P061: Talk and the City: How Far to Trust Bankers (Not) Calling for Bailouts?*

Diemo Dietrich† Thomas Gehrig‡

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Abstract

To evaluate a bank's resilience to financial stress, authorities often rely on private information from a peer institution, or counterparty. This reliance can be perilous, especially when assessing bailout options. Within a global games approach to bank runs, we study communication about a systemically important bank's financial status between an informed counterparty of said bank and an uninformed authority. This communication is costless, non-binding, and unverifiable—and yet pivotal for the authority's decision to bailout the bank. When information about the counterparty's own liquidity needs is private, the counterparty may exaggerate the systemically important bank's true need for support, but it may also withhold adverse information entirely. We show that the authority's risks in assessing bailout options is (1) shaped by the strategic behavior of the informed counterparty, (2) dependent on knowledge of the counterparty's own financial position, and (3) not necessarily continuous.

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†University of Greifswald, e-mail: `diemo.dietrich@uni-greifswald.de`

‡University of Vienna, Austria, and CEPR, SRC(@LSE), and VGSF, e-mail: `thomas.gehrig@univie.ac.at`

1 Introduction

A core function of the banking industry is to produce information that helps manage business risks—including, in particular, insights into the financial positions of peers to assess potential counterparty risk. As a result, monitoring counterparties, especially those with close and ongoing relationships, is a central component of banks' information-gathering activities. This constant monitoring places banks among the first to detect significant developments regarding the financial health of their peers. However, when a bank receives troubling information about a peer—particularly if it points at potentially serious systemic consequences that require swift supervisory intervention—does it have an incentive to promptly report this to the supervisory authorities responsible for maintaining financial stability? And even when banks do communicate to authorities, how credible is that communication—free from exaggeration, understatement, or noise?

We approach these questions by exploring how aligned the interests of a better-informed bank and a less-informed authority are in averting threats to the financial system. Our motivation is based on two key observations: first, supervisory authorities have frequently lagged behind financial institutions in understanding and responding to adverse developments in financial markets; and second, for time-critical assessments of systemically important banks, authorities often depend on input from peer institutions. We model a systemically important bank and its susceptibility to a bank run. Its systemic importance arises from its central role in the interbank market, where it offers demandable deposits to investment banks operating in otherwise segmented banking markets. Investment banks hold such deposits to preserve flexibility in case better investment opportunities arise. They withdraw at short notice to seize these opportunities as and when they present themselves (following Dietrich and Gehrig, 2025), but also upon receiving bad news about the systemically important bank's future earnings (following the global games approach by Goldstein and Pauzner, 2005).

An investment bank that receives information about the systemically important bank before others gains a privileged position for two reasons. First, its informational advantage allows it to withdraw before anyone else. Second, it can choose whether or not to communicate its private information to a supervisory authority. Such communication is costless, non-binding, and unverifiable; i. e., cheap talk. The privileged bank may send a message suggesting whether the systemically important bank is facing an impending run; and if so, the message may even indicate the amount of taxpayer money (allegedly) required for the bank's bailout. Alternatively, the privileged bank may not disclose anything at all. Upon receiving and interpreting the message from the privileged bank, the supervisory authority allocates its fixed budget between providing public goods and bailing out the systemically important bank. Consequently, a bailout raises the threshold for a bank run but comes at the expense of funding for public goods. The authority's allocation is observed by all other investment banks, who then either withdraw their deposits in random order or remain invested in the systemically important bank, depending on their own investment opportunities and assessment of the systemically important bank's risk.

We establish the following results. A privileged bank knowing that the systemically important bank is in critical condition may truthfully inform authorities, provided it lacks profitable alternatives and thus values the continued functioning of the interbank market. Depending on its owners' valuation of the public good, it may even suggest an efficient bailout size. However, if that valuation is low, it may propose an inflated bailout, even when no existential threat exists. Conversely, if that valuation is high, it may not suggest a bailout, even when the bank faces easily solvable liquidity issues. If the privileged bank has secured better investment alternatives, it signals all is well with the systemically important bank, regardless of the actual risk, to preserve the public good for its owners.[1] We therefore conclude that supervisors must stay closely attuned to market developments, which requires them to actively gather and interpret information about the condition of the signal sender, the systemic bank, or both. Only then can supervisors jointly assess the meaning of the messages received ('the talk') and the state of the financial system ('the city').

Accounting data is widely used to anticipate distress and failure, forming the basis for supervisory tools such as accounting-based ratings. A prime example is the CAMELS ratings used in the U. S. supervisory system.[2] Market instruments may further reflect insider information useful for predicting risk (e. g., Das et al., 2007). Market-based measures like the z-score (Altman, 1968) or

[1]Unlike, e. g., Gehrig (1997), we do not model strategic motives to undermine competitors in trouble.

[2]This system refers to C(apital), A(ssets), M(anagement Quality), E(arnings), L(iquidity), and S(ensitivity); see Drehmann and Juselius (2014) and Correia et al. (2024) for recent applications.

SRISK (Brownlees and Engle, 2016; Gehrig and Iannino, 2018, 2021) aggregate such signals to forecast (systemic) risk. Berger et al. (2000) show that market and accounting data are complementary. Our work highlights a distinct channel: the communication of private information by institutional investors with close, ongoing ties to a bank.

In our model, private-sector stakeholders obtain information about peers in the early stages of bank runs, which matches a prominent feature in financial history. In the U. S. before the Federal Reserve's creation in 1913, it was industry insiders who provided emergency lending during crises (Gorton and Tallman, 2016) and private-sector bank examiners helped discipline banks during the 1893 panic (Calomiris and Carlson, 2021). Most notably, the Panic of 1907 was resolved through private intervention when J. P. Morgan and his friends supplied liquidity to halt contagion from trust companies—early shadow banks—to the overall banking system (Frydman et al., 2015; Fohlin and Gehrig, 2025). During the 1931 German banking crisis, some banks knew in advance which peers were likely to fail and withdrew their deposits before the collapses occurred (Blickle et al., 2024). While bank runs became relatively infrequent following the advent of financial regulation, the informational advantages of private-sector agents reemerged as a critical factor during the 2008 Global Financial Crisis. So were large institutional investors instrumental in the early phases of the crisis, precipitating withdrawals that led to runs on Northern Rock in the UK (Shin, 2009) and Lehman Brothers in the U.S. (Gorton and Tallman, 2016). More recently, in 2023, runs on Silicon Valley Bank, Signature Bank, and First Republic were again driven by informed, uninsured large depositors who withdrew funds before supervisors fully recognized the gravity of the situation (Cipriani et al., 2024).[3]

