DISCUSSION PAPER SERIES

DP14243

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FINANCIAL ECONOMICS

MONETARY ECONOMICS AND FLUCTUATIONS

PUBLIC ECONOMICS

ISSN 0265-8003

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Discussion Paper DP14243
Published 24 December 2019
Submitted 21 December 2019

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JEL Classification: G3, P16, D72

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Linda M. Schilling*

December 17, 2019

Abstract

The paper provides a novel theory of how banks not only exploit but also cause being perceived as 'too big to fail'. Bank creditors are also voters. Economic voting prompts politicians to grant bailouts given a bank failure. The bank's capital structure acts as a tool to impact the electoral vote and thus the bail-out by changing the relative group size of voters who favor as opposed to voters who object the bailout. The creditors' anticipation of high bailouts, in return, allows the bank to reduce funding costs today, by this maximizing revenues.

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1 Motivation

Bank failures are politically important events. When a bank fails, bank creditors at risk of losing money can hold politicians accountable for their losses since creditors are also voters (Anderson, 2007). The creditors' implicit threat to change voting behavior in the upcoming election yields bargaining power to press politicians for subsidies (bail-outs). On the issue of an Italian state bail-out of Banca Monte dei Paschi di Siena, the New York Times writes on June 1, 2017,

'*Leaders in Rome are worried that forcing small-time investors to take a hit would make them susceptible to appeals by the populist Five Star Movement or the right-wing Northern League. [...] (The) secretary of a group representing small investors expressed anger at "a terrible political and managerial class that did not prevent this mayhem from happening.*"

The disparity in how recent bank failures in Cyprus versus Italy were handled can be seen as anecdotal evidence on how the political concerns interfere with the application of bank resolution directives: 2014, the released European 'Bank Recovery and Resolution Directive' (BRRD) stipulates 'bail-ins' of existing creditors to protect taxpayers. Nevertheless, in July 2017, the European Commission approves the Italian state bailout of Banca Monte dei Paschi di Siena. Depositors take no losses. Earlier in March 2013, on the other hand, the Cypriot financial crises ends with the shut down of Laiki bank and a $13 billion bail-out of the Bank of Cyprus. Uninsured depositors take haircuts of up to 80 percent although the BRRD had not been released by then. A look at the political economy may be enlightening here. The bail-out of Monte dei Paschi comprised small junior bond-holders, depositors and senior bondholders who belonged to Italy's middle class and who were believed to change voting behavior in the upcoming election should they not be bailed out, (New York Times, 2017).[1] The haircuts in Cyprus, on the other hand, were politically justified by the conjecture that about half of the deposits of Bank of Cyprus belonged to non EU residents (non-voters)(New York Times, 2013). If the political economy affects the application of bail-out policies through the anticipation of economic voting, then politics becomes relevant to the field of corporate finance.

[1] The time period was particularly crucial since the Italian anti-establishment party '5 Star Movement' had previously overtaken the governing Democrats in opinion polls, see Reuters (2016). The bailout allowed junior bondholders to convert their bonds into shares at 100% face value. Further, MPS offered to swap the shares to senior bonds, selling the shares to the government instead.

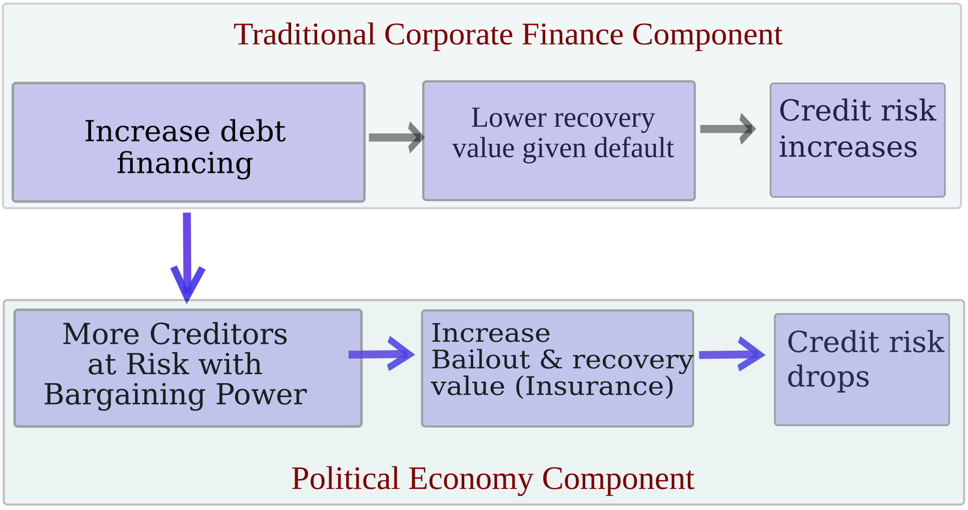

Figure 1: As debt financing increases, more creditors have a claim on the recovery value given default. The additional bargaining power, however, increases the bail-out by the threat of economic voting, and the total value to be recovered (including the bailout) increases.

As the main contribution of the paper, I provide a novel theory on the interaction between the political economy and corporate finance. Bank creditors not only finance the bank but they are also voters in an upcoming election. If the bank fails, creditors can 'bargain for bail-outs' with the governing politician by increasing their vote-share depending on the size of the granted bail-out (reward). Non-creditor voters, on the other hand, lower their vote share depending on the tax required to finance the bail-out (punishment). The politician, confronted with these two special interest groups of creditor and non-creditor voters, sets the bail-out which maximizes his vote-share (Drazen, 2002; Becker, 1983; Persson and Tabellini, 2016). I show, the vote-share maximizing bail-out increases in the group size ratio of creditor voters to non-creditor voters. For a fixed set of voters, the bank's capital structure choice therefore affects the balance of power between creditor-voters and non-creditor voters, and ultimately bail-outs. As an important and novel feature of the model, therefore, bail-outs increase endogenously as more voters (creditors) finance the bank.[2] The bankruptcy costs to bank creditors can decline in debt. The bank understands the politician's problem and exploits her creditors' bargaining power for revenue maximization: By seeking out capital structures which involve many voters (high debt ratios), the bank *causes* high bail-outs conditional

[2] The bank, here, represents the entire banking system of a particular country.

on the future event of a failure. This reversion of causality distinguishes the paper from the too big to fail literature. The paper therefore provides a new, political perspective on the commitment problem of regulators to (not) bail-outs banks. The anticipation of high bail-outs, in return, leads to changes in bank behavior ex ante. The insurance effect of the bail-out allows the bank to lower the interest rate on the debt contract, by this increasing the bank's revenues today (shareholder value) due to a substitution effect.

An essential assumption in the paper is that equity investors cannot bargain and do not receive bail-outs. The assumption can be defended since equity investors are the residual claimants and are supposed to have skin in the game.[3]

Literature

To link the bank's capital structure to the political economy, I combine a standard corporate finance model (Modigliani and Miller, 1958) with a standard probabilistic voting model (Lindbeck and Weibull, 1987; Acemoglu and Robinson, 2005). I intertwine the latter with a common pool problem (Persson and Tabellini, 2016), by this achieving that the bank can exploit the dispersion of the bail-out costs. The common pool problem reflects the fact that only the group of creditor voters benefit from the bail-out while costs are dispersed and levied on the entire set of voters. The probabilistic voting model, on the other hand, allows me to study gradual changes in the optimal bail-out policy due to changes in the political economy, i.e., due to (i) changes in the group size of creditor voters in comparison to all voters (determined by the bank's capital structure), and (ii) changes in the extent of influencing. The paper adds to the growing literature strand on optimal bank regulation and bail-out policies (Keister and Mitkov, 2016; Chari and Kehoe, 2016; Bianchi, 2012; Keister and Narasiman, 2016; Dewatripont and Tirole, 2018; Li, 2016). The paper here distinguishes itself from this literature strand by adding a political economy component such that the bank's capital structure endogenously impacts the size of her bail-out. Aghion and Bolton (1990) is further related. There, voters are debt investors, and the accumulation of public debt may raise a government's likelihood of being reelected. The mechanism however, differs from the one here. In Aghion and Bolton (1990), the governing party creates the constituency directly by raising debt since voters anticipate the opposing left-wing party, if elected, to strategically default. In this paper, the bank creates the constituency for a bail-out through her capital structure choice by manipulating the relative group size of voters who reward as opposed to punish

[3] I thus abstract from the impact of big money in politics.

the politician for the bail-out.

