve any free-riding problems among them.

[9] See Pennacchi and Santos (2021) for a detailed explanation why returns on equity are the standard performance target in banking. This objective function means that bankers only consider the narrow interest of their shareholders. Numerous reasons explain why bankers do not or cannot take into account other objectives of their owners (namely, households). Such reasons include heterogeneity of households

We note that depositors receive dr_d at $t=1$ with certainty. Yet, the source of this repayment depends on the state of the world: In the bad state, depositors are repaid exclusively by the government who raises the necessary funds by imposing a lump sum tax equal to

$$\underline{T} = dr_d \tag{6}$$

on households. In the good state, depositors are repaid either exclusively by the bank if $(1-\rho-\phi)(d+e)r_l - dr_d > 0$, or by both the bank and the government if $(1-\rho-\phi)(d+e)r_l - dr_d < 0$. Thus, if the good state occurs, the lump sum tax imposed on households to finance guarantees reads

$$\overline{T} = \max\{0, dr_d - (1-\rho-\phi)(d+e)r_l\}. \tag{7}$$

This, along with (5), implies that the government steps in if and only if no repayment is made to bank shareholders.

Finally, the capital structure of the representative bank has to satisfy

$$\frac{e}{d} \geq \vartheta, \tag{8}$$

where ϑ is a strictly positive parameter, exogenously set at the beginning of time by an international standard setter (such as the Basel Committee on Banking Supervision).[10] The analytical purpose of (8) is to ensure that the representative bank is not infinitely leveraged.

C. Households

We assume a continuum of risk-neutral households. Capital K and technology property rights are evenly distributed among them. It thus suffices to consider a representative household. In period $t=0$, once all regulatory provisions become known, households invest in a portfolio made up of three assets: k_s, d, and e. In period $t=1$, households use the returns on their investments in all three assets, plus profits from owning the technologies, plus taxes collected from banks in the good state, net of any lump sum tax they incur to cover guarantees, for consumption that has been produced by the two technologies. Let $\overline{c}$ and $\underline{c}$ denote the consumption of households in the good state and the bad state, respectively, where

$$\overline{c} = (\mu v r_s + \mu(1-v)r_d + (1-\mu)r_e)K + \Pi_s + \Pi_r + \Phi - \overline{T}; \tag{9}$$

$$\underline{c} = (\mu v r_s + \mu(1-v)r_d)K + \Pi_s - \underline{T}, \tag{10}$$

with $\mu v K = k_s$, $\mu(1-v)K = d$, and $(1-\mu)K = e$.[11] The variables μ and v describe how households' initial endowment is invested. They are the decision variables of

with respect to asset holdings, lack of information about preferences of shareholders, or self-interest of bankers, for whom the salary is related to performance (i.e., returns on equity). Such reasons could be formally included in our model, albeit without adding new insights to our main conclusions.

[10] See footnote 5.

[11] Recall from the preceding description that returns on k_s and d are state-independent, and that returns on equity, profits from the risky technology, and revenues from the bank tax can only take place in the good state.

the representative household, which (in an environment of perfect competition) takes as given returns r_s, r_d, and r_e and aggregate variables Π_s, Π_r, Φ, $\underline{T}$, and $\overline{T}$. Capital market clearing requires

$$K = k_s + k_r, \tag{11}$$

where $k_r = d + e$. Finally, the utility of the representative household reads

$$v_h = \sigma\overline{c} + (1-\sigma)\underline{c}. \tag{12}$$

D. Politicians

Politicians run the government and thus have the prerogative to set the bank tax. Following Grossman and Helpman (1994), we assume that politicians' utility is given by the weighted sum of the household's utility and campaign contributions. Formally, politicians aim to maximize

$$v_\pi = \eta v_h + \sigma P, \tag{13}$$

where P and v_h are given by (4) and (12), respectively, and $\eta \in (0,1)$ is the weight politicians attach to the households' utility.[12] This specification corresponds to politicians who are driven by their willingness to win elections, which is a function of households' (voters') welfare, and of the available resources for financing their campaigns.

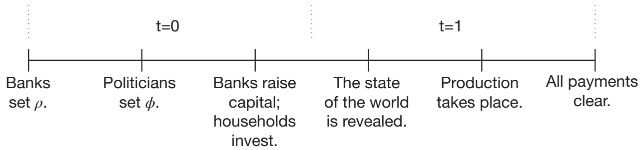
E. Timeline

The timeline of events is given in Figure 1. As in Grossman and Helpman (1994), an interest group *commits* to contributing before the policy decision, but it actually *makes* the contribution after a policy has been set. While the enforceability of such a commitment is a potential shortcoming in this type of models, we understand that reputation concerns suffice to enforce honoring of this commitment. The interpretation of ρ as bank shares offered to politicians may be an alternative way to solve the commitment problem.

FIGURE 1

Timeline

Figure 1 shows the timeline of events.



[12]As in Grossman and Helpman (1994), we consider that the weight politicians attach to contributions is higher than the weight they attach to households' utility (see footnote 5 in their paper). As we explain in Section IV.A, where we study the effects of η on the equilibrium, a specification with $\tilde{v}_\pi = \eta v_h + (1-\eta)\sigma P$ sustains our conclusions for every $\eta < 1/2$, while it yields a trivial solution with zero contributions for every $\eta \geq 1/2$.

Moreover, we note that banks take action at two distinct points in time. They first set the contribution rate ρ, which, along with politicians' decision on ϕ, forms the outcome of the political game. Once the political game is solved, banks determine their capital structure by raising deposits and equity. This timing is reflected in the way we solve the problem in the next section.

III. Equilibrium

We solve the problem backward. We first characterize the economic equilibrium (for a given outcome (ρ,ϕ) of the political game). We then endogenize banks' decision about the contribution rate and politicians' decision about the bank tax.

A. Economic Equilibrium

In equilibrium, households maximize expected income from asset returns, entrepreneurs maximize firm profits, banks maximize expected returns on equity, and all markets clear. To ease the notation, we define

(14) $$\mathcal{J} \equiv \frac{1+\vartheta}{\sigma+\vartheta}.$$

Due to perfect competition, it will turn out that $r_l = R$ in equilibrium.

Proposition 1. Let $\rho \in [0,1)$ and $\phi \in [0,1)$ be fixed. There exists k_r^* which characterizes the unique competitive equilibrium, and satisfies

(15) $$\sigma r_e^* = f'\left(K - k_r^*\right) = (1-\rho-\phi)\mathcal{J}\sigma R.$$

Because of the concavity of $f(K-k_r)$, we conclude that the higher the equilibrium returns, given by (15), the higher the amount of capital channeled to the risky technology via banks. Therefore, bankers' objective of maximizing their shareholders' returns σr_e^* is equivalent to maximizing the risk-taking k_r^* in the economy.

Moreover, from mere observation of (15), we obtain

Corollary 1. $\frac{\partial k_r^*}{\partial \rho} < 0$ and $\frac{\partial k_r^*}{\partial \phi} < 0$.