Methodologically, our analysis builds on the Allen et al. (2018) version of the Goldstein and Pauzner (2005) bank run model, whose origins go back to Bryant (1980) and Diamond and Dybvig (1983). We introduce three innovations: i) geographically dispersed, segmented investment banks; ii) a systemically important bank; and iii) an informational advantage of investment banks over the banking authority regarding the systemically important bank. Investment banks serve investors

[3] A related theoretical literature suggests that the informational edge of peer institutions over supervisors can support self-regulation and quality standards (e.g., Gehrig and Jost, 1995).

seeking flexibility to seize future opportunities, following Dietrich and Gehrig (2025).[4] This reflects the key role of institutional investors during the early stages of bank runs. Geographic dispersion creates a rationale for balancing idiosyncratic liquidity shocks (as in Gehrig, 1996; Dietrich and Vollmer, 2010). A centrally-placed bank facilitates this, making it systemically important. The informational asymmetry motivates communication from investment banks to the authority. These features allow us to replicate real-world core-periphery interbank networks, interpret uninsured deposits as interbank claims, link systemic bank runs to institutional investors, and highlight how insider communication shapes supervisory policy.

We also reintroduce a sequential service constraint into the Allen et al. (2018) framework. Though common in Diamond and Dybvig (1983)-type models, it is unclear why banks would not simply suspend convertibility to avoid runs (Allen and Gale, 1998; Gorton and Tallman, 2018), unless sequential service offers advantages. We follow Calomiris and Kahn (1991), who argue that sequential service incentivizes depositors to acquire costly information about banks. Although information costs are negligible in our model, it reflects the observed pattern during the early stages of bank runs, where uninsured institutional investors acquire private information about banks and withdraw early upon detecting risk.[5]

The remainder is organized as follows. Section 2 specifies the model setup. Section 3 analyzes the model, with a focus on the withdrawal game, and derives the ex-post efficient state aid. Section 4 studies how aligned the interests of a better-informed bank and a less-informed authority are in averting threats to the financial system. Section 5 discusses some policy implications. Section 6 concludes. Proofs are in the Appendix.

[4]By contrast, in Goldstein and Pauzner (2005), Allen et al. (2018), and in related models, retail banks serve consumers who want to take precautions against sudden consumption needs.

[5]Keister and Mitkov (2023) also grant informed investors an edge, but bail-in risk distorts their incentives. Their setup excludes self-fulfilling runs and uses bailouts and public goods to widen the scope for risk-sharing (see also Dietrich and Vollmer, 2024).

2 Setup

Overview We consider an economy consisting of a continuum of ex ante identical regions $k \in [0,1]$, each populated by a continuum of ex-ante identical *investors* $i \in [0,1]$ and one *investment bank*. There is also one inter-regional *systemically important bank* and a *banking authority*. Time is divided into two periods, or three dates $t \in \{0,1,2\}$, respectively. There is a private good at every date and a public good at date $t = 1$. As of date $t = 0$, the aggregate state of the economy is risky. At date $t = 1$, the aggregate state is a random variable $\tilde{\theta}$ uniformly distributed on $[0,1]$; let F denote the uniform distribution function and θ the realized value of $\tilde{\theta}$. At date $t = 2$, there are two possible aggregate states $s \in \{1,2\}$; state $s = 1$ with probability θ and state $s = 2$ with probability $1-\theta$.

Technologies There are four technologies. The first is *storage*. For every unit of the private good put into storage at either date $t \in \{0,1\}$, it returns one unit of the private good at the immediately following date $t+1$.

The second technology is *current production*. It can be initiated only at $t = 0$ by investing the private good. After one period, at date $t = 1$, current production does not yield a return yet but can be discontinued and liquidated, partially or fully. If liquidated, it yields a gross rate of return of one per liquidated unit of the private good invested at $t = 0$.[6] If not liquidated, current production's gross rate of return $\tilde{R}$ materializes at date $t = 2$ and depends on the aggregate state at that date

$$\tilde{R} = \begin{cases} R & \text{if} \quad s = 1 \\ 0 & \text{if} \quad s = 2 \end{cases} \tag{1}$$

Finalizing production has higher expected returns than liquidation; i. e., $R > 2$. Henceforth, we refer to current production as the R-technology.

The third technology is *future production*. It becomes available only at $t = 1$ and delivers a higher per-unit return of $Q > R$ after one period; i. e., at $t = 2$. Henceforth, we refer to future production as the Q-technology.

[6] Hence, current production weakly dominates storage in transferring the private good between dates $t = 0$ and $t = 1$.

Finally, there is a *bailout technology* that transforms at date $t = 1$ the public good into the private good at a rate of one-for-one to be used for support of a bank considered to be about to fail; there is no technology that transforms the private good into the public good.[7]

Investors Each investor is endowed with one unit of the private good at date $t = 0$. An investor derives satisfaction from consumption $c \geq 0$ of the private good at date $t = 2$, which she values according to a utility function $u : \mathbb{R}_+ \to \mathbb{R}$. She additionally derives satisfaction from the level $x_\mathrm{P} \geq 0$ of the public good at date $t = 1$, which she values according to the utility function $v : \mathbb{R}_+ \to \mathbb{R}$. Her overall well-being is additively separable in the expected satisfaction derived from consumption of the private good and from the public good; i. e., $\mathrm{E}\big[u(c) + v(x_\mathrm{P})\big]$.

All investors have access to the R-technology at date $t = 0$, and to storage at dates $t \in \{0, 1\}$. There is a chance that (some) investors residing in any given region will become 'lucky' at date $t = 1$, in that they gain access to the more productive Q-technology. As of date $t = 0$, the share $\lambda \in (0, 1)$ of regions with (some) lucky investors is common knowledge and the chances for each region to host 'lucky' investors are identical and independent; investors within a region have equal and independent chances of gaining access to the Q-technology conditional on their region being one of the regions with (some) 'lucky' investors.[8] Therefore, a region's probability to host future 'lucky' investors is $\lambda > 0$, whereas with probability $1 - \lambda$ no investor in a region becomes 'lucky'. Finally, all investors can also deposit with the investment bank in their own respective region.

Investment banks Regional *investment banks* are risk neutral, protected by limited liability, and maximize expected profits from *retail financial services* (as specified below) offered to investors residing in the same region as the bank. Each investment bank has direct access to storage and the R-technology. It has no direct access to the Q-technology, but can lend to 'lucky' investors if there are any. An investment bank can also deposit at date $t = 0$ with a systemically important bank and withdraw such deposits (as specified below) at a subsequent date of its choice; i. e., either at $t = 1$

[7] Except for future production, the available technologies are identical to the ones in, e. g., Allen et al. (2018).