2 The Model

A risk-neutral bank needs to decide about the optimal debt to equity mix to finance a risky investment. For each unit invested, the risky asset pays off H with likelihood $\hat{\theta} \sim F[0,1]$ and otherwise zero, where F is some arbitrary distribution function satisfying $\mathbb{E}_F[\hat{\theta}]H > 1$. The realization of $\hat{\theta}$ only becomes observable to the bank and her investors after the bank has risen debt and equity and is fully invested. Define $\theta = E[\hat{\theta}]$. The market for long-term debt is deep. Debt investors are small, and each investor has one unit to invest.[4] Debt investors require the bank to pay an interest rate $K \in (1, H)$ which makes them indifferent between investing in the bank and storing their endowment under the pillow (outside option). The market for equity is competitive. Debt is more senior than equity: debt investors are paid first and all residual profits go to equity investors. The bank makes zero profit. Let $E > 0$ the exogenous amount of initial bank equity. Let D the amount of long-term debt the bank decides to raise.

The bank raises the amount D to maximize the total value of equity. Investment is scalable. The bank therefore considers the equivalent problem of maximizing the value of a one unit investment

$$EV(\delta, K) = \max(0, \theta \frac{(H - \delta K)}{1 - \delta}) \tag{1}$$

by choosing the optimal debt ratio $\delta^* \in (0,1)$. Here, $H - \delta K$ is the total return on investment if the asset pays and after repaying all creditors. The division by $1 - \delta$ then yields the return per invested unit of equity. Given scalability, and a total amount of equity E available for investment, the total amount of debt D the bank decides to take on for financing is given by $D = m\delta^*$ where m is the bank's investment scaling factor defined via $m = E/(1 - \delta^*)$.

Political Bargaining for Bailouts

I add to the existing literature that in the course of the bank's failure, debt investors who are not repaid by the bank 'bargain for bailouts' with the government by threatening

[4] The feature that investors are small only becomes imporant in the voting game. There, I assume that a gradual increase in debt implies a gradual increase in the group size of voters who reward the politician for bailouts. One unit of debt has one vote.

to change voting behavior depending on the size of the admitted bailout. Let S denote the total bail-out (subsidy) granted by the politician in the event of a bank failure. In the first part of the paper, I consider bargaining and thus bailouts in reduced form. I assume an exogenous bailout function $S(\alpha, \delta) \in [0, D]$. In section 4, I microfound the functional form of S as the solution to a politician's decision problem. Bargaining power and thus the bailout are both strictly increasing in the group size of bargaining creditors D and, since m is positive, in δ. I introduce the parameter *influence* $\alpha \in (0, \infty)$ as an amplification tool of the debt investors' bargaining power and thus subsidy S. Influence α has an interpretation of lenience with which non-creditor voters punish the politician by vote-shading for granting bailouts at their expense. Influence α is exogenous to the debt investors and the bank. The bank strategically sets her debt ratio δ, taking as given α. Therefore, the measure of debt investors who bargain if the bank fails in the future, and the size of the bail-out are endogenous equilibrium objects.

Assumption 2.1. *The bailout function $S(\alpha, \delta)$ satisfies*
(i) for all $\delta \in (0, 1)$: $S(\alpha, \delta)$ is strictly increasing and differentiable in $\alpha \in (0, \infty)$
(ii) for all $\alpha \in (0, \infty)$: $S(\alpha, \delta)$ is strictly increasing and differentiable in $\delta \in (0, 1)$.
(iii) $\lim_{\delta \to 0} S(\alpha, \delta) = 0$ *for all $\alpha > 0$*
(iv) $\lim_{\alpha \to 0} S(\alpha, \delta) = 0$ *for all $\delta \in (\ell, 1)$ (zero bargaining power/benchmark)*

The bail-out is evenly pro rated to creditors. Each creditor receives the *pro rata share*

$$c_\alpha(\delta) = \min\left(\frac{S(\alpha, \delta)}{\delta m}, 1\right) \in [0, 1] \tag{2}$$

Debt investors cannot receive subsidies higher than the face value of debt, thus $c_\alpha(\delta)$ cannot exceed one. I discuss the financing of the bail-out in section 4.

Assumption 2.2. *For all $\alpha \in (0, \infty)$ the pro rata share satisfies*
(i) $\lim_{\alpha \to \infty} \frac{\partial}{\partial \delta} c_\alpha(\delta) > 0$ *for all $\delta \in (l, 1)$*
(ii) $\frac{\partial}{\partial \alpha} \frac{\partial}{\partial \delta} c_\alpha(\delta) > 0$ *for α large (amplification)*

Assumption (i) says that for influencing sufficiently high, the bail-out per creditor increases in debt financing. Part (ii) says that the bail-out per creditor increases faster in debt financing when influencing is higher as opposed to lower. Debt investors infer the following expected utility from the contract

$$EU(\delta, K, \alpha) = \theta K + (1 - \theta) c_\alpha(\delta) \tag{3}$$

Here, I assume that creditors are risk-neutral but risk-aversion is straight forward to incorporate for a strictly increasing utility function. Participation at a given α, δ and K requires that EU exceeds one. For given α, the bank's private revenue maximization problem is to choose a capital structure δ to maximize return on equity

$$\max_{\delta \in (0,1), K \in (1,H)} EV(\delta, K) \qquad \text{subject to} \qquad EU(\delta, K, \alpha) \geq 1; \tag{4}$$

subject to her creditors' participation constraint. Note, that α impacts the bank's objective function only indirectly. As α increases the debt investors' pro rata share, the participation constraint is satisfied already for lower interest rates respectively for distinct debt ratios. When optimizing, the bank takes as given her creditors' bargaining function $S(\alpha, \delta)$ which follows her choice of capital structure.

Timing The bank observes influence α and the amount of equity available in the economy $E > 0$. She then decides on her debt ratio δ and funding costs K such that equity value is maximized subject to the debt investors' participation constraint. The choice of δ then implies a choice for the total amount of debt D. Each creditor invests her unit. Then θ realizes and decides on whether the asset pays or not. If the asset fails to pay, the bank fails. In that case, debt investors bargain for bail-outs and equity investors receive zero. If the asset pays, debt investors are repaid K and excess returns beyond the outstanding debt go to equity investors.

3 Analysis: Corporate Finance

Denote by $\delta^*(\alpha) \in (l, 1)$ the bank's (constrained) optimal debt ratio. Denote by $K^*(\alpha)$ the bank's optimal interest rate. It is straight forward to show that equity value strictly declines and utility to debt investors strictly increases in the funding costs K. Thus, the creditors' participation constraint always binds and we can define the following implicit function

$$K_p^\alpha(\delta) = \frac{1}{\theta} - \frac{1-\theta}{\theta} c_\alpha(\delta) \tag{5}$$

For every debt ratio δ, $K_p^\alpha(\delta)$ yields the bank's equilibrium interest rate (funding costs) at which debt investors just participate. Continuing our comparative statics analysis, we can see that equity value strictly increases in the debt ratio δ by $H > K$ while

Lemma 3.1. *The utility EU which debt investors infer from the contract declines in debt if and only if the pro rata share $c_\alpha(\delta)$ declines in debt.*

We immediately obtain the first important result

Proposition 3.1 (Funding costs)**.** *Fix the influence parameter α low. Then, the bank's equilibrium funding costs are strictly increasing in the debt ratio, $(K_p^\alpha)'(\delta) > 0$ (classic comovement). Fix α large, then the bank's funding costs decline in δ, $(K_p^\alpha)'(\delta) < 0$ (counter movement).*

As described in Keister (2015), the anticipation of a bail-out resembles the effect of deposit insurance. The channel how insurance is provided here is, however, new. Bail-outs and thus insurance on debt contracts increase in debt financing through a strengthening of the creditors' bargaining power. As soon as the individual insurance, the pro rata share, becomes increasing in the debt ratio, the bank can therefore lower her funding costs.