The intuition is straightforward. Campaign contributions, as well as the bank tax, raise bank expenses and reduce bank returns. This compromises the banks' ability to raise funds, thereby decreasing the amount of capital channeled to the risky technology via banks. These are the *direct* effects of ρ and ϕ on the equilibrium risk-taking.

B. Political Equilibrium

If bankers were only to take into account the direct effect of ρ on bank returns, they would set $\rho = 0$. What would politicians' response be? To answer this, we first rewrite (13) as

$$v_\pi = \eta f(K - k_r) + (\eta + \rho(1-\eta))k_r \sigma R. \tag{16}$$

This expression takes into account that $v_h = f(K - k_r) + (1-\rho)k_r \sigma R$, since households (as the sole owners of capital and property rights) consume the entire production net of the campaign contributions. It then follows immediately that with $\rho = 0$ politicians want to maximize expected production $f(K - k_r) + k_r \sigma R$. This yields the efficient solution.

Proposition 2. Let $\rho = 0$. Politicians set $\phi = \widehat{\phi}$, where

$$\widehat{\phi} = \frac{\mathcal{J} - 1}{\mathcal{J}}, \tag{17}$$

that yields the optimal risk-taking $\widehat{k}_r$ in the economy, which satisfies

$$\sigma \widehat{r}_e = f'\left(K - \widehat{k}_r\right) = \sigma R. \tag{18}$$

That is, in the absence of campaign contributions, politicians choose the bank tax $\widehat{\phi}$ that fully internalizes the distortion of guarantees. More precisely, the optimal bank tax internalizes the amount of distortion that remains with capital regulation. In particular, as ϑ increases, the repayments to depositors that are expected from the government decrease. This, in turn, alleviates the distortion of guarantees, entailing a lower bank tax to internalize the remaining distortion. Formally, this becomes apparent by combining (14), (15), and (17): $\mathcal{J}$ is decreasing in ϑ, which means that equilibrium returns and risk-taking are also decreasing in ϑ, thus requiring a lower optimal bank tax $\widehat{\phi}$.

We refer to the difference between the equilibrium risk-taking k_r^* and the optimal risk-taking $\widehat{k}_r$, formally,

$$\varepsilon \equiv k_r^* - \widehat{k}_r, \tag{19}$$

as the abnormal risk-taking in the economy. Note from (18) that $\widehat{k}_r$ is the welfare-optimal solution. On the contrary, as shown from (15), the equilibrium risk-taking k_r^* does depend on the outcome (ρ, ϕ) of the political game between bankers and politicians. This allows us to restate the bankers' objective as follows: Maximizing bank returns σr_e^* is equivalent to maximizing equilibrium risk-taking k_r^*, which, in turn, is equivalent to maximizing abnormal risk-taking ε.

Proposition 2 shows that if bankers were to set $\rho = 0$, politicians would set $\phi = \widehat{\phi}$, thus eliminating abnormal risk-taking (i.e., $\varepsilon = 0$). Can bankers induce a strictly positive abnormal risk-taking in the economy? To answer this, we solve the political game between bankers and politicians.

Proposition 3. The game between bankers and politicians admits a unique equilibrium (ρ^*, ϕ^*), with

(20) $$\rho^* = \frac{\mathcal{J}-1}{\mathcal{J}+\frac{1-\eta}{\eta}}$$

and $\phi^* = 0$, which yields

(21) $$\sigma r_e^*(\rho^*,\phi^*) = f'\left(K - k_r^*(\rho^*,\phi^*)\right) = \frac{\mathcal{J}}{\eta\mathcal{J}+1-\eta}\sigma R,$$

and $\varepsilon \equiv k_r^*(\rho^*,\phi^*) - \widehat{k}_r > 0$.

This result shows that bankers can achieve higher returns and abnormal risk-taking when they offer strictly positive contributions. They can do it because, as we observe from (16), a strictly positive contribution rate ρ makes politicians weigh bank revenues $k_r\sigma R$ higher than the safe production $f(K-k_r)$. In fact, as we see in the proof of Proposition 3, for every ρ, politicians' response is to set

(22) $$\phi = \frac{\mathcal{J}-1}{\mathcal{J}} - \rho \cdot \left(1 + \frac{1-\eta}{\eta\mathcal{J}}\right).$$

Comparing against (17), we observe that as the contribution rate ρ increases, politicians move the bank tax farther below $\widehat{\phi}$, thus raising the risk-taking in the economy above $\widehat{k}_r$. This is the *indirect* effect of ρ, via ϕ, on the economic equilibrium, which allows bankers to induce abnormal risk-taking. This echoes the standard mechanism in the tradition of Grossman and Helpman (1994), formalized in a banking setup in this article: Bankers protect their returns by "buying" a lower bank tax, using campaign contributions, and thus they generate abnormal risk-taking in the economy.

Do more contributions imply larger abnormal risk-taking? The answer is not trivial. The reason is that as ρ increases, thus indirectly (via lowering ϕ) boosting the risk-taking, the direct (negative) effect of ρ, described in Corollary 1, takes a toll on risk-taking.

In fact, one can construct a benchmark rate

(23) $$\widehat{\rho} = \frac{\mathcal{J}-1}{\mathcal{J}}$$

that would result in the optimal risk-taking $\widehat{k}_r$ when the bank tax is set at zero. This is directly obtained by noting from (15) and Corollary 1 that the direct effects of ρ and ϕ on risk-taking are additive and move in the same direction. Therefore, the optimal risk-taking can arise when the optimal bank tax $\widehat{\phi}$, as given in Proposition 2, is replaced by a contribution rate of the same degree. Since bankers ultimately elicit a decrease of the bank tax from the optimal level to zero, the benchmark rate, which could restore the corrective effect of the optimal bank tax, is a measure of the influence exerted by banks: The higher the benchmark rate, the higher the distortion caused by decreasing the bank tax from the optimal level to zero.

Should the equilibrium contribution rate be equal to the benchmark rate, abnormal risk-taking would be fully eliminated (i.e., $\varepsilon \equiv k_r^* - \widehat{k}_r = 0$). However, since the equilibrium contribution rate is strictly less than the benchmark rate (i.e., $\widehat{\rho}-\rho^{*}>0$), we obtain abnormal risk-taking in equilibrium (i.e., $\varepsilon>0$). We refer to the difference between the benchmark rate $\widehat{\rho}$ and the equilibrium contribution rate ρ^{*}, formally,

$$\delta \equiv \widehat{\rho}-\rho^{*}, \tag{24}$$

as the discount enjoyed by banks when they exert influence.

Moreover, by referring to the difference between the equilibrium returns, given by (21), and the optimal returns, given by (18), as the abnormal returns achieved by banks,[13] we write

$$\alpha \equiv f'\left(K-k_r^{*}(\rho^{*},\phi^{*})\right)-f'\left(K-\widehat{k}_r\right)=f'\left(K-k_r^{*}(\rho^{*},0)\right)-f'\left(K-k_r^{*}(\widehat{\rho},0)\right). \tag{25}$$

We thus observe that the larger the discount, the less the contribution rate internalizes the effect of setting the bank tax at zero. Hence, the discount at which banks exert influence, not the mere offer of campaign contributions, is the cause of abnormal risk-taking in the economy.

