BANK RUNS: REGULATION VS. COORDINATION PROBLEM

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Abstract

This paper employs game theory to provide insights into the phenomenon of bank runs. The model presented in the study involves each player making a decision between withdrawing their deposit from the bank, thereby forfeiting accumulated interest, or leaving the deposit in the bank, which involves the risk of partial or total loss. The model incorporates variables such as interest rates, transaction fees, stock falls rate, and deposit insurance to reflect real-world conditions. The primary aim of this contribution is to analyze the fundamental causes of bank runs and evaluate the effects of deposit insurance on depositors' withdrawal strategies. Within the framework of a dynamic game with incomplete information, a payoff matrix is constructed for the players, and the results are thoroughly examined. The analysis reveals two Bayesian Nash equilibria and identifies two strategies that are considered optimal in the context of the game without deposit insurance. In this scenario, these strategies lead to the occurrence of a bank run. Conversely, when deposit insurance is introduced into the game, the optimal strategy shifts to keeping deposits in the bank. This adjustment reduces the likelihood of bank runs, highlighting the stabilizing effect of deposit insurance on the banking system. Nevertheless, the article shows with examples, that the deposit insurance is not such effective as it is thought and that the bank run is a coordination problem rather than regulation, while the macroprudential policy plays a significant role in the depositor's behavior

Keywords: *Bank run, game theory, dynamic game of incomplete information, Diamond-Dybvig model*

1. INTRODUCTION

Bank runs are a social phenomenon that might cause devastating consequences for the economy. They occur when a significant number of depositors withdraw their funds from a bank over a short period of time, fearing that the bank is about to fail. This is a self-fulfilling prophecy, since no bank is able to pay off all its obligations immediately (Arifovic et al., 2013). They can lead to widespread financial instability and potentially trigger a domino effect of negative consequences. The sudden withdrawal of funds from banks can lead to liquidity shortages, making it difficult for financial institutions to meet the demands of their depositors and fulfil their obligations. This ultimately leads to bank failures, which further destabilize the financial system as a whole. These bank failures can disrupt the flow of credit in the economy, as banks are unable to lend to businesses and individuals. This can result in a contraction of economic activity, as businesses are unable to access the necessary funds for investment and expansion (Shakina, 2019; Frexias at al., 2000). Additionally, bank runs can erode public confidence in the financial system, causing a loss of trust and leading to further withdrawals, exacerbating the crisis (Allen et al., 1998).

Bank runs were observed throughout history and were especially common during periods of financial crisis. One of the earliest recorded bank runs occurred in 17th century in Sweden, with the collapse of the Stockholm Banco in 1664. The bank defaulted on its loans, leading to panic among depositors and taking over the control on the Bank to the Crown (Pihl, 2024). A surge of bank runs preceded the Great Depression of the 1930s. In a similar vein, the 2008 financial crisis was marked by several instances of bank runs, such as the collapse of Lehman Brothers and the near-failure of AIG. Over the past several years, both the Czech Republic and the United States have had several notable instances of bank runs. The Russian invasion of Ukraine in 2022 caused a bank run on Sberbank in the Czech Republic. In 2023, the failure of Silicon Valley Bank and Signature Bank in the United States was caused by two instances of bank runs. Both of the cases will be considered more in details later.

Bank runs can have a significant and far-reaching effect on the economy. When depositors engage in quick fund withdrawals from banks, it puts a strain on the banks' liquidity, resulting in a decrease in their capital available for lending to businesses and consumers. This decline in accessible financing might lead to less investment and a deceleration in economic growth. Moreover, bank runs have the potential to undermine public trust in the financial system, making it more difficult for banks to get funds and provide loans.

This article provides a comprehensive analysis of bank runs, exploring their origins using game theory to gain a better understanding of how depositors behave. The work seeks to provide insight into the causes of bank runs by exploring the underlying elements that provoke them. Furthermore, it examines the impact of deposit insurance on depositors' choices to withdraw funds, providing a thorough examination of how these insurance programs could reduce the likelihood of bank panics. The objective of this study is to examine the underlying reason for bank runs and explore the influence of deposit insurance on the withdrawal tactics of depositors.

2. SYSTEMATIC TECHNIQUES AGAINST BANK RUNS

There are systematic techniques to prevent bank runs. One of the most important structures toward this end are deposit insurance, bank capital requirements, bank capital control, public communication and transparency, and central banks acting as a lender of last resort (Frexias at al., 2000; Lu, 2023; Sun, 2023).

It’s commonly thought that once the depositors know that their deposit is perfectly safe, they have no incentive to undertake the costly task of withdrawing their deposits from the banks when the contagion spreads. They have absolutely no incentive to take their money out of the banks.