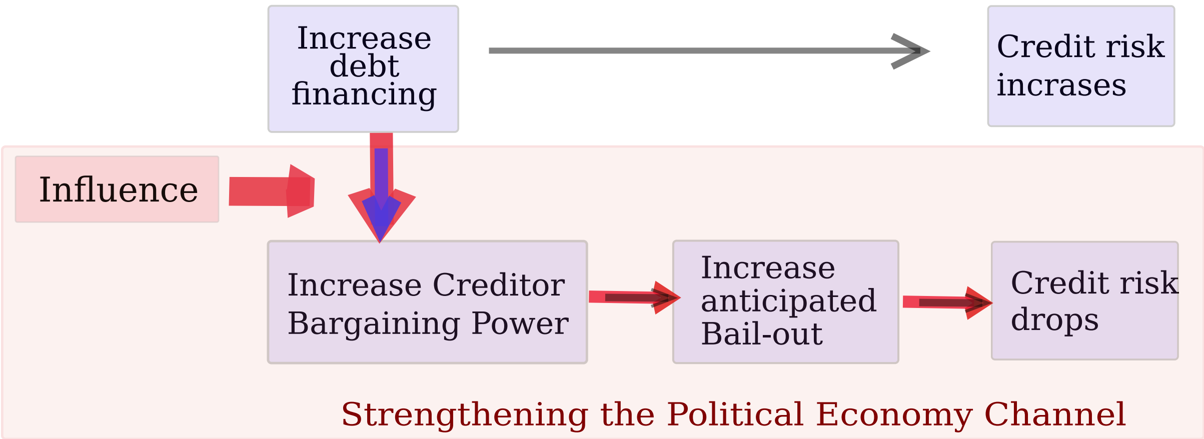

Figure 2: Influence strengthens the 'insurance effect' of the bail-out by amplifying the creditors' bargaining power while leaving the number of creditors with claims on the bail-out constant.

The first main result of the paper describes how the bank exploits her debt investors' double role as voters as influencing α increases. The result demonstrates how the bank exploits her creditors' bargaining power for revenue maximization by steering the implicit insurance coverage of her deposits via her capital structure choice. A classic argument via the envelope theorem delivers

Theorem 3.1 (Bank Optimization under Influencing)**.** *As α increases,*
(i) Equity value strictly increases
(ii) Every increase in α leads to either a strict increase in the bank's debt ratio or a decline in the interest rate or both.

(iii) For high α, the bank's equilibrium debt ratio discontinuously jumps up to full debt financing as the pro rata share becomes increasing in debt. The up-jump in the debt ratio is accompanied by a drop in the interest rate

I discuss the Theorem after providing the microfoundation.

4 Microfoundation: Special Interest Politics and Economic Voting

To motivate the functional form of the bail-out policy $S(\alpha, \delta)$ with the particular properties described in the model part, I intertwine a probabilistic voting model, similar to Acemoglu and Robinson (2005) chapter 12.2 and Lindbeck and Weibull (1987), with a common pool problem, see Persson and Tabellini (2016) chapter 7 and 2.[5]

A governing politician A is up for reelection by his voters. Voters are described by the set $\mathcal{V} = [0, V]$, exogenous to the politician. The incumbent A faces the contender B. Voters can vote either for A or for B. All voters vote. To introduce the special interest groups, the set of voters can be partitioned into two disjoint sets. Some voters are bank creditors, others are not $D < V$, $D = m\delta$. All creditors are voters, $D \subset \mathcal{V}$, each creditor has one vote. Here, with slight abuse of notation, D also denotes the set of all creditors.[6] One may think of the bank as representing the banking sector of a specific country.

To introduce probabilistic voting, voters are heterogeneous in terms of their individual preferences in favor of the governing politician and his contender: Each voter $i \in [0, V]$ infers a non-policy related benefit σ_i^B ('ideology') if B's party is elected and infers benefit σ_i^A if A's party is reelected. To A, his voter's ideology is unobservable and he believes that the differences in ideology

$$\Delta_i = \sigma_i^B - \sigma_i^A \tag{6}$$

[5] Probabilistic voting models generate continuity of a party's expected vote share in its supplied policy S, by this allowing the analysis of how marginal changes in the bank's debt ratio (measure of voters) cause marginal changes in the optimal policy. In particular, probabilistic voting models circumvent nonexistence of voting equilibria in models without single-peaked preferences. Common pool problems, on the other hand, describe situations where a public good is provided to a special group while the costs for its provision are dispersed over the general public through its financing via on a common pool of tax revenues.

[6] The case, where some creditors are not voters (foreign nationals), is straight forward to cover and is out of scope for this analysis.

are iid uniformly distributed according to $U(-c_s, c_s)$ where $c_s > 0$ is chosen below. Denote by F_Δ the according distribution function and by f_Δ the uniform density.

Special interest groups If the bank does fine, voters vote according to their ideology. They vote for A if and only if σ_i^A realizes higher than σ_i^B, i.e. if $\Delta_i < 0$. If the bank, however, fails, then A can make a policy choice on the bailout $S \in [0, \delta - \ell]$, by this impacting the vote. The change of the voters' behavior depends on the size of the granted bailout *and* their membership to a special interest group. Denote the group of creditor-voters by $\mathcal{V}_D \subset \mathcal{V}$. This group bargains for bail-outs by which I mean, this group rewards the politician for a bail-out S by increasing its vote share as a function of S (see below). The group of non-creditor-voters $\mathcal{V}_{ND}$, $\mathcal{V} = \mathcal{V}_D \cup \mathcal{V}_{ND}$ does not bargain for bail-outs, but has to contribute to its financing. A change in the capital structure δ prompts a change in the proportion of voters who finance the bank as opposed to voters who do not finance the bank, by this impacting the balance of power between the two groups. Let

$$v_D = \frac{D}{V} \tag{7}$$

the share of creditor voters who bargain for bail-outs. Let $v_{ND} = 1 - v_D$ the share of non-creditor voters who do not bargaing.

Financing and Common Pool Problem I now describe the encapsulated common pool problem. To finance the bailout S, the politician levies lump-sum taxes

$$\tau(S) = \frac{S}{V} \in [0, 1] \tag{8}$$

on all voters. Creditor voters are the beneficiaries of the bail-out. While contributing to the financing, creditor voters, in addition, receive the evenly pro rated share

$$c(S) = \frac{S}{D} \in [0, 1] \tag{9}$$

of the bailout. By setting S, the politician determines the extent of cross-subsidization from the group of non-creditor voters $\mathcal{V}_{ND}$ to the group of creditor voters $\mathcal{V}_D$. Creditor voters are net winners from the policy S: the pro rata share c strictly exceeds the tax τ since the receiving group $\mathcal{V}_D$ is strictly smaller than the paying group $\mathcal{V}$. The difference $c - \tau > 0$ increases with the bail-out.

Vote Shading (Indirect utility from policies S): Given a bank failure, voters shade their vote away from their ideology to punish or reward A depending on the indirect utility $V(S)$ they infer from A's choice. The indirect utility inferred from S depends on the voter's special interest group. Group members of $\mathcal{V}_D$ vote for A if and only if

$$\sigma_i^B \leq \sigma_i^A + V^D(S) \tag{10}$$

where the direct utility is given by $V^D(S) = g(c(S) - \tau(S))$, and g is a positive, strictly increasing, twice differentiable and concave function. The likelihood that i votes for A equals $F_\Delta(V^D(S))$. Group members of $\mathcal{V}_{ND}$ vote for A if and only if

$$\sigma_i^B \leq \sigma_i^A - V^{ND}(S) \tag{11}$$

where the direct disutility from tax τ is given by $V^{ND}(S) = h(\tau(S))$ for $h(\cdot)$ a positive, strictly increasing, twice differentiable and convex function. The likelihood that i votes for A equals $F_\Delta(-V^{ND}(S))$. Assume that a zero bail-out policy implies no vote-shading, $V^D(0) = f(0) = V^{ND}(0) = h(0) = 0$. For the support of Δ, assume

$$c_s > \max(\max_S V^D(S), \max_S V^{ND}(S)) \tag{12}$$

This says that there exist certain extreme ideologies who will vote for or against A no matter how unfavourable respectively favourable A's policy choice is for the group. I parametrize the non-creditors' indirect utility function V^{ND} by influence α.