A large discount is the result of the contribution rate ρ^{*} being disproportionately low compared to the exerted influence as measured by the benchmark rate $\widehat{\rho}$. This is a manifestation of the Tullock paradox: "low contributions for high influence." A specification where contributions are disproportionately low compared to the exerted influence is only possible because our setup allows a distinction between the direct (negative) and the indirect (boosting) effect of contributions on risk-taking.

For the same reason, specifications where both contributions (measured by ρ^{*}) and influence (measured by $\widehat{\rho}$) are large, or where both are small, can arise as well. Thus, to know whether more contributions imply larger abnormal risk-taking, we need to identify how the underlying factor that causes a high ρ^{*} impacts the benchmark rate $\widehat{\rho}$. We address this question in the next section.

We complete the discussion in this section by noting that the expression of the Tullock paradox invokes the comparison between the contributions and the exerted influence. Therefore, the discount $\delta \equiv \widehat{\rho}-\rho^{*}$, which, as explained above, measures the difference between the exerted influence and the offered contributions, is also a measure of the paradox's prominence in the context of banking.

IV. Comparative Statics

We proceed to study the effects of the parameters η, ϑ, and σ on the contribution rate, the benchmark rate, and abnormal returns. By doing so, we will identify when larger contributions imply higher or lower abnormal risk-taking in the economy.

[13] Abnormal returns have been examined in empirical studies (Faccio (2006), Claessens, Feijen, and Laeven (2008), Goldman, Rocholl, and So (2009), and Cooper, Gulen, and Ovtchinnikov (2010)) as the dependent variable that can be impacted by firms' political activity. These studies do not focus on banks, though.

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A. Distribution of Political Power

Tullock (1972) identifies the lack of political competition as the factor that can generate high abnormal returns for a politically active agent. In our setup, bankers are the sole politically active interest group. Yet, the political power of the competing interest group (namely, households, which are the ones harmed by abnormal risk-taking due to the bank influence) is nonetheless captured by the parameter η. That is, households are represented in the political game to the extent politicians weigh households' welfare. We proceed to identify how the distribution of political power between households and bankers, as captured by η, impacts the outcome.

Proposition 4. The equilibrium contribution rate ρ^* is increasing, the benchmark rate $\widehat{\rho}$ is constant, and abnormal returns α are decreasing as η increases in the interval $(0,1)$.

Figure 2 illustrates this result. The intuition runs as follows: We see from (16) that as politicians value households' utility more, the mismatch between the weight of safe production, measured by η, and bank revenues, measured by $\eta+\rho(1-\eta)$, decreases. In turn, this increases the contribution rate to counteract the negative impact of a zero bank tax on households' utility. That is, politicians sell (bankers buy) influence at a higher rate, closer to the benchmark $\widehat{\rho}$, which itself is independent from η, as seen from (23). As a result, the discount banks enjoy decreases, the boosting effect of a zero bank tax on bank returns is internalized to a larger extent, and abnormal risk-taking diminishes.

To further understand the role of η, we consider a modified specification of politicians' objective function, where campaign contributions can be valued less than the households' utility. Specifically, let $\tilde{v}_\pi = \eta v_h + (1-\eta)\sigma P$ with $\eta \in (0,1)$. This implies that

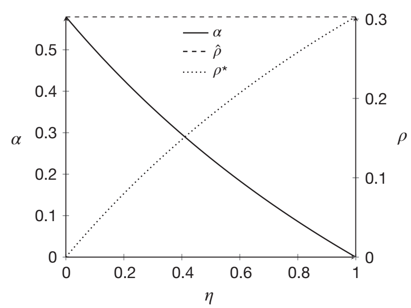
$$\tilde{v}_\pi = \eta f(K-k_r) + (\eta + \rho(1-2\eta))k_r\sigma R. \tag{26}$$

We observe that for every $\eta > 1/2$, politicians value the safe production $f(K-k_r)$ more than bank revenues $k_r\sigma R$. As a result, they demand a rate that outweighs the harm on $f(K-k_r)$ due to a zero bank tax. This means that banks need to pay a premium to buy influence on the bank tax for every $\eta > 1/2$, as opposed to

FIGURE 2

Effect of the Distribution of Political Power

Figure 2 shows that abnormal returns α are decreasing with the weight η as a result of an increasing equilibrium rate ρ^* and a constant benchmark rate $\widehat{\rho}$. We use $\vartheta = 0.1$, $\sigma = 2/3$, and $R = 2$.



enjoying a discount for every $\eta < 1/2$. Of course, bankers refuse to do that, since it makes them worse off compared to the case where they pay nothing. This leads to an equilibrium with $\rho^* = 0$ and $\phi^* = \widehat{\phi}$ for every $\eta > 1/2$.

Summing up, for strictly positive contributions to occur, politicians need to value the households' utility less than they value contributions. When this is the case, bankers enjoy a discount and abnormal risk-taking, which are decreasing as the political power of households increases. This formalizes the verbal reasoning by Tullock (1972): Granted (political) competition, that is, when η is high in our setup, the competitive rate of return (in political favors) shall prevail, that is, δ, α, and ε converge to zero in our setup.

B. Capital Regulation

In the discussion right after Proposition 2, we explain that the bank tax that yields the optimal risk-taking is decreasing as capital regulation becomes stricter. This implies that the benchmark rate, given by (23), is also decreasing as ϑ increases. At the same time, we observe from (20) that the equilibrium contribution rate is also decreasing in ϑ, because ρ^* is increasing in $\mathcal{J}$, which, in turn, is decreasing in ϑ. The reason is that bankers are willing to sacrifice a smaller fraction of their revenues to entice politicians into setting the bank tax at zero, as the amount of guarantees-driven distortion that remains with capital regulation, and thus can benefit banks, becomes smaller.[14]

We thus know that both $\widehat{\rho}$ and ρ^* are decreasing in ϑ. What is the effect of ϑ on abnormal returns and abnormal risk-taking?

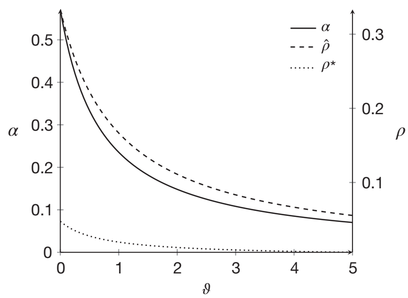
Proposition 5. The equilibrium contribution rate ρ^*, the benchmark rate $\widehat{\rho}$, and abnormal returns α are decreasing as ϑ increases.

As shown in Figure 3, abnormal returns converge to zero as capital regulation becomes stricter, despite the contribution rate converging to zero as well.

FIGURE 3

Effect of Capital Regulation

Figure 3 shows that abnormal returns α are decreasing with ϑ as a result of the benchmark rate $\widehat{\rho}$ being decreasing at a faster pace than the equilibrium rate ρ^*. We use $\sigma = 2/3$, $R = 2$, and $\eta = 0.1$.