Nevertheless, there are two problems with deposits. The first problem is that deposit insurance may create adverse selection and a moral hazard problem. As deposit insurance structure protects the depositors against the potential costs of banks' failure, they have the incentive to select high-risk banks because these high-risk banks offer higher interest rates. As a result, deposit insurance may direct the savings of the economy toward the banks with worse financial structures. And, because of deposit insurance, the shareholders and the top managers of the banks, who typically do not participate in the account of small deposits, may have the tendency to undertake higher risks and speculative activities. These two problems may together increase the overall equity risk in the country. (Noman et al.2022;Chiaramonte et al.2020)

The second problem is that there are cases in the newest history when the deposit insurance, being an efficient instrument, didn’t prevent depositors from impulsive withdrawals based on the believe of a bank fall. This may be due to ignorance of exactly how the state deposit insurance system works, coupled with a reluctance to deal with the bureaucratic system. This hypothesis will be discussed in detail in this article.

Deposit insurance should be implemented within the right and comprehensive macroprudential policy. Regulatory and controlling policies should be aligned with each other ensuring that regulations provide the best opportunities for banks to help them properly assess, monitor, and control risks. The question is whether market discipline improves when safety nets are in place. If deposit insurance is reliable, depositors might not hold banks accountable because the risk of losing their money is minimal. Therefore, a well-designed deposit insurance system should reassure small depositors and prevent them from panicking, while also addressing the potential negative effects of giving insured banks a false sense of security. (Amador, Bianchi, 2024; Ashraf et al.2020; Barth et al., 2013)

In this analysis, we explore the impact of various levels of deposit insurance liability on the occurrence of bank runs, particularly in the context of recent reforms. Additionally, we assess the implications of the Basel III introduced by the Basel Committee on Banking Supervision (BCBS), which includes new guidelines for managing systemically important banks. Our findings indicate that banking crises can create a reliance on deposit insurance, effectively trapping financial institutions and the broader economy in a cycle of risk and dependency. This reliance undermines market discipline, as depositors may feel overly secure and thus less vigilant about the risks taken by banks. To mitigate the negative effects of such reforms and to preserve market discipline, it is crucial for governments to gradually diminish the systemic importance of banks deemed "too big to fail." By doing so, they can reduce the moral hazard associated with large financial institutions, ensuring a more stable and resilient banking system. (Cummings, Guo, 2020; Gottschalk et al., 2022)

3. SBERBANK CASE IN 2022

On the February 25, 2022, Sberbank Europe AG, the European branch of Sberbank, the largest bank in Russia, saw a substantial occurrence of customers withdrawing their funds in the Czech Republic. This happened the next day as political tensions escalated, and Russia initiated its invasion of Ukraine. Until then, the Sberbank CZ was a regular Czech bank that had been meeting the banking regulation requirements of the Czech National Bank (CNB, 2022), including but not limited to the minimal capital requirements and participation in the Financial Market Guarantee System of the Czech Republic.

The bank run on Sberbank in the Czech Republic was primarily triggered by escalating fears among depositors regarding the safety of their assets following the imposition of severe sanctions on Russian financial institutions. The CNB observed a sharp increase in withdrawals as customers sought to secure their funds amidst the uncertain economic environment even though, their deposits were protected up to €100.000, or in some special cases up to €200.000, by the Financial Market Guarantee System and the Deposit Insurance Fund (CNB, 2022). Due to the bank's inability to pay its obligations immediately, CNB took a decision to revoke license.

This scenario emphasized the weaknesses of banking system functioning inside the realm of social and political turmoil that directly influence the depositors' behavior. This demonstrates us a case when a bank run leads to insolvency even with the state deposit insurance system, bank capital requirements, bank capital control, and transparency. The only missing techniques were public communication and central banks acting as a lender of last resort, which is rather related to political reasons than economical. This case shows us that the bank run is rather the coordination issue than the regulation one.

4. SILICON VALLEY BANK CASE IN 2023

Silicon Valley Bank (SVB) was a key financial institution primarily serving the technology sector and venture capital-backed start-ups. It was founded in 1983 and had become one of the most influential banks in the tech industry. Its clientele included a range of start-ups, venture capital firms, and tech companies, making it highly interconnected with the start-up ecosystem. (Dong at al., 2024; Metrick, Schmelzin, 2023)

During the COVID-19 pandemic, tech companies and start-ups experienced significant growth, and SVB saw a massive influx of deposits as these firms thrived. The bank invested heavily in long-term U.S. Treasury bonds and mortgage-backed securities, which were considered low-risk assets. However, SVB's strategy left it exposed to interest rate risk. When the Federal Reserve began increasing interest rates aggressively in 2022 to combat inflation, the value of these long-term bonds decreased. As interest rates rise, bond prices fall, particularly affecting those with longer durations.