The exogenous parameter 'influence' parametrizes the speed at which non-creditor voters punish the politician for levying the tax to finance the bail-out. This parameter can be understood as non-costly lobbying or (social) media influencing. For instance, one may think of the work of Cambridge Analytica, which makes the bail-out appear necessary to prevent a financial crises. The case that voting behavior can be socially influenced through media attention is made in Murphy and Shleifer (2004); Beck et al. (2002); Zaller et al. (1992). Reduced form influencing functions of special interest groups have amongst others been applied in Becker (1983, 1985).

Assumption 4.1 (Influencing: Vote shading)**.** *The vote shading function h_α of non-creditor voters satisfies:*

(i) $\frac{\partial}{\partial\alpha} h'_\alpha(\tau) < 0$

(ii) $\lim_{\alpha\to\infty} h''_\alpha(\tau) = 0$

(iii) $\frac{\partial}{\partial\alpha} h''_\alpha(\tau) < 0$

(iv) *The function* $\frac{1}{\tau}\hat{h}'_\alpha(\tau)$ *is mon. decreasing in* τ*, where* $\hat{h}_\alpha(\tau) := \frac{\partial}{\partial\alpha} h_\alpha(\tau)$

(v) $h'_\alpha(\tau) \to \infty$ *as* $\alpha \to 0$ *for all* $\tau \in [0,1]$

By (i), for high α, non-creditor voters punish the politicians less through vote shading than they do for low α. By (ii), for high influencing, the vote shading function h grows at a constant rate (e.g. becomes linear). By (iii), for high influencing, the punishment by non-creditor voters grows slower in the tax than under low influencing. Condition (iv) is reminiscent of a constraint on the relative risk-aversion coefficient, here however, defined over disutility instead of utility. By (iii), condition (iv) necessarily implies the limit behavior $\lim_{\alpha\to\infty} h'_\alpha(\tau) = 0$.

The politician's problem Since the politician has the power to grant any subsidy $S \in [0, D]$ through taxation, the politician maximizes his expected vote share

$$\mathbb{E}[A(S)] = v_D\, F_\Delta(g(c(S) - \tau(S))) + (1 - v_D)\, F_\Delta(-h(\tau(S))) \tag{13}$$

by choosing S, by this determining τ and c, taken as given the set of voters $\mathcal{V}$ and the relative group size which is determined through the bank's capital structure choice. The choice $S = D$ constitutes a complete bail-out since the pro rata share becomes $c = 1$. We call the subsidy which maximizes (13) the *vote-maximizing subsidy* S^*. As another main result of the paper, I show that the assumptions 4.1 which specifiy the non-creditor voters' punishment behavior imply an optimal bail-out policy with the functional form as described in the model outline, assumption (2.1) and (2.2). As a consequence, Theorem 3.1 describes the bank's optimal response to her correct anticipation of the politician's behavior follwing her capital structure choice δ.

Theorem 4.1 (Endogenous functional form of optimal bailout $S^*(\alpha, \delta)$)**.** *It holds:*
(i) Independently of Assumption 4.1, for all $\delta \in (0,1)$*, the vote-maximizing subsidy* $S^*(\delta)$ *is monotonically increasing in* δ *and strictly increasing when* S^* *is interior.*
(ii) Under Assumption 4.1 (i), the vote-maximizing subsidy S^* *is monotonically increasing in* α *and strictly increasing when* S^* *is interior.*
(iii) Independently of Ass 4.1, $\lim_{\delta\to 0} S^*(\delta) = 0$.
(iv) Under Ass 4.1 (ii), it holds $\frac{d}{d\delta}c^* > 0$ *for* α *large.*
(v) Under Ass 4.1 (i), (ii), (iii), and (iv), then $\frac{\partial}{\partial\alpha}\frac{\partial c^*}{\partial\delta} > 0$ *as* α *becomes large (strong amplification holds).*
(vi) Under Ass 4.1 (v), it holds $\lim_{\alpha\to 0} S^*(\alpha, \delta) = 0$ *for all* $\delta \in (0,1)$

The economic mechanism behind Theorem 4.1 (i) is straight forward. As the bank changes the proportion of creditor-voters who finance her investment, she manipulates the balance of power between the two special interest groups who determine whether the politician A is reelected or not. As she finances investment with more voters, the bank strengthens the special interest group which is pro bail-outs, by this increasing the expected bail-out should the bank fail in the future. This is, since the set of voters who raise their vote in response to the bail-out grows relative to the set of voters who lower their vote. On (ii), the subsidy grows in influencing since non-creditor voters punish the politician less for increasing the bail-out while creditor voters reward the politician at the same rate. On (iii), the optimal subsidy is zero when the set of creditor-voters becomes empty since then all voters punish the politician for granting a bail-out while the rewarding group vanishes. Part (vi) provides the important benchmark case that as influencing goes to zero, the politician sets zero bail-outs. By this, we nest the standard case in which bargaining for bail-outs is not considered or not effective. The challenge is in providing the properties (i) and (ii) of assumption 2.2. As the bank increases her debt financing, by Theorem 4.1 (i), the politician increases the equilibrium subsidy but also the measure of creditors who have a claim on the subsidy goes up. The resulting pro rata share c^* may go down. Property (i) of assumption 2.2, therefore, requires the politician to increase the equilibrium subsidy sufficiently fast in response to the bank's change in the capital structure. Condition (iv) of assumption 2.2 is even more subtle. The politician is tempted to free-ride on the influencing effect. Under high influencing, the politician sets a higher equilibrium subsidy than under low influencing and creditor-voters reward the politician for the higher subsidy, although the capital structure of the bank has not changed. As the bank now sets a higher debt ratio, again by Theorem 4.1 (i), the politician responds with an even higher subsidy. But since the subsidy is already higher under greater influencing, he is tempted to increase the subsidy less than in a situation where influencing was lower. Under condition (iv) of assumption 4.1, this free-riding is prevented. The assumption 4.1 can be reasonably satisfied, consider the following examples

Example Vote-shading functions:
(i) $h_\alpha(\tau) = \frac{1}{\alpha}\tau^2$, $\alpha > 0$.
(ii) $h_\alpha(\tau) = \frac{1}{\alpha}(e^{\beta\tau^2} - 1)$.

4.1 Discussion of Results

Theorem 3.1 characterizes bank optimal capital structures and funding costs in a changing political economy. The politician endogenously increases the bail-out as either the group of creditor-voters becomes larger or the group of non-creditor voters punishes less harshly (higher influencing). The bank, on the other hand, anticipates the politician's bail-out policy for every level of influencing when deciding on her capital structure and her interest rate. The bank understands that her capital structure choice impacts the share of creditors among all voters, and therefore determines the size of the anticipated bail-out given a failure.

The equilibrium equity value strictly increases with influencing, i.e. as non-creditor voters punish the politician less for granting bail-outs. This increase in the bank's equity value is financed through a rise in the taxation of non-creditor voters. The main mechanism is that the bank uses her capital structure as a tool to pressure the politician into granting higher bail-outs in the incident of a bank failure. Since creditors understand that larger bail-outs increase the safety of debt, they accept a lower interest rate on the debt contract in return for financing the bank. The lower funding costs increase the bank's equity value. In addition, the bank strategically exploits the amplification mechanism of influence. As non-creditor voters punish the politician less for the tax, the politician increases the bail-out faster. Thus, the bank can divert more.