[14]In fact, absent guarantees, there is no distortion in the economy that boosts risk-taking. This makes politicians set a zero bank tax even without receiving campaign contributions. It then follows immediately that banks avoid the (negative) direct effect of ρ by offering no contributions to politicians.

The reason is that the guarantees-driven distortion (that needs to be internalized by the contribution rate) is decreasing even further as minimum equity-to-deposit ratio increases.

The difference between the effects of η (Proposition 4) and ϑ (Proposition 5) is worth noting. When ρ^* is low due to a small η, abnormal returns become large; when ρ^* is low due to a high ϑ, abnormal returns become small. In both configurations, it is the discount δ, neither the exerted influence ($\widehat{\rho}$) nor the extent of contributions (ρ^*) per se, that causes abnormal risk-taking.

Proposition 5 shows that bankers have incentives to devote resources to lower international minimum standards, or even to entirely exit such agreements. This may explain the suggestion by J.P. Morgan's CEO Jamie Dimon that "[$\cdots$] the United States shouldn't be in Basel any more" (Braithwaite and Jenkins (2011)), since the stringency of these standards determines the scope of bank influence at the national level. Accordingly, this result underlines a political economic aspect of the criticism that current international standards are too loose (Admati and Hellwig (2014)).

Resources for influencing international standards may be campaign contributions to politicians who are involved in negotiating these international agreements, or lobbying expenses to directly convince policy-makers at international level. The former case is based on the mechanism of influence via contributions we describe in this article, interacting with the influence on other politicians in their home country (see Foarta (2018) for a study of this interaction). The latter case (i.e., lobbying) is driven by a mechanism that is distinct from the one we study here (see Crawford and Sobel (1982) for the theoretical foundations of lobbying via information transmission, and Young (2012) and Chalmers (2017) for empirical studies on lobbying international capital requirements).

A more general remark about our model is in order. Capital regulation, deposit guarantees, and the bank tax form the regulatory framework in which banks operate. In our setup, only the bank tax is set endogenously, whereas the rest are treated as given features of the banking system. This is only done to simplify the analysis. One could endogenize all the tools of the regulatory framework, and even add more (e.g., liquidity regulation). The mechanism at work would remain the same as long as interest groups are the same: Banks can achieve the highest possible influence, that is, all regulatory tools would take the values that favor bank returns the most, at the cost of offering the contribution rate ρ^*. The economic implications, again, would be determined by the discount $\widehat{\rho}-\rho^*$. That is, our conclusions do not depend on the number of regulatory tools we consider endogenous.

C. Likelihood of Bank Solvency

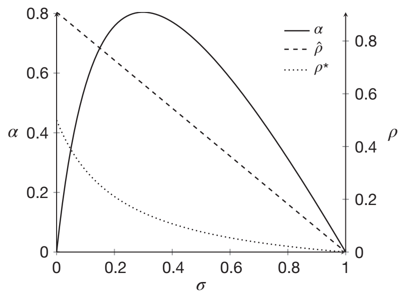
We now study how the likelihood that the bank is solvent impacts the equilibrium.

Proposition 6. The equilibrium contribution rate ρ^* and the benchmark rate $\widehat{\rho}$ are decreasing, and abnormal returns α are single-peaked with respect to σ.

FIGURE 4

Effect of the Likelihood of Bank Solvency

Figure 4 shows that abnormal returns α are single-peaked with respect to σ, while both the benchmark rate $\widehat{\rho}$ and the equilibrium contribution rate ρ^* are decreasing. We use $\vartheta=0.1$, $R=2$, and $\eta=0.1$.



As we observe from Figure 4, abnormal returns become small when the likelihood of solvency takes either too low or too high values.[15] This is the case although the guarantees-driven distortion is substantial for too low values of σ and insignificant for too high values. In particular, when bank insolvency is too likely, the distortion of guarantees is crucial because it will take effect almost with certainty. This makes the exerted influence significant, but, at the same time, it renders bankers willing to pay a high contribution rate to exert influence. Since high influence is accompanied by high contributions, the discount and the resulting abnormal risk-taking are small. Moving to values of σ that are too high, the guarantees-driven distortion becomes insignificant since it is almost certain that the government will not step in. This makes bankers unwilling to pay a high contribution rate. Yet, at the same time, the exerted influence is also insubstantial. Low contributions accompanied by low influence result in low abnormal risk-taking.

V. Extensions

We extend our model to study the role of a contribution tax and a contribution cap. We also allow a negative bank tax, and we consider implications when politicians attach varying weights to different components of aggregate consumption.

A. Contribution Tax

Our analysis has identified the discount enjoyed by bankers in buying political influence as the cause of inefficiency. In terms of public economics, this means that the rate incurred by banks does not internalize the externality of securing rescue funds in the bad state. Would taxing contributions correct this failure?

[15]Note that this is a distinct scenario from a scenario of pure change of risk, that is, when σ increases but σ R is kept constant.

Let τ denote a tax rate imposed at $t=1$ on contributions, with $\tau \in [0,1]$. At $t=1$, the tax revenues are distributed to households. Therefore, households' utility now reads

$$v_h = f(K-k_r) + (1-\rho(1-\tau))k_r\sigma R, \tag{27}$$

and politicians' objective function becomes

$$v_\pi = \eta f(K-k_r) + (\eta + \rho(1-\tau)(1-\eta))k_r\sigma R. \tag{28}$$

We obtain

Proposition 7. The game between bankers and politicians admits a unique equilibrium (ρ^*, ϕ^*), with

$$\rho^* = \frac{\mathcal{J}-1}{\mathcal{J}+(1-\tau)\frac{1-\eta}{\eta}} \tag{29}$$

and $\phi^*=0$, which yields abnormal returns α that are decreasing as τ increases in the interval $[0,1]$.

As we see from (28), a higher τ decreases the dependence of politicians' utility on campaign contributions. Accordingly, it increases the value they attach to safe production $f(K-k_r)$. As a result, a higher rate is needed to make politicians harm safe production by setting the bank tax at zero. A numerical example is presented in Figure 5. As with the effect of η, a high contribution rate implies a small discount, low abnormal returns and abnormal risk-taking. The reason is that the contribution tax raises the contribution rate, while it leaves the benchmark rate intact.

If taxing contributions decreases abnormal risk-taking, then why has such a policy not already been established? The answer lies in the final remark of Section IV.B: A contribution tax is another policy tool that harms bankers' capability to achieve abnormal returns and induce abnormal risk-taking. Thus, if it is endogenously set, it can be influenced downward by bankers via campaign contributions.