[8] To keep the analysis tractable without affecting the main results, the Q-technology exhibits constant returns to scale, implying that the size of the investor group potentially gaining access to it in each region is irrelevant.

or at $t = 2$. For the sake of expositional clarity, there is only one investment bank per region. The regional market for banking services is fully contestable, though; i. e., an investment bank operates under perfect *Bertrand* competition with potential competitors from that same region who would enter the market whenever an investment bank would not offer services as to maximize expected utility $\mathrm{E}\big[u(c)\big]$ of investors. Abusing terminology slightly, an investment bank is called 'impatient' provided there are (some) 'lucky' investors in its region at $t = 1$, and 'patient' otherwise.

Systemically important bank The systemically important bank is also risk neutral and protected by limited liability, but maximizes expected profits from *wholesale financial services* (as specified below) offered to regional investment banks. The systemically important bank has direct access to storage and the R-technology. It does not have access to the Q-technology. There is only one systemically important bank. However, the market for its banking services is fully contestable. Hence, the wholesale services it offers to investment banks are such that the latter can offer retail services to investors as to maximize their expected utility $\mathrm{E}\big[u(c)\big]$.

Frictions The following frictions exist.

1. Markets are incomplete. Specifically, there are no markets where aggregate risks can be traded. Also, no secondary market exists at date $t = 1$ on which (claims on) the R-technology can be traded.

2. Following ideas put forward first by Wallace (1988), transaction costs associated with the regional distribution of investment banks imply that the deposit contracts, which investment banks have with the systemically important bank, are incomplete and re-negotiations too costly. Also, these contracts are subject to a sequential service constraint. Accordingly, investment banks are served in the order in which they demand withdrawal from the systemically important bank at date $t = 1$, and those that withdraw at that date do not know their place in the queue. Once they withdraw, banks will distribute funds to their investors immediately and cannot be taxed.

3. Credit frictions hamper the flow of funds across regions. Specifically, while investors who gain access to the Q-technology at date $t = 1$ can borrow funds to invest from the investment bank located in their own region, they cannot borrow from investment banks in other regions, and they cannot borrow from or deposit with the systemically important bank. Also, investment banks cannot borrow from and lend to each other.

4. Informational asymmetries prevent the systemically important bank to identify at date $t = 1$ the regions where investors have become 'lucky'. Therefore, it cannot lend to anyone with such access, be it directly (i. e., to 'lucky' investors) or indirectly (i. e., to investment banks in regions with 'lucky' investors).

Banking Authority There is a banking authority BA in charge of averting inefficient failures of systemically important financial institutions. To perform its task, BA has a budget $T > 0$ at date $t = 1$ from which it can provide state aid $x_{\mathrm{B}} \geq 0$ at that very date in support of the bank. It cannot commit resources at any date for any future date. Whatever is not spent on state aid will remain for spending on the public good $x_{\mathrm{P}} \geq 0$ at $t = 1$. The budget is balanced; i. e., the authority cannot raise taxes and cannot borrow. Therefore, $T = x_{\mathrm{P}} + x_{\mathrm{B}}$. State aid comes in form of the private good and cannot be used in any other way than to prevent the liquidation current production. Granting state aid is hampered by an informational disadvantage of the BA, for it has no knowledge of the financial status and health of any bank (investment or systemically important bank) at date $t = 1$.

Information and sequence of events At date $t = 0$, the distribution F of the aggregate state $\tilde{\theta}$ and the share λ of regions with (some) 'lucky' investors are common knowledge; contracts are agreed upon between investment banks and investors as well as between investment banks and the systemically important bank; current production starts; all portfolio choices become public information.
At date $t = 1$, information structure and sequence of events is complex:

1. Before anyone else, one (randomly picked) *privileged investment bank* observes two private signals. One, it learns whether (some) investors in its own region have become 'lucky'. Two,

it receives a perfect signal about the true aggregate state θ. Based upon this knowledge, this investment bank can send a non-verifiable message to the BA.

2. After receiving and interpreting this message, the BA allocates its budget T between state aid x_{B} for the systemically important bank and the public good x_{P}. This allocation immediately becomes public knowledge.

3. The remaining investment banks make two further private observations. One, they learn whether (some) investors in their respective region have become 'lucky'. Two, they receive their own private, noisy signal about the aggregate state θ. The signal received by the investment bank located in region i is of the form $\Theta_i = \theta + \varepsilon_i$ where ε_i is a uniformly and independently distributed small error term with $\varepsilon_i \in [-\varepsilon, +\varepsilon]$.

4. All investment banks who wish to withdraw from the systemically important bank at $t = 1$ join a queue. The privileged investment bank gets the first position, every other investment bank follows after in random order. To pay out withdrawal demands, the systemically important bank uses the private goods held in storage first and, provided storage is depleted, liquidates current production as long as it has not already run out of assets.

5. Investment banks in regions with (some) 'lucky' investors lend all available private goods (storage from $t = 0$ to $t = 1$, plus liquidation value of current production started in their own region, plus withdrawn funds from the systemically important bank) to 'lucky' investors in their respective region. Investment banks in regions without any 'lucky' investors store all private goods already held in storage plus any withdrawn funds from the systemically important bank, but do not liquidate any current production started in their own region.

Finally, at date $t = 2$, provided the systemically important bank survives date $t = 1$ and the state is $s = 1$, goods are produced and split equally among those investment banks which have not withdrawn from the systemically important bank at date $t = 1$. Investment banks take all private goods available to them and distribute them equally to all investors in their region.

To conclude the setup, we also make the following assumptions.

Assumption 1 $v \in C^2(\mathbb{R}_{++}, \mathbb{R})$ *with* $v(0)=0$*,* $v'(x)>0$*,* $v''(x)<0$*,* $\lim_{x\to 0} v'(x)=\infty$*, and* $\lim_{x\to\infty} v'(x)=0$*.*

Assumption 2 $u \in C^2(\mathbb{R}_{++}, \mathbb{R})$ *with* $u(0)=0$*,* $u'(x)>0$*,* $u''(x)<0$*,* $\lim_{x\to 0} u'(x)=\infty$*,* $\lim_{x\to\infty} u'(x)=0$*, and* $R(x) = -xu''(x)/'(x) < 1$ *for all x.*

Assumption 3 $Ru(1) < v'(T)$*.*

Assumption 1 states that investors have positive and strictly decreasing marginal utility from the public good. Assumption 2 states that investors are risk averse with respect to the private good, with relative risk aversion smaller than one; assuming $u(0) = v(0) = 0$ simplifies the exposition. Assumption 3 is used later to ensure that state aid is inefficient if it cannot avert a bank run.