Generically, property (ii) and (iii) of Theorem 3.1 state that influencing is a confounding variable which drives both debt ratios and interest rates. The classic result that high debt ratios imply high credit risk or low interest rates imply low credit risk (Modigliani and Miller, 1958) no longer holds. The bank's equilibrium funding costs are strictly increasing in the debt ratio under harsh punishment (low influencing) and strictly decreasing under mild punishment (high influencing). The first holds since under low influencing, more debt financing lowers the pro rata share to creditors, by this increasing credit risk. Under high influencing, however, bail-outs increase fast as the bank is financed with more voters such that the anticipated pro rata share increases in debt financing. Therefore, credit risk drops and equilibrium funding costs go down. As a consequence, under high influencing, there is an alignment of the bank's and her creditors' interests in favor of maximum debt financing when bail-outs increase fast in debt. Creditors are willing to give up on the interest rate in return for a greater bail-out, implied by a larger debt ratio. Intuitively, the bank exploits the insurance effect of the bail-out to lower her funding costs. The drop in the interest rate can be understood as the payment of an insurance premium. The increase in the anticipated bail-out in return for lower interest rates is the mechanism which allows the bank to divert part of the bail-out into the pockets of equity investors. On a more abstract level, the bank redistributes creditor payoffs (interest rate) away from good states of the world in which she survives into bad states of the world where she fails (pro rata share).

4.2 Policy Implications

The paper demonstrates a version of the well-known result that the anticipation of bank bail-outs ex post leads to adverse behavior of banks ex ante. Banks may shift risk in their investment portfolios (Bianchi, 2012), select higher leverage ratios (Chari and Kehoe, 2016) or invest excessively in illiquid assets (Keister, 2015). Here, the change in behavior is two-fold, either debt ratios increase or funding costs drop. Therefore, and as opposed to (Chari and Kehoe, 2016), capital regulation does not solve or ameliorate the problem since the bank can still divert bail-outs by lowering interest rates. Instead, the regulator would need to tie his hands and not grant bail-outs. But how credibly do so? The political economy result of the paper puts into focus the commitment problem of the regulator to (not) bail out banks. Politicians are held accountable for creditor losses as long as they have an impact on the bank resolution proceedings. In order to protect their vote share, politicians need to grant certain bail-outs to make their voters happy. To actively seek and achieve credibility for not bailing out failing banks, governments would need to delegate the authority for bank resolution to an institution in which they are not represented, and without a back door. In that case, the responsibility for creditor (voter) losses can be foisted off on this institution, and politicians will not suffer a decline in their vote share due to the absence of bail-outs. As the resolution of Monte dei Paschi die Siena (MPS) shows, die BRRD does currently not satisfy this criterium since the Italian government initiated the recapitalization of MPS.[7]

4.3 Empirics

Since 2011, the Financial Stability Board announces the list of globally systemically important banks (G-SIBs). A bank's classification as systemically relevant can be interpreted as the announcement of a high bank-specific influencing parameter α. Figure 3 shows funding costs and debt ratios for US G-SIBs versus consolidated FDIC insured

[7] Circumvention of bail-ins is possible under the BRRD by article 32 paragraph 4 if a failure of the bank is considered a threat to the economy or the financial stability of the system.

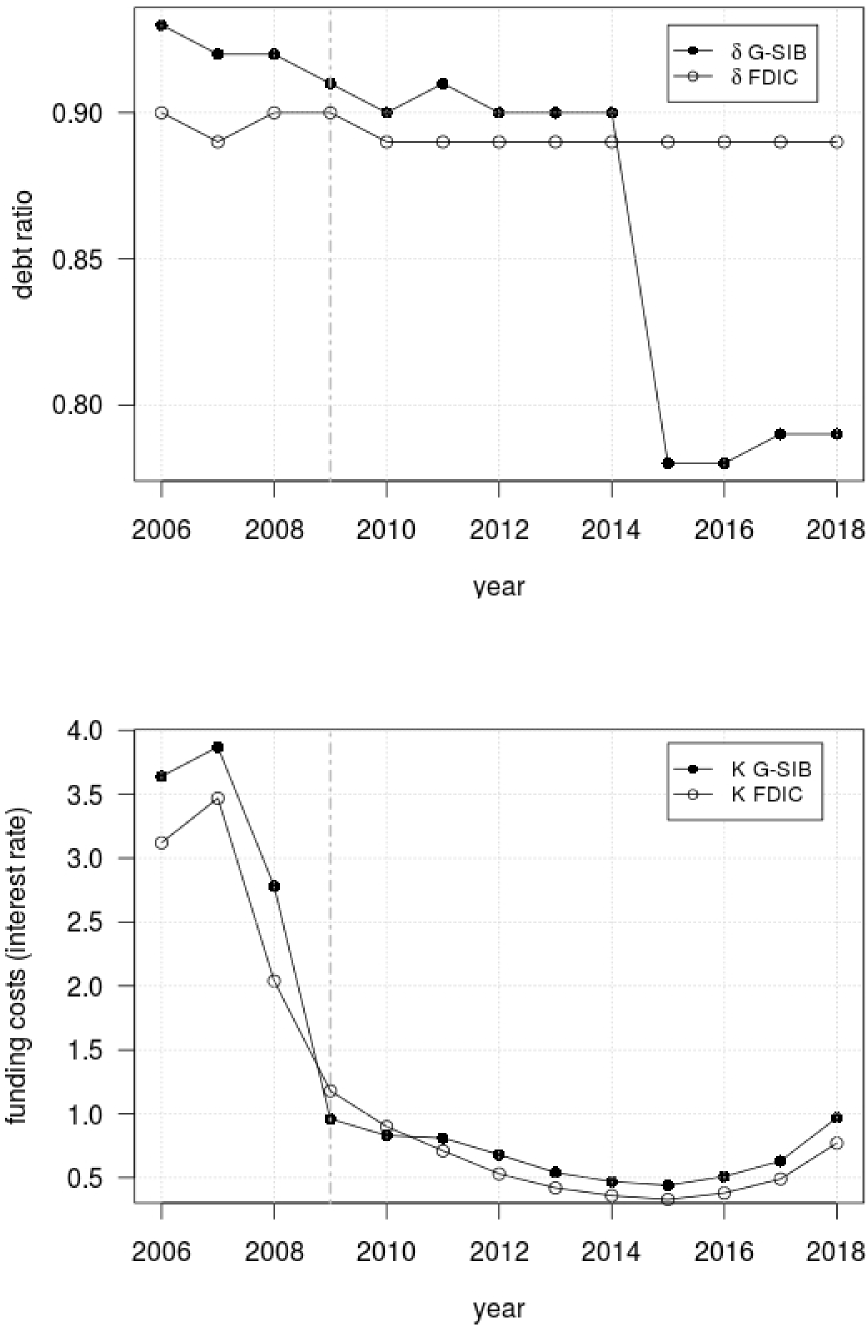

Figure 3: Systemically relevant US banks versus FDIC insured banks. Classification as 'systemically relevant' occurs 2009. Funding costs and debt ratio are calculated as equally weighted average. US Banks included: Bank of America, Bank of NY Mellon, Citigroup, Goldman Sachs, JP Morgan Chase, Morgan Stanley, State Street, Wells Fargo. Source: Annual Reports and 10K's, FDIC consolidated time series data. K equals total interest expense over total liabilities, δ equals total liabilities over total assets.

banks. While the official announcement of the list of G-SIBs was only made public in 2011, funding costs for such banks already dropped before 2009. Between 2009 and 2014, the funding costs for G-SIBs reach a level equivalent of an FDIC insured institution while the debt ratios remain unaffected by the 'systemically relevant' classification.[8] Only later in 2015, G-SIBs exhibit a drop in the debt ratio which is due to additional captial regulation for G-SIB calssified banks (TLAC and G-SIB surcharge) and the implementation of Basel 3. The empirical findings are fully in line with O'hara and Shaw (1990). Using an event study, O'hara and Shaw provide evidence that policy announcements such as a 'too big to fail' classification leads to positive wealth effects (increase in equity value) for included banks and negativ effects for non-included banks today.