B. Contribution Cap

We now turn to another form of regulation of campaign contributions that *does* take place: a contribution cap. Let $\overline{\rho} \in [0,1]$ denote the maximum contribution rate banks can offer. We obtain

Proposition 8. Let $\overline{\rho}$ be fixed. The game between bankers and politicians admits a unique equilibrium (ρ^*, ϕ^*), with

$$\rho^* = \min\left\{\overline{\rho}, \frac{\mathcal{J}-1}{\mathcal{J}+\frac{1-\eta}{\eta}}\right\} \tag{30}$$

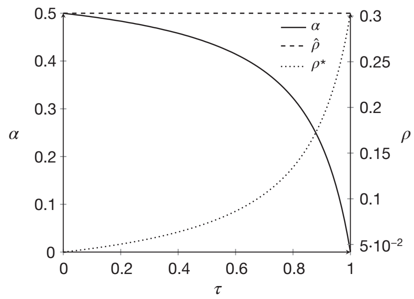
and

$$\phi^* = \frac{\mathcal{J}-1}{\mathcal{J}} - \rho^* \cdot \left(1+\frac{1-\eta}{\eta\mathcal{J}}\right). \tag{31}$$

FIGURE 5

Effect of Contribution Tax

Figure 5 shows that abnormal returns α are decreasing with the tax rate τ as a result of an increasing equilibrium rate ρ^* and a constant benchmark rate $\widehat{\rho}$. We use $\vartheta = 0.1$, $\sigma = 2/3$, $R = 2$, and $\eta = 0.1$.



Note that if $\rho^* = \overline{\rho}$, then $\phi^* > 0$. This is a deviation from the equilibria we have studied so far, where the bank tax was set at zero. This deviation marks a stark difference between the purposes of a contribution tax and a contribution cap. The tax aims at raising the rate incurred by banks to exert influence, leaving the extent of influence intact; the cap directly aims at limiting bank influence. Note further that when $\phi^* > 0$, the benchmark rate (i.e., the exerted influence) becomes $\widehat{\rho} = \widehat{\phi} - \phi^*$. Thus, a lower $\overline{\rho}$ induces a lower amount of contributions (determined by ρ^*), a higher bank tax ϕ^* and a lower exerted influence (determined by $\widehat{\rho} = \widehat{\phi} - \phi^*$), thus decreasing the discount and the resulting abnormal risk-taking.

We have already discussed why taxing contribution revenues can hardly ever be implemented. Contribution caps, on the other hand, are already in place, and alleviate abnormal risk-taking if they are binding. Yet, our preceding analysis suggests that a contribution cap is less likely to be binding, and thus less likely to limit bank influence and abnormal risk-taking, when high abnormal returns can be achieved with a small contribution rate. Moreover, to assess the effect of such a cap, one needs to take into account other forms of contributions besides campaign financing, which can be used as loopholes to circumvent the cap (Bombardini and Trebbi (2011), Bertrand, Bombardini, Fisman, and Trebbi (2020), and Teso (2022)).

C. Negative Tax

Our analysis considers a nonnegative tax rate (i.e., $\phi \in [0,1)$). In principle, however, the tax rate can also be negative, representing a subsidy to banks (see Avi-Yonah (2011) for how banks can be subsidized). Thus, a more general setup would allow $\phi < 0$ and $\rho \in \mathbb{R}$. In such a setup, politicians' response function remains the same as given by (22) which leads to $f'(K - k_r) = \left(1 + \rho \frac{1-\eta}{\eta}\right) \sigma R$ as explained in the proof of Proposition 3. Since we know from Proposition 1 that $\sigma r_e = f'(K - k_r)$ in equilibrium, we obtain that banks (aiming to maximize expected returns on equity) would offer an ever-increasing ρ, since this would induce an increasing subsidy as well.

We thus assume that there is a constitutional limit on bank subsidization. This is the equivalent of what is generally called an “anti-aid provision” specified in constitutions. The rationale is that public funds should not be used to make private profits, and the constitution determines the scope of subsidization to private businesses. The constitution of many US states comprises such provisions (Mitchell, Currie, and Ghei (2019)).

Specifically, we assume that there is a constitutional limit on subsidies, denoted by $\phi^c<0$, and thus only subsidies with $\phi \geq \phi^c$ can be selected.[16] In this setup, bankers set ρ as high as possible, so that politicians' choice for the bank tax hits the lower limit, that is,

$$\phi^* = \phi^c. \tag{32}$$

Substituting for $\phi^* = \phi^c$ into (22), and solving for the contribution rate, we obtain that, in equilibrium, bankers offer

$$\rho^* = \frac{(1-\phi^c)\mathcal{J}-1}{\mathcal{J}+\frac{1-\eta}{\eta}}. \tag{33}$$

Of course, the benchmark rate needs to be adjusted accordingly, so that when banks exert influence (i.e., turning the bank tax from $\widehat{\phi}$, as given by (17), to ϕ^c), the equilibrium returns are equal to the optimal level $f'\left(K-\widehat{k}_r\right)=\sigma R$. This yields

$$\widehat{\rho} = \frac{(1-\phi^c)\mathcal{J}-1}{\mathcal{J}}. \tag{34}$$

Comparing (34) to the benchmark rate in the baseline analysis, as given by (23), we observe that a negative tax requires a larger benchmark rate for the optimal risk-taking to occur. The reason is intuitive: When bankers elicit a negative ϕ in equilibrium, the benchmark rate needs to counteract the direct subsidy offered to banks on top of the indirect subsidy that benefits banks in the form of deposit guarantees.

As in the baseline analysis, $\widehat{\rho}>\rho^*$, which allows banks to enjoy a discount when exerting influence. In turn, this generates abnormal returns and abnormal risk-taking. Note that the inefficiency is more acute with bank subsidies: The discount, as defined by (24), reads

$$\delta = \frac{(\mathcal{J}-1)\cdot(1-\eta)/\eta}{\mathcal{J}(\mathcal{J}+(1-\eta)/\eta)} \tag{35}$$

in the baseline analysis, whereas

$$\delta = \frac{((1-\phi^c)\mathcal{J}-1)\cdot(1-\eta)/\eta}{\mathcal{J}(\mathcal{J}+(1-\eta)/\eta)} \tag{36}$$

with $\phi^c<0$ when the bank tax can be negative.

[16] Alternatively, one could assume that politicians are punished by low reelection chances if subsidies become too large. A contribution cap, as described in Section V.B, could also set a limit on the subsidies offered to bankers.

D. Weighing Bank Returns

In this section, we allow politicians to attach different weights to returns from deposits and from equity. This may be the case because some households' returns rely more on bank deposits, whereas other households' returns depend more on other investment opportunities. Since poorer households are likely to invest more in deposits than bank equity (see, e.g., Doerr, Drechsel, and Lee (2021)) and the government might have a motive for smoothing the cross-sectional income distribution, it might want to put more weight on the deposit return rather than on the equity return.