3 Bank Runs and Bailouts

The analysis of the model in this paper focuses on communication about the aggregate state θ at date $t = 1$, and the associated effects on the *withdrawal game* among investment banks at that date. As a precursor, we merely describe the *depositing game* at date $t = 0$, details of which can be gathered easily from Dietrich and Gehrig (2025). We then study the decisions of investment banks in the withdrawal game provided there is *no bailout*. Next, we determine the ex-post *efficient bailout* policy; i. e., the amount of state aid to the systemically important bank that the banking authority would grant for a given contract between systemically important bank and regional investment banks—provided the banking authority actually knew the aggregate state θ at date $t = 1$.

3.1 Intermediated Banking Arrangement

As of date $t = 0$, no investor knows for sure whether she will gain access to the Q-technology, creating scope for *risk sharing*. Suppose, counter-factually, there were no friction. Investors from all regions could pool their resources to form a jointly owned investment bank at $t = 0$. This bank would transfer all funds from date $t = 0$ to $t = 1$ to lend them at $t = 1$ to 'lucky' investors, whose earnings at $t = 2$ would then be distributed pro rata to all investors. The transfer from to $t = 1$ could be through storage or investing in the R-technology; letting the R-technology mature at $t = 2$ would be inefficient, though. This situation aligns with the frictionless case analyzed in Dietrich and Gehrig (2025).

Such scheme does not work globally, however. Specifically, the possibility that the share of 'lucky' investors in a region can be zero gives risk-sharing an inter-regional dimension. But inter-regional risk-sharing is hampered by inter-regional credit frictions. The best investors can do is to hold shares in regional investment banks and instruct them to jointly pool the funds from all regions in the systemically important bank that devises a second-best, inter-regional risk-sharing mechanism. Suppose, counter-factually, the R-technology were risk-free. The systemically important bank would invest all funds in the R-technology. At $t = 1$, impatient investment banks withdraw to fund their 'lucky' investors' Q-projects; the systemically important bank liquidates part of the R-investment to finance these withdrawals. Patient investment banks wait until $t = 2$ to withdraw, distributing the returns from the systemically important bank's remaining R-investment to their investors. Because investors' relative risk aversion is below one, early withdrawals yield more than the initial deposit. Such systemically important bank aligns with the frictional case in Dietrich and Gehrig (2025).

Finally, re-introduce risk in the R-technology. Being an aggregate fundamental risk that is not fully resolved even at $t = 1$, investors (through their investment bank) have to bear it. Upon receiving private signals about the prospects for the systemically important bank, investment banks may run on the systemically important bank. The threat of a run may justify welfare-improving bailouts. Leaving informational advantages of institutional investors and their communication to the banking authority aside, the problem for our (wholesale) systemically important bank in its dealings with regional investment banks aligns with the problem of the (retail) bank in Allen et al. (2018)—except for the latter's limitations in interpreting bank runs as realizations of *systemic risk*. However, due to their similarities, we conjecture that one can still infer that the promised payments upon early withdrawal, denoted d, remain above one in equilibrium.

3.2 Bank runs without state aid

Suppose state aid can be ruled out; e. g., the banking authority, BA, commits itself to spend its entire budget T on the provision of the public good (i. e., $x_{\mathrm{P}} = T$). Suppose also that the contract is such that a run will not happen with certainty (i. e., $\lambda d < 1$). Then, for $\varepsilon \to 0$ patient investment banks are indifferent between early withdrawal at date $t = 1$ and waiting until date $t = 2$ provided

$$0 = \int_{\lambda}^{1/d} \left(\theta u\left(R\tfrac{1-nd}{1-n}\right) - u(d)\right) \mathrm{d}n + \int_{1/d}^{1} \left(0 - \tfrac{1}{nd}u(d)\right) \mathrm{d}n \tag{2}$$

with n being the share of investment banks withdrawing from the bank at date $t = 1$. This share includes all impatient investment banks and potentially also (some) patient investment banks. The right hand side shows the additional expected utility of an investor in a patient investment bank if it does not withdraw at date $t = 1$ instead of withdrawing at $t = 1$. The first term states such utility differential conditional on the survival of the systemically important bank, the second term conditional on its failing at $t = 1$. Hence, there is a unique $\bar{\theta} \in \,]u(1)/u(R), 1[$ for which all patient investment banks are just indifferent; i. e.

$$\bar{\theta} = \frac{u(d)\,(1 - \lambda d + \ln d)}{d \int_{n=\lambda}^{1/d} u\left(R\tfrac{1-nd}{1-n}\right) \mathrm{d}n}. \tag{3}$$

There is thus a bank run if and only if $\theta < \bar{\theta}$.

By Assumption 3, two further observations follow.

Observation 1 $x_{\mathrm{B}} \leq \lambda d$.

Proof: See Appendix A. □

The first observation is that, from the BA's perspective, a bailout could be considered if the systemically important bank suffers from illiquidity, but not if it is insolvent.

Observation 2 $\theta R u'\left(R\frac{1-\lambda d + x_{\mathrm{B}}}{1-\lambda}\right) - v'(T - x_{\mathrm{B}}) < 0$ *for all* $x_{\mathrm{B}} \geq 0$.

Proof: See Appendix B □

The second observation is that if the systemically important bank does not require a bailout at date $t = 1$, then allocating resources to it does not increase the expected utility of investors in patient investment banks. It is thus a technical condition that later ensures that the BA wishes to consider a bailout only to the extent that it prevents a bank run at date $t = 1$ but not to allow investors in patient investment banks to receive higher payouts from the systemically important bank at $t = 2$. In other words, the relationship between BA and systemically important bank is not plagued by crony capitalism.

3.3 Ex-post efficient state aid

Suppose BA does not rely on communication by any investment bank with close relationships to the systemically important bank; i. e., BA directly observes θ at date $t = 1$. For $\theta > \bar{\theta}$, BA infers that there will be no run on the systemically important bank. No inefficient liquidation thus occurs even if BA does not intervene. As the private good provided by BA cannot be used in any other way than to prevent the liquidation of production, the authority's objective reads

$$\max_{x_{\mathrm{B}} \in [0,T]} \quad \lambda u(Qd) + (1-\lambda)\theta u\left(R\frac{1-\max\{0,\lambda d - x_{\mathrm{B}}\}}{1-\lambda}\right) + v(T - x_{\mathrm{B}}) \tag{4}$$

Problem (4) states that BA aims at allocating its budget T between bailout funds x_{B} and provision of public goods $T - x_{\mathrm{B}}$ as to maximize the welfare of society, subject to a survival of the systemically important bank even without bailout ($\theta \geq \bar{\theta}$). In so doing, BA takes as given the now known success probability θ for R-investments, and the deposit contract between systemically important bank and investment banks, which stipulates payout d upon early withdrawal at date $t = 1$. Maximum welfare of society trades off the utility derived from the public good with risk-sharing among investors. As regards the latter, in regions where some of the investors turned out 'lucky' get (through their respective investment bank) the promised payout of d which generates Q per unit invested leaving Qd for each investor in those regions; the other investors in regions where nobody turned out 'lucky' derive satisfaction from sharing (through their respective investment bank) the returns of the not liquidated investments in the R-technology, provided it is successful. Importantly, the share of investments in the R-technology that is to liquidated depends on how much bailout funds x_B are made available.[9] Problem (4) is convex and, by Observation 2, its unique solution is $x_\text{B} = 0$.