5 Conclusion

I provide a novel theory at the intersection of corporate finance and political economy to show that banks can *cause* bail-outs when bank creditors are also voters in an upcoming election. Given a bank failure, bank creditors hold the governing politician accountable by increasing their vote share depending on the granted bail-out. Non-creditor voters, on the other hand, punish by lowering their vote-share since the bail-out is financed via taxation. The bank interferes with the election through her capital structure choice, which impacts the relative group size of creditor to non-creditor voters, and, ultimately, the bail-out. The anticipation of bail-outs, in return, allows the bank to reduce funding costs today to maximize revenues.

[8] The graphic makes the simplifying assumption that the bank's assets and therefore credit risk stay constant over time.

6 Appendix

6.1 Proofs: Corporate Finance

Proof. [Theorem 3.1]

Part (i) The bank's Lagrangian is given by

$$\mathcal{L}(\delta, K, \alpha) = EV(\delta, K) + \lambda \left(EU(\delta, K, \alpha) - 1 \right) \tag{14}$$

where $\lambda \geq 0$. Note, the bank's equity value does not directly depend on influencing. The α, however, impacts EV indirectly by changing the creditors' participation constraint. The first order derivatives yield

$$\frac{\partial}{\partial \delta} \mathcal{L}(\delta^*(\alpha), K^*(\alpha), \alpha) = \frac{\partial}{\partial \delta} EV(\delta^*(\alpha), K^*(\alpha)) + \lambda \frac{\partial}{\partial \delta} EU(\delta^*(\alpha), K^*(\alpha), \alpha) = 0 \tag{15}$$

$$\frac{\partial}{\partial K} \mathcal{L}(\delta^*(\alpha), K^*(\alpha), \alpha) = \frac{\partial}{\partial K} EV(\delta^*(\alpha), K^*(\alpha)) + \lambda \frac{\partial}{\partial K} EU(\delta^*(\alpha), K^*(\alpha), \alpha) = 0 \tag{16}$$

The optimal solutions $\delta^*(\alpha), K^*(\alpha)$ can be reinserted into the bank's objective to yield the value function

$$EV(\alpha) = EV(\delta^*(\alpha), K^*(\alpha)) \tag{17}$$

The total change in the value function due to a change in α is then given by

$$\frac{d}{d\alpha} EV(\alpha) = \frac{\partial EV}{\partial \delta} \frac{\partial \delta^*}{\partial \alpha} + \frac{\partial EV}{\partial K} \frac{\partial K^*}{\partial \alpha} \tag{18}$$

Using a classic envelope Theorem argument, via (15) and (16), one can rewrite

$$\frac{d}{d\alpha} EV(\alpha) = -\lambda^* \left(\frac{\partial EU}{\partial \delta} \frac{\partial \delta^*}{\partial \alpha} + \frac{\partial EU}{\partial K} \frac{\partial K^*}{\partial \alpha} \right) \tag{19}$$

Further exploiting that a change in α has to prompt δ and K to change in a way such that the total change in utility remains zero,

$$\frac{d}{d\alpha} EU = \frac{\partial EU}{\partial \delta} \frac{\partial \delta^*}{\partial \alpha} + \frac{\partial EU}{\partial K} \frac{\partial K^*}{\partial \alpha} + \frac{\partial EU}{\partial \alpha} = 0 \tag{20}$$

we can again rewrite

$$\frac{d}{d\alpha} EV(\alpha) = \lambda^* \frac{\partial EU}{\partial \alpha} \tag{21}$$

We know $\lambda^* \geq 0$. But since equity value strictly declines in K, and since $E(\theta) < 1$ and $c_\alpha(\delta) \in [0, 1]$, λ^* cannot be zero. Thus $\lambda^* > 0$. Further, the debt investors' utility from the debt contract is strictly increasing in α since the bail-out increases in α, see assumption 2.1 (ii).

Thus, $\frac{d}{d\alpha}EV(\alpha) > 0$.

Part (ii) and (iii) We next analyze the equilibrium change in the debt ratio and the interest rate. The debt investors' participation constraint needs to remain binding as α increases.
(a) Assume K is fixed. Then (20) becomes

$$\frac{d}{d\alpha}EU = \frac{\partial EU}{\partial \delta}\frac{\partial \delta^*}{\partial \alpha} + \frac{\partial EU}{\partial \alpha} = 0 \tag{22}$$

The bail-out increases in α, thus $\frac{\partial EU}{\partial \alpha} > 0$.
Case (a1): If α is small, then the pro rata share $c_\alpha(\delta)$ declines in debt. Thus, $\frac{\partial EU}{\partial \delta} < 0$ which causes $\frac{\partial \delta^*}{\partial \alpha} > 0$ for the constraint to remain binding.
Case (a2): If α is large, then the pro rata share $c_\alpha(\delta)$ increases in debt. Thus, $\frac{\partial EU}{\partial \delta} > 0$. But then, the debt investors' incentives are aligned with the bank's incentives by $\frac{\partial EV}{\partial \delta} > 0$ Thus, the debt ratio jumps up to maximum debt financing $\delta^* \to 1$. This jump in the debt ratio is accompanied by a drop in the interest rate. This holds since the participation constraint was otherwise slack and since equity value strictly declines in K.

(b) When holding δ fix (for instance if δ^* has the reached the maximum), then (20) becomes

$$\frac{d}{d\alpha}EU = \frac{\partial EU}{\partial K}\frac{\partial K^*}{\partial \alpha} + \frac{\partial EU}{\partial \alpha} = 0 \tag{23}$$

Then, by $\frac{\partial EU}{\partial \alpha}, \frac{\partial EU}{\partial K} > 0$ it has to be $\frac{\partial K^*}{\partial \alpha} < 0$ since equity value strictly declines in the interest rate. Altogether, every increase of α leads to a decline in K or an increase in δ or a mix of the two.

□

6.2 Proofs: Political Economy

Proof. [Theorem 4.1] For given α, V, $D = \delta m$ and the implied $v_D = \frac{D}{V}$, the politician chooses S^*, by this setting $c(S) = \frac{S}{D}$ and $\tau(S) = \frac{S}{V}$. Denote by $\frac{\partial c}{\partial \delta}$ the partial derivative of c by δ, holding S fixed (i.e. without taking into account the politician's equilibrium change of S^* as a response to the change in δ). The first order conditions of the politician with regard to S are

$$\frac{\partial}{\partial S}\mathbb{E}[A(S)] = v_D\, f_\Delta(V^D)\, \frac{dV^D}{dS} - (1 - v_D)\, f_\Delta(-V^{ND})\, \frac{dV^{ND}}{dS} \tag{24}$$

$$= v_D\, g'(c - \tau)\left(\frac{\partial c}{\partial S} - \frac{\partial \tau}{\partial S}\right) - (1 - v_D)\, h'(\tau)\, \frac{\partial \tau}{\partial S} \tag{25}$$

since by assumption (12), $f_\Delta(V^D) = f_\Delta(-V^{ND}) = 1$ by $-c_s \leq -V^{ND} \leq V^D \leq c_s$ for all S. One can show $v_D(\frac{\partial c}{\partial S} - \frac{\partial \tau}{\partial S}) = \frac{\partial \tau}{\partial S}(1 - v_D)$, therefore

$$\frac{\partial}{\partial S}\mathbb{E}[A(S)] = \frac{1}{V}(1 - v_D)\left(g'(c - \tau) - h'_\alpha(\tau)\right) \tag{26}$$