We thus consider the case with politicians attaching more weight to deposit returns dr_d. Let politicians attach weight η to all components of household consumption, apart from deposit returns dr_d to which politicians attach weight $\eta\gamma$ with $\gamma > 1$. This means that out of $(1-\rho)k_r\sigma R$, which is households' utility stemming from the banking sector, the amount $(1-\rho)k_r\sigma R - dr_d$ is weighted by politicians with η, whereas the amount dr_d is weighted with $\eta\gamma$. We thus write the utility of politicians, which is given by (16) in the baseline setup, as

$$v_\pi = \eta(f(K-k_r) + (1-\rho)k_r\sigma R - dr_d) + \eta\gamma dr_d + \rho k_r\sigma R. \tag{37}$$

Since we know from the proof of Proposition 1 that $\frac{e}{d} = \vartheta$, and with $e + d = k_r$, we have $d = \frac{k_r}{1+\vartheta}$. Knowing also from the proof of Proposition 1 that $r_d = f'(K-k_r) = (1-\rho-\phi)\mathcal{J}\sigma R$, we rewrite (37) as

$$v_\pi = \eta\left(f(K-k_r) + (1-\rho)k_r\sigma R + \frac{\gamma-1}{1+\vartheta}k_r(1-\rho-\phi)\mathcal{J}\sigma R\right) + \rho k_r\sigma R. \tag{38}$$

Therefore, for given ρ offered by bankers, politicians obtain that

$$\frac{\partial v_\pi}{\partial\phi} = \frac{\partial k_r}{\partial\phi}\cdot(-\eta f'(K-k_r) + (\eta + \rho(1-\eta))\sigma R) + \frac{\gamma-1}{1+\vartheta}\mathcal{J}\sigma R\eta\left(\frac{\partial k_r}{\partial\phi}(1-\rho-\phi) - k_r\right). \tag{39}$$

We note that substituting into (39) for the solution from the baseline analysis, where $f'(K-k_r^*) = \left(1+\rho\frac{1-\eta}{\eta}\right)\sigma R$ as known from the proof of Proposition 3, we obtain $\frac{\partial v_\pi}{\partial\phi} < 0$. The reason is that the first term in (39) would be equal to zero, whereas the second term is negative because $\gamma > 1$ and $\frac{\partial k_r}{\partial\phi} < 0$, as known from Corollary 1. This means that with $\gamma > 1$, politicians would be better off with a solution that generates higher returns $f'(K-k_r)$ than in the baseline solution, and thus with a higher k_r.

Hence, with $\gamma > 1$, bankers can induce politicians to set $\phi = 0$ by offering a contribution rate that is lower, compared to the rate ρ^* described in Proposition 3. In turn, this results in higher abnormal risk-taking, compared to the baseline solution. In other words, by valuing deposit returns more, politicians are more willing to facilitate the effect of guarantees, which, in turn, allows banks, which also benefit from this effect, to buy influence at a lower rate.

E. Weighing Tax Technologies

There are two different tax technologies in our model: i) Imposing a lump sum tax to finance guarantees, and ii) raising revenues from taxing banks to distribute them to households. In this section, we investigate the implications when the latter is superior to the former. There are several ways to formalize this. A simple way is to assume that only the fraction $1-\lambda$ of the (expected) amount of guaranteed deposit returns $(1-\sigma)dr_d$ is ultimately consumed, where $\lambda \in (0,1)$ measures the costs for administering deposit guarantees. We continue to assume that one unit is consumed by households for every unit raised from taxing banks in the good state.

Following the reasoning that led to (38), we obtain

$$(40)\quad v_\pi = \eta\left(f(K-k_r)+(1-\rho)k_r\sigma R-(1-\sigma)\frac{\lambda}{1+\vartheta}k_r(1-\rho-\phi)\mathcal{J}\sigma R\right)+\rho k_r\sigma R,$$

and

$$(41)\quad \begin{aligned}\frac{\partial v_\pi}{\partial\phi} &= \frac{\partial k_r}{\partial\phi}\cdot(-\eta f'(K-k_r)+(\eta+\rho(1-\eta))\sigma R)\\ &\quad -(1-\sigma)\frac{\lambda}{1+\vartheta}\mathcal{J}\sigma R\eta\left(\frac{\partial k_r}{\partial\phi}(1-\rho-\phi)-k_r\right)\end{aligned}$$

in the case of a utility loss $\lambda \in (0,1)$ due to imposing a lump sum tax to finance guarantees. We note now that the baseline solution $f'\left(K-k_r^*\right)=\left(1+\rho\frac{1-\eta}{\eta}\right)\sigma R$ results in $\frac{\partial v_\pi}{\partial\phi}>0$, since the second term of (41) is positive. This means that bankers have to pay a higher contribution rate to convince politicians to enable the distortion of guarantees by setting the bank tax at zero. In turn, this generates lower abnormal risk-taking compared to the baseline analysis.

In the specification with a utility loss due to financing guarantees, the optimal investment in banking also changes. In particular, without campaign contributions (i.e., when $\rho=0$), but with a utility loss $\lambda \in (0,1)$ from administering deposit guarantees, politicians' choice results in a lower level of investment in banks, compared to the level described in Proposition 2. To observe this, let us substitute for $\rho=0$ in (41). We then obtain that politicians set a ϕ so that $f'(K-k_r)$ becomes smaller than σR to counteract the second term that is positive. That is, optimal capital investment in the banking sector is below the level described in Proposition 2 when politicians consider a utility loss $\lambda \in (0,1)$ from financing guarantees and $\rho=0$.

F. Underinvestment in Banking

The preceding analysis prompts us to investigate a different setup where absent contributions risk-taking is inefficiently low, not only lower compared to the level described in Proposition 2. Ultimately, we aim at answering whether (risk-taking boosting) bank influence may be welfare-enhancing in this setup. To this end, we let politicians still attach weight η to consumption stemming from the safe sector, and attach weight $\eta_b<\eta$ to consumption stemming from the bank-funded risky sector. We then rewrite (16) as

$$(42)\quad v_\pi = \eta f(K-k_r)+(\eta_b+\rho(1-\eta_b))k_r\sigma R.$$

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Following the reasoning of the proof of Proposition 3, we obtain that for every given ρ, politicians set

$$\phi = \frac{\mathcal{J} - \eta_b/\eta}{\mathcal{J}} - \rho \cdot \left(1 + \frac{1-\eta_b}{\eta \mathcal{J}}\right), \tag{43}$$

so that

$$f'(K - k_r) = \left(\frac{\eta_b}{\eta} + \rho \frac{1-\eta_b}{\eta}\right)\sigma R. \tag{44}$$

This induces bankers to offer

$$\rho^* = \frac{\mathcal{J} - \eta_b/\eta}{\mathcal{J} + \frac{1-\eta_b}{\eta}}, \tag{45}$$

which, in turn, makes politicians set $\phi^* = 0$. We thus obtain in equilibrium

$$f'\left(K - k_r^*\right) = \frac{\mathcal{J}}{\eta \mathcal{J} + 1 - \eta_b}\sigma R. \tag{46}$$

Absent campaign contributions (i.e., for $\rho = 0$), politicians set $\phi = \frac{\mathcal{J} - \eta_b/\eta}{\mathcal{J}}$ to achieve returns $f'(K - k_r) = \frac{\eta_b}{\eta}\sigma R$. Comparing to (18), and using $\frac{\eta_b}{\eta} < 1$, we obtain that, when $\rho = 0$, bankers set the bank tax at inefficiently high levels, to favor investments in the safe sector. This generates an insufficient level of risk-taking in the economy, which opens the possibility for welfare-enhancing bank influence.