For $\theta < \bar{\theta}$, state aid to avert a run on the systemically important bank could be justified. Whether or not to grant state aid to the bank, and if so which amount to give, depends on whether the state aid is sufficient to actually prevent a bank run. Consider the function $G : [0, \lambda d] \times [0,1] \to \mathbb{R}$ defined by

$$G(x_\text{B}, \theta) := \int_{\lambda}^{\min\{1,(1+x_\text{B})/d\}} \left(\theta u\left(R\tfrac{1-nd+x_\text{B}}{1-n}\right) - u(d)\right) \mathrm{d}n + \int_{\min\{1,(1+x_\text{B})/d\}}^{1} \left(0 - \tfrac{(1+x_\text{B})}{nd} u(d)\right) \mathrm{d}n. \quad (5)$$

The right hand side of (5) modifies the respective expressions from Eq. (2) and states the additional expected utility of an investor in a patient investment bank if it does not withdraw at date $t = 1$ instead of withdrawing at $t = 1$—this time, however, including state aid $x_\text{B} \in [0, \lambda d]$. Note, this differential does not depend on the utility derived from the public good, as it cancels out.

If for $(x_\text{B}, \theta) \in [0, \lambda d] \times [0,1]$ the equation

$$G(\theta, x_\text{B}) = 0 \quad (6)$$

holds, a patient investment bank is indifferent between withdrawing early or late for this given combination (x_B, θ). According to the implicit function theorem, Equation (6) then defines the threshold level for θ as a function g of the level of state aid, x_B, given by

$$g(x_\text{B}) = \frac{(1+x_\text{B})(1+\ln d - \ln(1+x_\text{B})) - \lambda d}{d \displaystyle\int_{n=\lambda}^{(1+x_\text{B})/d} u\left(R\tfrac{1-nd+x_\text{B}}{1-n}\right) \mathrm{d}n} u(d). \quad (7)$$

Note $g(0) = \bar{\theta}$. For every $\theta \in [0, \bar{\theta}]$ for which $\{g^{-1}(\theta)\} \neq \emptyset$ we can define $x_\text{B}(\theta) = \min\{g^{-1}(\theta)\}$ as the smallest level of state aid which makes patient investment banks just indifferent between running and not running at date $t = 1$ and is thus sufficient to prevent a bank run.

[9] Note, by assumption 2, ex post utility in case of failure of the R-technology is $u(0) = 0$.

Our first lemma states that the relation between sufficient state aid and the success probability θ, while not necessarily differentiable, is monotone.

Lemma 1 (Monotonicity) *Consider any two $j = 1,2$ with $\theta_j \in [0,\bar{\theta}]$ and $\{g^{-1}(\theta_j)\} \neq \emptyset$. Then $x_{\mathrm{B}}(\theta_1) > x_{\mathrm{B}}(\theta_2)$ if and only if $\theta_1 < \theta_2$.*

Proof: See Appendix C. □

Lemma 1 together with Observation 2 implies that, if a run on the systemically important bank is to be averted, it is never optimal to support it by more than necessary to achieve just this. The following Lemma 2 states the conditions under which it is not ex-post efficient to bailout the systemically important bank—even if actually threatened by a bank run.

Lemma 2 (No state aid to a distressed systemically important bank) *Suppose $\theta \in \left[0,\bar{\theta}\right]$. The policy of an informed BA is $x_{\mathrm{B}}^* = 0$ provided either of the following conditions hold*

$$\{g^{-1}(\theta)\} = \emptyset \tag{8}$$

$$x_{\mathrm{B}}(\theta) > T \tag{9}$$

$$\lambda u(Qd) + \theta(1-\lambda)u\left(R\frac{1-\lambda d + x_{\mathrm{B}}(\theta)}{1-\lambda}\right) + v(T - x_{\mathrm{B}}(\theta)) < \frac{\left(\lambda u(Qd) + (1-\lambda)u(d)\right)}{d} + v(T) \tag{10}$$

Proof: Omitted. □

If condition (8) holds, the systemically important bank is *fundamentally insolvent* and deserves to go bankrupt, for there is no $x_{\mathrm{B}} \in [0, \lambda d]$ such that $g(x_{\mathrm{B}}) \leq \theta$. State aid, even if it fully covers the withdrawal demand of all impatient investment banks, is insufficient to induce patient investment banks to wait with their withdrawal until date $t = 2$. If condition (9) holds, the banking authority suffers from a *lack of resources* to effectively support an illiquid but solvent systemically important bank—the funds required for an effective bailout, $x_{\mathrm{B}}(\theta)$, exceed the available budget, T. Finally, if condition (10) holds, bailouts—although perhaps feasible and helping only with illiquidity problems—are simply *not worth it*, for they would leave investors with lower welfare than letting the systemically important bank go bust and spending the BA's budget solely on the provision of the public good. In either of these cases, optimal state aid is $x_{\mathrm{B}}^{*}=0$ as it is not at all optimal to grant some aid to a bank while letting it still fail.

In all other cases, it is ex-post efficient to provide state aid to just avert a bank run (i. e., $x_{\mathrm{B}}^{*}=x_{\mathrm{B}}(\theta)$). We summarize our findings in Theorem 1.

Theorem 1 (Ex-post efficient state aid) *Under* Assumption 3 *state aid by an informed BA satisfies*

$$x_{\mathrm{B}}^{\mathrm{eff}}=\begin{cases} x_{\mathrm{B}}^{*} & \text{if} \quad \theta\in\left[0,\bar{\theta}\right] \\ 0 & \text{if} \quad \theta\in\left[\bar{\theta},1\right]. \end{cases}$$

Proof: Follows directly from Lemma 1 and Lemma 2. □

4 Sender (Non-)Communication

In this section, we consider the other interesting case where BA does not observe any signals about θ. Hence, BA relies on investment banks to pass on their private information. Although all investment banks learn about θ and their own patience at date $t=1$, only one (randomly picked) investment bank becomes privileged. This privileged bank distinguishes itself from all other investment banks in two respects. First, it can make a withdrawal from the systemically important bank before any other investment bank; i. e., it can secure itself the pole position in the queue of all that wish to withdraw at date $t=1$. Second, it can communicate to BA. Assume that BA can act upon this communication before anyone other than the privileged bank can make a withdrawal, what would the privileged investment bank want BA to do?