It is straight forward to show that $\mathbb{E}[A(S)]$ is concave in S

$$\frac{\partial^2}{\partial S^2}\mathbb{E}[A(S)] = \frac{1}{V}(1 - v_D)\left(g''(c - \tau)(\frac{\partial c}{\partial S} - \frac{\partial \tau}{\partial S}) - h''_\alpha(\tau)\frac{\partial \tau}{\partial S}\right) < 0 \tag{27}$$

since g is concave, h_α is convex and since not all voters are creditors $v_D < 1$. By concavity of $\mathbb{E}[A(S)]$, if the subsidy which maximizes the likelihood of reelection is interior, then it is determined by the politician's first order conditions (26), or equivalently as the zero of the function

$$F(S, \delta, \alpha) \equiv g'(c(S) - \tau(S)) - h'_\alpha(\tau(S)) \tag{28}$$

For proving (i) and (ii), we want to find out how the zero moves in δ and α:

$$\frac{\partial}{\partial \delta}F(S, \delta, \alpha) = g''(c(S) - \tau(S))\,\frac{\partial c}{\partial \delta} > 0 \tag{29}$$

since g is concave and $\frac{\partial c}{\partial \delta} = -\frac{S}{m\delta^2}$ is negative. Moreover,

$$\frac{\partial}{\partial S}F(S, \delta, \alpha) = g''(c - \tau)\left(\frac{\partial c}{\partial S} - \frac{\partial \tau}{\partial S}\right) - h''(\tau)\,\frac{\partial \tau}{\partial S} < 0 \tag{30}$$

from (27). Thus, given S^* is interior and therefore a zero of F, then the change of S^* in δ is described by the implicit function theorem as

$$\frac{\partial S}{\partial \delta} = -\frac{\frac{\partial}{\partial \delta}F}{\frac{\partial}{\partial S}F} > 0 \tag{31}$$

Further,

$$\frac{\partial}{\partial \alpha}F(S, \delta, \alpha) = -\frac{\partial}{\partial \alpha}h'_\alpha(\tau) > 0 \tag{32}$$

by assumption. Thus, by the same argument, if S^* is interior, then $\frac{\partial S}{\partial \alpha} = -\frac{\frac{\partial}{\partial \alpha}F}{\frac{\partial}{\partial S}F} > 0$. Fix a debt ratio δ_b. Assume, the vote-maximizing subsidy for this debt ratio is at the right boundary (full bail-out) $S^* = D = \delta_b m$. Concavity then requires $F(S, \delta_b) \geq 0$ for all $S \in [0, \delta_b m]$. But since $\frac{\partial}{\partial \delta}F(S, \delta, \alpha) > 0$, the subsidy remains at the right boundary for all larger $\delta \in (\delta_b, 1)$. Analogous for influence α.

Part (iii): Immediate from (26), in the special cases that all voters are creditors, $D = V$, the likelihood of getting elected does not change in S: It holds $v_D = 1$ and $c = \tau$. Since the politician's vote share is constant in S, $S^*=0$ is among the optimal policies.

If none of the voters are creditors, $D\to 0$, every fixed subsidy $S>0$ lets the pro rata share c to go to infinity. Since g is concave and τ is fixed in D, $\lim_{D\to 0} g'(c-\tau)=\lim_{x\to\infty} g'(x)=\min_x g'(x)=0<h'_\alpha(\tau)$ under the standard Inada conditions. Thus $\frac{\partial}{\partial S}\mathbb{E}[A(S)]<0$ for every $S>0$ and $S^*=0$ is optimal, by this meeting assumption 2.1 (iii), $\lim_{\delta\to 0} S^*(\delta)=\lim_{v_D\to 0} S^*(\delta)=0$.

Part (iv): Show: If $h''_\alpha(\tau)\to 0$ as $\alpha\to\infty$, then for high α, the politician endogenously sets a bailout such that the resulting pro rata share increases in debt, $\frac{d}{d\delta}c^*>0$. The equilibrium change of the pro rata share is given by the total derivative of the function $c(S,D)=S/D$ according to δ. It takes into account both, the change in the denominator of c *as well as* the politician's equilibrium change in the subsidy S^* as δ increases.

$$\frac{d}{d\delta}c(S,D)=\frac{\partial c}{\partial S}\frac{\partial S}{\partial \delta}+\frac{\partial c}{\partial D}\frac{\partial D}{\partial \delta}=\frac{1}{D}\left(\frac{\partial S}{\partial \delta}-cm\right) \tag{33}$$

Thus, $\frac{d}{d\delta}c>0$ if and only if $\frac{\partial S}{\partial\delta}>cm$. Assuming that the equilibrium S^* is interior, then the change of the vote-maximizing subsidy is exactly described by the implicit function theorem and $\frac{\partial S}{\partial\delta}>cm$ if and only if

$$\frac{\partial S}{\partial \delta}=-\frac{\frac{\partial F}{\partial \delta}}{\frac{\partial F}{\partial S}}=-\frac{g''(c-\tau)\frac{\partial c}{\partial \delta}}{g''(c-\tau)\left(\frac{\partial c}{\partial S}-\frac{\partial \tau}{\partial S}\right)-h''_\alpha(\tau)\frac{\partial \tau}{\partial S}}>cm \tag{34}$$

Taking the inverse and multiplying with the negative term $\left(\frac{\partial c}{\partial \delta}\right)/\left(\frac{\partial \tau}{\partial S}\right)$ yields equivalence to

$$-\left(\frac{\frac{\partial c}{\partial S}}{\frac{\partial \tau}{\partial S}}-1-\frac{h''_\alpha(\tau)}{g''(c-\tau)}\right)>\frac{1}{cm}\left(\frac{\frac{\partial c}{\partial \delta}}{\frac{\partial \tau}{\partial S}}\right) \tag{35}$$

Now plugging in the expressions for $\frac{\partial c}{\partial S}=\frac{1}{D}$, $\frac{\partial \tau}{\partial S}=\frac{1}{V}$, $\frac{\partial c}{\partial \delta}=-\frac{S}{m\delta^2}$, the given inequality is equivalent to

$$1+\frac{h''_\alpha(\tau)}{g''(c-\tau)}>0 \tag{36}$$

which has to hold for α large. By assumption, h is convex and g is concave, $h''_\alpha>0$ for all α and $g''<0$. If $h''_\alpha\to 0$ as $\alpha\to\infty$, then (36) and thus $\frac{d}{d\delta}c^*>0$ holds for α sufficiently large since g'' is constant in α.

Part (v): Define $\hat{h}_\alpha(\tau):=\frac{\partial}{\partial\alpha}h_\alpha(\tau)$. Assume, $\frac{\partial}{\partial\alpha}h''(\tau)<0$, $\lim_{\alpha\to\infty} h''_\alpha(\tau)=0$ and that $\frac{1}{\tau}\hat{h}'_\alpha(\tau)$ is a decreasing function in τ.

We want to show that in that case, the equilibrium pro rata share granted by the politician increases faster in debt financing if there is more influencing $\frac{d}{d\alpha}\frac{dc^*}{d\delta} > 0$ as $\alpha \to \infty$. From (33),

$$\left(\frac{d}{d\alpha}\frac{d}{d\delta}c\right) = \frac{1}{D}\left(\frac{\partial}{\partial\alpha}\frac{\partial S}{\partial\delta} - m\frac{d}{d\alpha}c\right) = \frac{1}{D}\left(\frac{\partial}{\partial\alpha}\frac{\partial S}{\partial\delta} - \frac{m}{D}\frac{\partial S}{\partial\alpha}\right) \tag{37}$$

With $D = \delta m$, therefore, it holds $\frac{d}{d\alpha}\frac{dc^*}{d\delta} > 0$ if and only if

$$\delta\left(\frac{\partial}{\partial\alpha}\frac{\partial S}{\partial\delta}\right) - \frac{\partial S}{\partial\alpha} > 0 \tag{38}$$

The local change $\frac{\partial S}{\partial\delta}$ is given by the implicit function theorem through (31). Analogous for $\frac{\partial S}{\partial\alpha}$. Plugging these in and calculating $\frac{\partial}{\partial\alpha}\frac{\partial S}{\partial\delta}$ using expressions in F, inequality (38) is equivalent to

$$-\delta\cdot\frac{\left(\frac{\partial}{\partial\alpha}\frac{\partial F}{\partial\delta}\right)\frac{\partial F}{\partial S} - \left(\frac{\partial}{\partial\alpha}\frac{\partial F}{\partial S}\right)\frac{\partial F}{\partial\delta}}{\left(\frac{\partial F}{\partial S}\right)^2} + \frac{\frac{\partial F}{\partial\alpha}}{\frac{\partial F}{\partial S}} > 0 \tag{39}$$