Indeed, by comparing (46) to the optimal level of returns as given by (18), and taking (14) into account, we obtain

Proposition 9. Let $\eta_b < \eta$. If $\frac{1-\eta}{1-\eta_b} < (>) \frac{\sigma+\vartheta}{1+\vartheta}$, then the equilibrium risk-taking is below (above) the optimal level. If $\frac{1-\eta}{1-\eta_b} = \frac{\sigma+\vartheta}{1+\vartheta}$, then the optimal level of risk-taking occurs in equilibrium.

We thus can describe conditions for a benign form of bank influence that counteracts a (hypothetical) bias against the bank-funded risky sector (i.e., when the weight η_b is sufficiently low so that $(1-\eta)/(1-\eta_b) \leq (\sigma+\vartheta)/(1+\vartheta)$). Whether such a setup has a real-world relevance depends on the political economic environment within which the game between bankers and politicians takes place. For example, in a period with public demand for over-regulation, say in the aftermath of a crisis, bank influence might indeed take a benign form that counteracts the political forces driving risk-taking to inefficiently low levels. On the contrary, when $\eta_b > \eta$, bank influence can only exacerbate the misallocation of capital, by channeling inefficiently large amounts of capital to the risky sector via banks.

VI. Conclusion

We offer a framework where abnormal risk-taking does not simply arise because banks buy a favorable political decision, but because they buy it *at a discount.* When banks contribute too little and still exert substantial influence, which manifests the Tullock paradox in banking, abnormal risk-taking in the economy is large as a result of a large discount. When large influence comes with large contributions, or small influence occurs with small contributions, abnormal risk-taking is small as a result of a small discount. This means that a positive relationship among abnormal risk-taking (or the extent of inefficiency, in general), the exerted influence, and the amount of contributions shall not be presupposed.

Specifically, our analysis reveals a variety of relationships which could be tested empirically. We summarize the most important ones:

- Contributions and the resulting inefficiency are decreasing as capital regulation becomes stricter.
- Contributions are monotonically decreasing with the probability that banks are solvent, yet the resulting inefficiency is single-peaked with respect to this likelihood.
- Contributions are increasing, but the resulting inefficiency is decreasing, as politicians attach more weight to households' welfare relative to the weight attached to the amount of contributions they receive.
- Taxing campaign contributions increases contributions, but decreases the resulting inefficiency.
- A binding contribution cap decreases contributions and the resulting inefficiency.
- The inefficiency is accentuated when politicians put more weight on deposit returns compared to other return components.

We leave the empirical test of these predictions for future research. Moreover, there are many avenues for future theoretical research. Adding reelection concerns and campaign financing for instance will further enrich the knowledge about how contributions by interest groups influence politics.

Appendix

A.1. Proof of Proposition 1

Maximization of (1) yields

$$r_s = f'(k_s). \tag{A-1}$$

We turn to the risky technology. We already know from the description of the model in Section II.A that the output of the risky technology is zero if the bad state occurs, and therefore, loan returns and profits are zero as well. Because of the linearity of (2), and of perfect competition, the profits of the representative firm operating the risky technology need to be zero in the good state as well. In turn, this means that

$$r_l = R. \tag{A-2}$$

An equilibrium with $r_l < R$ or $r_l > R$ would result in either infinite or zero loan demand, respectively. The former violates the resource constraint and the latter cannot occur in equilibrium since it would result in $f'(k_s) = f'(K) = 0$.

From (8) we know that $e > 0$. Because of the Inada conditions in the safe technology, we also know that $k_s > 0$. Moreover, because we will show below that banks choose

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$\frac{e}{d}=\vartheta>0$, we investigate an equilibrium with $d>0$. Therefore, and because risk-neutral households invest in the asset with the highest expected returns, it must hold that

$$r_s=r_d=\sigma r_e>0. \tag{A-3}$$

The inequality $\sigma r_e>0$ implies that there is no equilibrium with insolvent banks in both states of the world. Since banks are insolvent in the bad state, because loan returns are zero, as noted in Section II.A, we conclude that banks are solvent in the good state. This means that

$$(1-\rho-\phi)(d+e)r_l-dr_d>0. \tag{A-4}$$

Taking (A-2) into consideration, we rewrite (5) as

$$r_e=\frac{(1-\rho-\phi)(d+e)R-dr_d}{e}. \tag{A-5}$$

Substituting for (A-1) and (A-5) into (A-3), we obtain

$$f'(k_s)=r_d=\sigma r_e=\sigma\frac{(1-\rho-\phi)(d+e)R-dr_d}{e}. \tag{A-6}$$

Solving (A-6) with respect to r_d, we obtain

$$f'(k_s)=r_d=\sigma r_e=(1-\rho-\phi)\frac{d+e}{\sigma d+e}\sigma R. \tag{A-7}$$

We obtain from (A-7) that $\frac{\partial r_e}{\partial e}<0$ and $\frac{\partial r_e}{\partial d}>0$. This means that banks choose the capital structure that satisfies (8) with equality, which we know is sustained by households' investment decisions, since they are indifferent among k_s, d, and e because (A-3) holds. Substituting for $e/d=\vartheta$ into (A-7), and taking (11) into consideration, we establish (15). It is then straightforward from the concavity of $f(k_s)$ that there exists an allocation k_r^* that uniquely solves (15).

It remains to show that the consumption good market clears in the good state and the bad state of the world. For the consumption good market to clear if the good state of the world occurs, we have to show that

$$\overline{c}+P=f(k_s)+k_rR, \tag{A-8}$$

where $\overline{c}$ and P are given by (9) and (4), respectively. For the calculation of $\overline{c}$ we use (A-2) and (A-4) to obtain that $\Pi_r=\overline{T}=0$. We then write

$$\begin{aligned}\overline{c}+P&=k_sr_s+dr_d+e\frac{k_r(1-\rho-\phi)R-dr_d}{e}+f(k_s)-k_sr_s+\phi k_rR+\rho k_rR\\&=f(k_s)+k_rR.\end{aligned} \tag{A-9}$$

For the consumption good market to clear if the bad state of the world occurs, we have to show that

$$\underline{c}=f(k_s), \tag{A-10}$$

where $\underline{c}$ is given by (10). Indeed,

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(A-11) $$\underline{c} = dr_d + k_s r_s + f(k_s) - k_s r_s - dr_d = f(k_s).$$

This completes the proof. □

A.2. Proof of Proposition 2

Substituting for $\rho = 0$ into (16), we obtain

(A-12) $$v_\pi = \eta(f(K-k_r) + k_r \sigma R),$$

and

(A-13) $$\frac{\partial v_\pi}{\partial \phi} = \eta \frac{\partial k_r}{\partial \phi}(-f'(K-k_r) + \sigma R).$$

Because $\lim_{k_r \to 0} f'(K-k_r) = 0$ and $\lim_{k_r \to 0} \frac{\partial v_\pi}{\partial \phi} = \eta \frac{\partial k_r}{\partial \phi} \sigma R > 0$, v_π is maximized by a value of k_r that solves $\frac{\partial v_\pi}{\partial \phi} = 0$. We thus obtain (18). Moreover, because $f(k_s)$ satisfies the Inada conditions, as described in Section II.A, there is a unique value of $\widehat{k}_s$, and therefore $\widehat{k}_r = K - \widehat{k}_s$, which satisfies (18). Finally, by comparing (15) with (18), and solving for ϕ, we obtain that the unique allocation $\widehat{k}_r$ occurs if and only if $\phi = \widehat{\phi}$ as given by (17). □