Let Σ be the set of all possible messages σ which the informed investment bank can make and $h:\Sigma\to\mathbb{R}_{+}$ be a function that maps a message σ to the amount of state aid; i. e., $x_{\mathrm{B}}=h(\sigma)$.[10] Assume that the message space Σ is such that $\left\{h^{-1}(x_{\mathrm{B}})\right\}_{x_{\mathrm{B}}\in[0,T]}\subseteq\Sigma$; i. e., the informed investment bank can perfectly control the amount of state aid through her message.

[10] On mapping messages onto actions see Neligh (2025).

Lemma 3 (Communication if privileged investment bank is impatient) *Suppose the privileged investment bank is impatient. Then, message σ satisfies $h(\sigma) = 0$.*

Proof: See Appendix D □

Intuitively, any impatient investment bank withdraws at $t = 1$ because (some) investors in its region have found much better investment alternatives (since $Q > R$). For a privileged impatient investment bank, it is not only irrelevant with which probability of success θ the R-technology actually succeeds and how much of the R-technology is going to be liquidated at date $t = 1$. A privileged impatient investment bank is also earlier informed about the aggregate state than anyone else. Hence, it can beat the queue and withdraw quickly enough to secure payout of its deposits in full. Any state aid would thus benefit only investors in other investment banks (patient if $\theta \geq \bar{\theta}$, and impatient as well as patient otherwise) at the expense of the provision of the public good. The privileged investment bank has no interest in either if it is impatient.

Lemma 4 (Communication if privileged investment bank is patient and states are favorable) *Suppose the privileged investment bank is patient and $\theta \geq \bar{\theta}$. Then, message σ is such that*

$$h(\sigma) \in \begin{cases} \mathbb{R}_{++} & \text{if } \frac{\theta R}{1-\lambda} u'\left(R\frac{1-\lambda d}{1-\lambda}\right) - v'(T) > 0, \\ \{0\} & \text{otherwise} \end{cases}$$

Proof: See Appendix E. □

Intuitively, if the privileged investment bank is patient, it may wait until date $t = 2$ instead of withdrawing at date $t = 1$. This withdrawal decision, and hence its call for state aid, depends on the state. Again, state aid is unnecessary for the privileged investment bank to withdraw its deposits in full, for it can beat the queue. Yet granting state aid may benefit the patient privileged investment bank as it leaves a higher share of investments in the R-technology to mature until $t = 2$—specifically if the patient privileged investment bank would have to share the benefits of state aid with a rather small mass of other patient investment banks; i. e., the share of regions without 'lucky' investors gaining access to new investment opportunities is not too large. The latter follows since there exist some $\overline{\lambda} < 1$ and some $\underline{\lambda} \in]0, \overline{\lambda}]$ such that $h(\sigma) > 0$ for all $\lambda > \overline{\lambda}$ and $h(\sigma) = 0$ for all $\lambda < \underline{\lambda}$.[11]

To determine the message sent by a privileged patient investment bank in poor states, i. e., $\theta < \bar{\theta}$, it is helpful to let σ^* denote the solution to

$$\max_{\sigma \in \Sigma} \quad \theta u\left(R\tfrac{1-\lambda d + x_{\mathrm{B}}}{1-\lambda}\right) + v(T - x_{\mathrm{B}}) \tag{11}$$

$$\text{s.t.}$$

$$x_{\mathrm{B}} = h(\sigma),\, h(\sigma) \geq x_{\mathrm{B}}(\theta),\, 0 \leq x_{\mathrm{B}} \leq T.$$

The objective in Problem (11) is to maximize the expected utility, derived by the investors in the privileged patient investment bank, *conditional on its own late withdrawal* (for which the survival of the systemically important bank is a necessary condition). Here, the privileged investment bank takes into account its investors' valuation of the public good and the success probability, θ, of the systemically important bank according to its own private signal. The first constraint relates a message σ to the actual state aid x_{B} granted; the second constraint requires any state aid implied by the message to be sufficient to actually let the systemically important bank survive; and the third constraint requires that any state aid implied by the message must not exceed the BA's total budget. Suppose

$$\frac{\theta R}{1-\lambda} u'\left(R\tfrac{1-\lambda d + x_{\mathrm{B}}(\theta)}{1-\lambda}\right) - v'(T - x_{\mathrm{B}}(\theta)) \geq 0. \tag{12}$$

The solution σ^* then satisfies

$$h(\sigma^*) \in \begin{cases} \{z | x_{\mathrm{B}}(\theta) < z \leq T\} & \text{if (12) holds with strict inequality,} \\ \{x_{\mathrm{B}}(\theta)\} & \text{otherwise.} \end{cases} \tag{13}$$

The first line states the condition under which the privileged investment bank, if patient, wants BA to grant more state aid than required to merely help the systemically important bank survive. Note,

[11]This obtains from Observation 2, continuity of $\frac{\theta R}{1-\lambda} u'\left(R\frac{1-\lambda d}{1-\lambda}\right) - v'(T)$, and taking its limits for $\lambda \to 1$ and $\lambda \to 0$, respectively.

by Observation 2, there exist $\hat{\lambda} \in]\overline{\lambda}, 1[$ and $\check{\lambda} \in]0, \hat{\lambda}]$ such that this condition holds for all $\lambda > \hat{\lambda}$ and never holds for any $\lambda < \check{\lambda}$. Accordingly, it is more likely for a patient privileged investment bank to ask for too much state aid if the share of regions with ‘lucky’ investors is large.

Theorem 2 (Communication if privileged investment bank is patient and states are unfavorable) *Suppose*

$$u(d) + v(T) \geq \theta u\left(R\frac{1-\lambda d + h(\sigma^*)}{1-\lambda}\right) + v(T - h(\sigma^*)), \tag{14}$$

the privileged investment bank is patient, and $\theta < \bar{\theta}$. Then, message σ is such that

$$h(\sigma) = \begin{cases} 0 & \text{if either (8) } \textit{or} \text{ (9) } \textit{or} \text{ (14) } \textit{holds}, \\ h(\sigma^*) & \text{otherwise.} \end{cases}$$

Proof: See Appendix F □

Intuitively, any state aid for the systemically important bank which does not prevent a bank run would only benefit the other investment banks as the probability of them getting their deposits back from the bank is higher. The cost of state aid in terms of a lower amount of the public good is borne by everyone, however, including the privileged investment bank.

5 Discussion and Outlook

Table 1 summarizes our insights, indicating a potential for conflicts of interest. Impatient investment banks will always want to withdraw their funds in order to reinvest in higher yielding projects. Hence, if the privileged investment bank is impatient, it always wishes to protect the public good provision and sends messages as to deter BA from giving state aid to the systemically important bank—even if positive state aid is optimal.