Since g is independent of α, $\frac{\partial}{\partial\alpha}\frac{\partial F}{\partial\delta} = 0$. Multipliciation with the negative term $\frac{\partial F}{\partial S}$ and acknowledging that $-\frac{\frac{\partial F}{\partial\delta}}{\frac{\partial F}{\partial S}} = \frac{\partial S}{\partial\delta} > 0$, $\frac{\partial}{\partial\alpha}\frac{\partial F}{\partial S} = -\frac{\partial}{\partial\alpha}h''(\tau)\frac{\partial\tau}{\partial S}$, $\frac{\partial F}{\partial\alpha} = -\frac{\partial}{\partial\alpha}h'(\tau) > 0$, and $\delta\frac{\partial\tau}{\partial S} = v_D/m$, we obtain the equivalent condition

$$\left(\frac{\partial S}{\partial\delta}\right) > \frac{m}{v_D}\frac{\frac{\partial}{\partial\alpha}h'(\tau)}{\frac{\partial}{\partial\alpha}h''(\tau)} \tag{40}$$

where $\frac{\partial}{\partial\alpha}h''(\tau) < 0$. Using the analogous steps as in part (iv), and observing that $\frac{\partial c}{\partial S}/\frac{\partial\tau}{\partial S} = 1/v_D$ while $(v_D/m)(\frac{\partial c}{\partial\delta}/\frac{\partial\tau}{\partial S}) = -c$, inequality (40) holds if and only if

$$1 - \frac{1}{v_D} + \frac{h''_\alpha(\tau)}{g''(c-\tau)} > -c\,\frac{\frac{\partial}{\partial\alpha}h''(\tau)}{\frac{\partial}{\partial\alpha}h'(\tau)} \tag{41}$$

By $v_D \in (0,1)$, both sides of the inequality are negative. Further, replacing c and v_D, with $S = \tau V$, condition (41) becomes

$$-(1 - v_D) + v_D\frac{h''_\alpha(\tau)}{g''(c-\tau)} > -\tau\,\frac{\frac{\partial}{\partial\alpha}h''(\tau)}{\frac{\partial}{\partial\alpha}h'(\tau)} \tag{42}$$

Taking the inverse times (-1) yields

$$\frac{1}{1 - v_D\left(1 + \frac{h''_\alpha(\tau)}{g''(c-\tau)}\right)} > \frac{1}{\tau}\,\frac{\frac{\partial}{\partial\alpha}h'(\tau)}{\frac{\partial}{\partial\alpha}h''(\tau)} \tag{43}$$

The right hand side is strictly below one for all $\tau \in [0,1]$ since, by assumption, $\frac{1}{\tau}\hat{h}'_\alpha(\tau)$ is a decreasing function in τ.[9] The left hand side exceeds one if and only if $1+\frac{h''_\alpha(\tau)}{g''(c-\tau)} > 0$, i.e. with (iv), if and only if $\frac{d}{d\delta}c^* > 0$. To conclude, if α is large, then the assumption that $\frac{1}{\tau}\hat{h}'_\alpha(\tau)$ is a decreasing function of τ together with $\frac{d}{d\delta}c^* > 0$ implies that $\frac{d}{d\alpha}\frac{dc^*}{d\delta} > 0$. That is, once $\frac{dc^*}{d\delta}$ crosses zero and becomes positive for some α, it also stays above zero and increases monotonically for all larger α. If, however, $\frac{d}{d\delta}c^* < 0$, then $\frac{dc^*}{d\delta}$ can be non-monotonic in α. The assumption $\lim_{\alpha\to\infty} h''_\alpha = 0$ guarantees that $\frac{dc^*}{d\delta} > 0$ and thus $\frac{d}{d\alpha}\frac{dc^*}{d\delta} > 0$ for α sufficiently large (single crossing).

Part (vi): Show: If $\lim_{\alpha\to 0} h'_\alpha(\tau) = \infty$, then it holds $\lim_{\alpha\to 0} S^*(\alpha,\delta) = 0$ for all $\delta \in (0,1)$. Going back to the politician's first order condition (26), it holds

$$\lim_{\alpha\to 0}\frac{\partial}{\partial S}\mathbb{E}[A(S)] = \frac{1}{V}(1-v_D)\left(g'(c-\tau) - \lim_{\alpha\to 0} h'_\alpha(\tau)\right) = -\infty \tag{44}$$

since $g'(c-\tau)$ is constant in α.

□

[9]This condition relates to the relative risk-aversion coefficient but defined over disutility.

References

Daron Acemoglu and James A Robinson. *Economic origins of dictatorship and democracy*. Cambridge University Press, 2005.

Philippe Aghion and Patrick Bolton. Government domestic debt and the risk of default: a political-economic model of the strategic role of debt. *Public debt management: theory and history*, 315, 1990.

Christopher J Anderson. The end of economic voting? contingency dilemmas and the limits of democratic accountability. *Annu. Rev. Polit. Sci.*, 10:271–296, 2007.

Paul Allen Beck, Russell J Dalton, Steven Greene, and Robert Huckfeldt. The social calculus of voting: Interpersonal, media, and organizational influences on presidential choices. *American political science review*, 96(1):57–73, 2002.

Gary S Becker. A theory of competition among pressure groups for political influence. *The quarterly journal of economics*, 98(3):371–400, 1983.

Gary S Becker. Public policies, pressure groups, and dead weight costs. *Journal of public economics*, 28(3):329–347, 1985.

Javier Bianchi. Efficient bailouts? Technical report, National Bureau of Economic Research, 2012.

VV Chari and Patrick J Kehoe. Bailouts, time inconsistency, and optimal regulation: A macroeconomic view. *The American Economic Review*, 106(9):2458–2493, 2016.

Mathias Dewatripont and Jean Tirole. Liquidity regulation, bail-ins and bailouts. Technical report, Working Paper, 2018.

Allan Drazen. Political economy in macroeconomics. *Princeton University Press*, 2002.

Todd Keister. Bailouts and financial fragility. *The Review of Economic Studies*, 83(2):704–736, 2015.

Todd Keister and Yuliyan Mitkov. Bailouts, bail-ins and banking crises. *Memo, presented at the Board of Governors of the Federal Reserve System, September*, 27, 2016.

Todd Keister and Vijay Narasiman. Expectations vs. fundamentals-driven bank runs: When should bailouts be permitted? *Review of Economic Dynamics*, 21:89–104, 2016.

Yang Li. Liquidity regulation and financial stability. *SSRN: https://ssrn.com/abstract=2880350*, 2016.

Assar Lindbeck and Jörgen W Weibull. Balanced-budget redistribution as the outcome of political competition. *Public choice*, 52(3):273–297, 1987.

Franco Modigliani and Merton H Miller. The cost of capital, corporation finance and the theory of investment. *The American*, 1:3, 1958.

Kevin M Murphy and Andrei Shleifer. Persuasion in politics. *American Economic Review*, 94 (2):435–439, 2004.

NYT New York Times. Higgins, Andrew: Cyprus Bank's Bailout Hands Ownership to Russian Plutocrats. August 21 2013.

NYT New York Times. Ewing, Jack and Pianigiani, Gaia and Bray, Chad: Why Troubles at a Midsize Italian Bank Worry the E.U. June 1 2017.

Maureen O'hara and Wayne Shaw. Deposit insurance and wealth effects: the value of being "too big to fail". *The Journal of Finance*, 45(5):1587–1600, 1990.

Torsten Persson and Guido Tabellini. *Political economics*. MIT press, 2016.

Reuters. Gavin Jones: Italy's 5-Star overtakes Renzi's Democrats in opinion polls. July 6 2016.

John R Zaller et al. *The nature and origins of mass opinion*. Cambridge university press, 1992.