A.3. Proof of Proposition 3

We solve the game with backward induction. Suppose bankers have chosen some ρ in the first substage. We obtain

(A-14) $$\frac{\partial v_\pi}{\partial \phi} = \frac{\partial k_r}{\partial \phi}(-\eta f'(K-k_r) + (\eta + \rho(1-\eta))\sigma R),$$

where v_π is given by (16). Using the same reasoning as in the proof of Proposition 2, we solve $\frac{\partial v_\pi}{\partial \phi} = 0$ with respect to $f'(K-k_r)$ to obtain that politicians set a bank tax so that

(A-15) $$f'(K-k_r) = \left(1 + \rho \frac{1-\eta}{\eta}\right)\sigma R.$$

Substituting for (15) into (A-15), and solving for ϕ, we obtain that for every ρ, politicians set

(A-16) $$\phi = \frac{\mathcal{J}-1}{\mathcal{J}} - \rho \cdot \left(1 + \frac{1-\eta}{\eta \mathcal{J}}\right).$$

We turn to the bankers' problem. Taking (15) into consideration, we know that bankers aim to maximize (A-15), which is increasing in ρ. At the same time, we know from mere observation of (A-16) that ϕ is decreasing in ρ. Taking into account that $\phi \geq 0$, we obtain that bankers set ρ so that $\phi^* = 0$. Substituting for $\phi = 0$ in (A-16), and solving for ρ, we obtain (20). In turn, substituting for (20) into (A-15), we obtain (21).

By noting that $\frac{\mathcal{J}}{\eta \mathcal{J} + 1 - \eta} > 1$, we conclude that $f'\left(K - k_r^*(\rho^*, \phi^*)\right)$, as given by (21), is strictly greater than $f'\left(\widehat{k}_s\right)$, as given by (18). This suffices to conclude that $\varepsilon \equiv k_r^*(\rho^*, \phi^*) - \widehat{k}_r > 0$. □

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A.4. Proof of Proposition 4

It is straightforward that the benchmark rate $\widehat{\rho}$, as given by (23), does not depend on η, whereas the equilibrium rate ρ^*, as given by (20), is increasing in η. It then follows from combining (18), (21), and (25) that $\frac{\partial\alpha}{\partial\eta}<0$. □

A.5. Proof of Proposition 5

Substituting for (14) into (20) and (23), we obtain

$$\rho^* = \frac{1-\sigma}{1+\frac{1-\eta}{\eta}\sigma+\frac{\vartheta}{\eta}}; \tag{A-17}$$

$$\widehat{\rho} = \frac{1-\sigma}{1+\vartheta}. \tag{A-18}$$

We thus conclude that both ρ^* and $\widehat{\rho}$ are decreasing in ϑ. Substituting for (18) and (21) into (25), we obtain

$$\alpha = \frac{\mathcal{J}}{\eta\mathcal{J}+1-\eta}\sigma R - \sigma R. \tag{A-19}$$

We further write

$$\frac{\partial\alpha}{\partial\vartheta} = \frac{\sigma R}{(\eta+\sigma-\eta\sigma+\vartheta)^2}(\eta-1)(1-\sigma). \tag{A-20}$$

Taking into account that $\eta\in(0,1)$, we conclude that α is decreasing in ϑ. □

A.6. Proof of Proposition 6

From mere observation of (A-17) and (A-18), we know that both ρ^* and $\widehat{\rho}$ are decreasing in σ. Substituting for (14) into (A-19), we write

$$\alpha = \frac{1+\vartheta}{\eta+\vartheta+\sigma(1-\eta)}\sigma R - \sigma R \tag{A-21}$$

and

$$\frac{\partial\alpha}{\partial\sigma} = \frac{(1+\vartheta)\cdot(\eta+\vartheta)\cdot R}{(\eta+\vartheta+\sigma(1-\eta))^2} - R, \tag{A-22}$$

from which we conclude that $\frac{\partial^2\alpha}{\partial\sigma^2}<0$, and thus that α is concave. We also obtain that $\frac{\partial\alpha}{\partial\sigma}=R\cdot\left(\frac{1+\vartheta}{\eta+\vartheta}-1\right)>0$ for $\sigma=0$, and that $\frac{\partial\alpha}{\partial\sigma}=R\cdot\left(\frac{\eta+\vartheta}{1+\vartheta}-1\right)<0$ for $\sigma=1$ because $\eta\in(0,1)$. This suffices to conclude that α is single-peaked as σ increases from zero to one. □

A.7. Proof of Proposition 7

Following the same steps as in the proof of Proposition 3, we obtain that for politicians to solve $\frac{\partial v_\pi}{\partial\phi}=0$, where v_π is now given by (28), they set regulation such that $f'(K-k_r)=\left(1+\rho(1-\tau)\frac{1-\eta}{\eta}\right)\sigma R$. This induces

$$\rho^* = \frac{\mathcal{J}-1}{\mathcal{J}+(1-\tau)\frac{1-\eta}{\eta}}. \tag{A-23}$$

We note that the equilibrium contribution rate ρ^*, as given above, is increasing in τ. Substituting for (A-23), we obtain □

$$\frac{\partial f'(K-k_r(\rho^*,0))}{\partial \tau} = -\frac{(\mathcal{J}-1)\frac{1-\eta}{\eta}}{\left(\mathcal{J}+(1-\tau)\frac{1-\eta}{\eta}\right)^2}\mathcal{J}\sigma R<0.$$

Taking then (25) into account, we conclude that α is decreasing in τ.

A.8. Proof of Proposition 8

This result follows from the proof of Proposition 3, and specifically by observing that bank returns, as given by (A-15), are increasing in ρ, and that politicians' response is to set ϕ according to (22), which is decreasing in ρ. This implies that if $\overline{\rho}$ is sufficiently low, then bankers can only reduce ϕ to a level that is strictly above zero, by setting $\rho^* = \overline{\rho}$. □

A.9. Proof of Proposition 9

Let $\eta_b < \eta$ and $\frac{1-\eta}{1-\eta_b} < \mathcal{J}^{-1}$. Then, $\frac{\mathcal{J}}{\eta\mathcal{J}+1-\eta_b}\sigma R < \sigma R$, and thus risk-taking is below the optimal level. If $\frac{1-\eta}{1-\eta_b} = \mathcal{J}^{-1}$, then $\frac{\mathcal{J}}{\eta\mathcal{J}+1-\eta_b}\sigma R = \sigma R$, and thus risk-taking is at the optimal level. If $\frac{1-\eta}{1-\eta_b} > \mathcal{J}^{-1}$, then $\frac{\mathcal{J}}{\eta\mathcal{J}+1-\eta_b}\sigma R > \sigma R$, and thus risk-taking is above the optimal level. □

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