— Table 1 about here —

Patient investment banks (i. e., without better investment alternatives) are more likely to communicate their information, albeit not always truthfully and not necessarily as a continuous function of their signal. A patient privileged investment bank may overstate or understate the required bailout funds, depending on the (marginal) valuation of a successful bailout relative to the (marginal) valuation of the public good. Provided it understates the required bailout funds, it will message the BA with the aim to deter it from providing any bailouts—and this can happen even if the information available to the privileged investment bank indicates a mere liquidity problem of the systemically important bank.

In our stylized setting, communications of investment banks with privileged information are cheap talk; i. e., costless, non-binding, and unverifiable. Just because talk is cheap does not imply incentives to communicate false statements about peers. However, unlike in canonical cheap talk games in the tradition of Crawford and Sobel (1982), inducing credible and truthful communication through equilibrium partitioning of messages does not work here. This is because the actual preferences of the sender are not known at the time of communication, and the bias in those preferences (relative to the authority's) is not monotone. Neither are supervisory authorities in (potential or actual) contractual relationship with peer institutions and thus cannot effectively deploy tools known from mechanism design theory.

Hence, while direct communication seems to remain the only possibility, authorities need to be put in a better position to (correctly) interpret the communications it receives from within the banking industry. For example, they need to understand the relative valuations of the message-sending bank as they drive incentives to over- or understate the actual status of systemically important financial institutions. Such information about the message-sending bank's business model and own financial situation is the key to decipher its messages—and thus complementary to the information it discloses. This type of information is typically costly to acquire, for instance by regularly orchestrating on-site visits or stress tests, and to make them informative about the motivations of the sending bank. It is also not known, a priori, which bank will be (the first) sending messages. Therefore, such complementary information acquisition needs to be applied to all potentially sending banks.

Empirical evidence strongly suggests a complementary role of on-site inspections by supervisors, as emphasized by Cole and Gunther (1998), Hirtle and Lopez (1999) and Berger et al. (2000), among others, while the nature thereof remains unclear. Regarding a need to better understand the informational role of supervisory stress tests, Flannery et al. (2017) present evidence about the informational content of bank stress tests for the stress-tested bank itself as well as for the overall state of the banking industry. This finding aligns nicely with communication problems of the type we pointed out here. Although the empirical literature does not inform about the sources of informational gains of onsite inspections and of stress tests per se, our analysis suggests that a finer industry knowledge is key to properly interpret messages from the finance industry ('the city'). Moreover, to the extent that the messaging bank understands that its messages are going to be scrutinized and interpreted by the receiving banking authority, another element of strategic communication may open up. In such a rich communication game the incentives of the sender to acquire costly information may be affected by the authority's own investments in technologies to interpret the sender's message.

Finally, while we argue in favor of active (and probably costly) communication between peer institutions and supervisory authorities, an immediate reaction to liquidity problems that emerged in 2023 was a call to reform and widen the scope of deposit insurance (Cecchetti et al., 2023; Heider et al., 2023). In our framework, a global deposit insurance covering all depositors in systemically important banks would not be a good idea at all. By eliminating the reasons for bank runs, even efficient ones, global deposit insurance would undermine the incentives for producing (costly) information about counterparties and generate a situation of banks having nothing at all to talk to the supervisory authorities. Thus, widening the coverage of deposit insurance will render it a positively costly institution, whereas exploiting the value of information production and communication probably provides socially cheaper ways of intervention. At any rate, a full analysis of the communication between the banking industry and a banking authority deserves more scrutiny in future analysis.

6 Conclusion

Our analysis highlights the need for a banking authority (and other financial supervisory authorities) to maintain an 'open ear' to the industry in order to improve the quality of communication, especially in periods of stress. By understanding market conditions and the financial conditions of peer banks, supervisors may get a better idea about the underlying communication incentives, and, hence, the proper meaning of the communicated information, or the lack thereof. Our analysis points to a complementary nature of on-site inspections and stress tests. By isolating particular characteristics or vulnerabilities of peers' business models, the communication (not) sent in periods of stress may reveal useful information required for a proper interpretation of the signals revealed. Ultimately, who communicates what and when matters crucially. But unlike stressed by Berger et al. (2000), communication is not a horse race between ratings, market assessments, or supervisory forecasts; rather it is an intricate bundle of complementary signals. We provide an argument that proper supervisory assessments are key to understand 'talk and the city'.

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	Authority	Privileged investment bank	
	Ex-post efficiency	impatient	patient
$\theta \in]\bar{\theta}, 1]$	$x_{\mathrm{B}}^{\mathrm{eff}} = 0$	$h(\sigma) = 0$	$h(\sigma) \in \begin{cases} \mathbb{R}_{++} & \text{if } \frac{\theta R}{1-\lambda} u'\left(R \frac{1-\lambda d}{1-\lambda}\right) > v'(T) \\ \{0\} & \text{otherwise} \end{cases}$
$\theta \in [0, \bar{\theta}[$	if $x_{\mathrm{B}}^{\mathrm{eff}} \in \begin{cases} \mathbb{R}_{++} & \text{if neither (8), (9), nor (10) hold} \\ \{0\} & \text{otherwise} \end{cases}$	$h(\sigma) = 0$	$h(\sigma) \in \begin{cases} \left\{ z \,\middle\vert\, x_{\mathrm{B}}^{\mathrm{eff}} < z \leq T \right\} & \text{if neither (8), (9), nor (14) hold while (12) holds with strict inequality} \\ \{x_{\mathrm{B}}^{\mathrm{eff}}\} & \text{if neither (8), (9), nor (14) hold while (12) holds with equality} \\ \{0\} & \text{otherwise} \end{cases}$

Table 1: Conflicts of interest

A Proof of Observation 1

The proof is by contradiction, distinguishing two cases: Suppose $x_{\mathrm{B}} > \lambda d$.

Case 1 There is no bank run. As λd is withdrawn, BA could increase x_{P} by reducing excess state aid $x_{\mathrm{B}} - \lambda d$, which would go otherwise to waste. Therefore $x_{\mathrm{B}} > \lambda d$ is not optimal.

Case 2 There is a bank run. Thus, the BA's problem would read

$$\max_{x_{\mathrm{B}} \in [0,T]} \quad \frac{1+x_{\mathrm{B}}}{d}\big(\lambda u(Qd) + (1-\lambda)u(d)\big) + v(T - x_{\mathrm{B}}). \tag{15}$$

We show that, contrary to the claim that the solution to this problem (15) satisfies $x_{\mathrm{B}} > \lambda d > 0$, the solution indeed satisfies $x_{\mathrm{B}} = 0$ for all $d \geq 1$.

Consider the first derivative to the objective function in problem (15)

$$\frac{1}{d}\big(\lambda u(Qd) + (1-\lambda)u(d)\big) - v'(T - x_{\mathrm{B}})$$

We next show that its sign is negative for all $x_{\mathrm{B}} \in [0,T]$. If this is so, then

$$\frac{1}{d}\big(\lambda u(Qd) + (1-\lambda)u(d)\big) - v'(T) < 0 \tag{16}$$

since $v'' < 0$.

- Suppose $d = 1$. Then,

$$\frac{1}{d}\big(\lambda u(Qd) + (1-\lambda)u(d)\big) = \lambda u(Q) + (1-\lambda)u(1) > \lambda u'(Q) + (1-\lambda)u'(1) \tag{17}$$

since $u'' < 0$ and $u(0) = 0$ together imply $u(x) > u'(x)$ for all $x > 0$. Therefore, a sufficient condition for the inequality in (16) to hold is

$$\lambda u'(Q) + (1-\lambda)u'(1) < v'(T). \tag{18}$$

Since $\lim_{Q\to 1}\left(\lambda u'(Q)+(1-\lambda)u'(1)\right)=u'(1)$, and assumption 3 ensures that $u'(1)<v'(T)$, and hence condition (16) holds for $Q\to 1$ if $d=1$. Furthermore, $u''<0$ implies that condition (16) holds for any $Q>1$ if $d=1$.

- To show that this continues to hold for $d>1$, it suffices to show that the LHS in equation (17), $\frac{1}{d}\left(\lambda u(Qd)+(1-\lambda)u(d)\right)$ is decreasing in d. Note, $u''<0$ along with $u(0)=0$ implies $\frac{\mathrm{d}}{\mathrm{d}x}\frac{u(x)}{x}<0$. Since

$$\frac{\lambda u(Qd)+(1-\lambda)u(d)}{d}=\lambda Q\frac{u(Qd)}{Qd}+(1-\lambda)\frac{u(d)}{d} \tag{19}$$

one obtains

$$\begin{aligned}\frac{\partial}{\partial d}\left(\frac{\lambda u(Qd)+(1-\lambda)u(d)}{d}\right) &= \lambda Q\left(\frac{\partial}{\partial x}\frac{u(x)}{x}\bigg|_{x=Qd}\right)\frac{\partial Qd}{\partial d}+(1-\lambda)\left(\frac{\partial}{\partial x}\frac{u(x)}{x}\bigg|_{x=d}\right)\\ &< 0.\end{aligned} \tag{20}$$

In sum, condition (16) holds for all $d\geq 1$, such that $x_{\mathrm{B}}=0$ would indeed solve the BA's problem, thus contradicting the initial claim $x_{\mathrm{B}}>\lambda d$.

B Proof of Observation 2

Since $u(0)=0$ we have $u(1)>u'(1)$. Therefore, $\theta Ru'\left(\frac{R}{1-\lambda}\right)<\theta Ru'(R)<\theta Ru'(1)<\theta Ru(1)<Ru(1)$ such that under assumption 3 the sign is negative for all $x_{\mathrm{B}}\geq 0$.

C Proof of Lemma 1

For any $\theta<\bar{\theta}$, $x_{\mathrm{B}}=0$ does not satisfy equation (6). Hence, if $0\leq\theta_1<\theta_2\leq\bar{\theta}$ then $x_{\mathrm{B}}(\theta_j)\neq\emptyset$ for both j requires $x_{\mathrm{B}}(\theta_1)>0$ and $x_{\mathrm{B}}(\theta_2)\geq 0$. Since $G'_\theta>0$, the function g, where defined, is continuous and satisfies $g'(x_{\mathrm{B}}(\theta))<0$. The latter is because if $g'(x_{\mathrm{B}}(\theta))>0$ then there would exist a $\bar{x}_{\mathrm{B}}<x_{\mathrm{B}}(\theta)$ for which $\theta\geq g(\bar{x}_{\mathrm{B}})$ which would be a contradiction of $x_{\mathrm{B}}(\theta)=\min\left\{g^{-1}(\theta)\right\}$. Therefore, $x_{\mathrm{B}}(\theta_1)>x_{\mathrm{B}}(\theta_2)$ if and only if $\theta_1<\theta_2$.

D Proof of Lemma 3

For $\theta \geq \bar{\theta}$, an impatient informed investment bank's objective is

$$\max_{\sigma \in \Sigma} \quad u(Qd) + v(T - x_{\mathrm{B}})$$

s.t.

$$x_{\mathrm{B}} = h(\sigma), 0 \leq x_{\mathrm{B}} \leq T.$$

As $v' > 0$, the unique solution is to send some message σ for which $h(\sigma) = 0$.

E Proof of Lemma 4

For $\theta \geq \bar{\theta}$, a patient informed investment bank's objective is

$$\max_{\sigma \in \Sigma} \quad \theta u\left(R\tfrac{1-\lambda d + x_{\mathrm{B}}}{1-\lambda}\right) + v(T - x_{\mathrm{B}})$$

s.t.

$$x_{\mathrm{B}} = h(\sigma), 0 \leq x_{\mathrm{B}} \leq T$$

The optimum message σ is such that $h(\sigma)$ satisfies

$$\frac{\theta R}{1-\lambda} u'\left(R\tfrac{1-\lambda d + h(\sigma)}{1-\lambda}\right) - v'(T - h(\sigma)) \leq 0$$

with strict inequality if and only if $h(\sigma) = 0$. Therefore, $h(\sigma) > 0$ if

$$\frac{\theta R}{1-\lambda} u'\left(R\tfrac{1-\lambda d}{1-\lambda}\right) - v'(T) > 0. \tag{21}$$

F Proof of Theorem 2

If either (8) or (9) holds, a bank run cannot be averted given the budget T and given that BA will not pay more than λd. If neither (8) or (9) holds, the message can be

- either $h(\sigma) < x_{\mathrm{B}}(\theta)$ in which case the informed patient investment bank withdraws at $t = 1$ and sends a message σ such that $h(\sigma) = 0$ because this solves

$$\max_{\sigma \in \Sigma} \quad u(d) + v(T - x_{\mathrm{B}})$$

$$\text{s.t.}$$

$$x_{\mathrm{B}} = h(\sigma),\, h(\sigma) < x_{\mathrm{B}}(\theta),\, 0 \leq x_{\mathrm{B}} \leq T;$$

- or $h(\sigma) \geq x_{\mathrm{B}}(\theta)$ in which case the informed patient investment bank withdraws at $t = 2$ and sends a message σ^* satisfying (13).

Finally, $0 \succsim h(\sigma^*)$ if and only if $u(d) + v(T) \geq \theta u\left(R\frac{1-\lambda d + h(\sigma^*)}{1-\lambda}\right) + v(T - h(\sigma^*))$.