SVB's bond portfolio began to lose value as the Fed raised interest rates. While these were unrealized losses, they could become problematic if SVB needed to sell the bonds before maturity. Simultaneously, the tech sector began to face challenges, with many start-ups burning through cash reserves as venture funding slowed down. This led to an increase in withdrawals from SVB, pressuring the bank's liquidity.

On the March 8, 2023, SVB announced that it had sold $21 billion worth of its bond portfolio at a $1.8 billion loss to shore up its liquidity. To cover this loss, the bank planned to raise $2.25 billion through a combination of equity and debt offerings. This announcement caused panic among investors and depositors. The news triggered concerns about the bank's solvency, leading to a classic bank run. Following the announcement, SVB's stock plummeted by over 60% the next day. Venture capital firms reportedly advised their portfolio companies to withdraw their funds from SVB, exacerbating the panic.

Over the next 24 hours, depositors attempted to withdraw $42 billion, creating an overwhelming demand for liquidity that the bank could not meet. (Dong at al., 2024; Metrick, Schmelzin, 2023)

SVB was unable to meet the withdrawal demands and became insolvent. The California Department of Financial Protection and Innovation shut down the bank, and the Federal Deposit Insurance Corporation was appointed as receiver on the March 10. The FDIC created a new entity, the Deposit Insurance National Bank of Santa Clara, to hold the insured deposits from SVB. Uninsured depositors faced uncertainty about the fate of their funds.

At the time of the collapse, SVB was subject to less stringent oversight compared to larger banks, partly due to its size and a 2018 law that eased regulatory requirements for banks with assets below $250 billion. This regulatory relief may have contributed to the bank's ability to take on more risk without adequate oversight. The deposit insurance system was there and covered up to $250.000 per depositor. Even though the deposit insurance is considered as a reliable tool against bank runs, it didn't help. In the next chapter, a mathematical model is presented to describe the behavior of depositors.

5. DIAMOND-DYBVIG MODEL

A seminal game model for understanding bank runs was introduced by Diamond and Dybvig in (Diamond, Dybvig, 1983). This model provides insights into the behavior of depositors and the stability of banks when faced with uncertainty and the possibility of early withdrawals. In this framework, there are two investors who each deposit an amount D into a bank. The bank uses these deposits to fund a long-term investment project, totaling 2D in capital. The project is expected to generate a payoff of 2R upon its successful completion, where R is greater than D. This setup reflects a scenario where the returns on the investment are expected to be higher than the initial deposit. However, the model incorporates a crucial feature of real-world banking systems: liquidity risk. If any investor decides to withdraw their deposit before the project reaches its maturity, the bank is compelled to liquidate its investments prematurely. This forced liquidation comes at a cost, with the bank selling its investments at a reduced price of 2r, where $D > r > D / 2$. The reduction in value is due to a penalty associated with early liquidation, which means that the bank cannot realize the full potential payoff of the project (Diamond, Dybvig, 1983; Lu, 2023).

The model delineates two distinct periods during which depositors have the opportunity to make decisions regarding their investments. In period 1, before the project completion, depositors must decide whether to withdraw their funds or leave them invested. The outcomes of these decisions are as follows:

- If one investor withdraws while the other does not:
    - The bank sells its investment at the penalty price of 2r.
    - The investor who withdraws receives D, the amount they originally deposited.
    - The remaining investor receives the difference between the liquidation value and the amount withdrawn, which is 2r−D.
    - The game ends at this stage as the bank's assets have been distributed.
- If both investors choose to withdraw:
    - Both investors receive r, which is the reduced amount resulting from the forced liquidation.
    - The game concludes here, with both investors receiving equal and reduced payouts.
- If both investors choose to keep their funds invested, then the game enters the period 2.

In the period 2, the project concludes successfully, and the total payoff of 2R is realized. the scenario unfolds as follows:

- If one investor decides to withdraw while the other does not:

   - The withdrawing investor receives 2R−D, which is the total project payoff minus the amount retained by the other investor.
   - The non-withdrawing investor gets their original deposit amount, D.
- If both investors either withdraw or keep their deposits, they receive R each, the payoff from the successful project divided equally. (Diamond, Dybvig, 1983; Sun, 2023)

Since the model doesn't assume any of discounting, the payment matrix can be presented as in the table 1, where R > D > r > 2r – D.

	Withdraw deposit	**Keep invested**
Withdraw deposit	(r,r)	(D, 2r – D)
Keep invested	(2r – D,D)	(R,R)

Table 1. Payment matrix for a standard game

Source: Gibbons, R 1992 "Game theory for applied economists". Princeton, NJ: Princeton Univ. Press. Princeton paperbacks. p. 75.

The game model described has two Nash equilibria, which are key points where players' strategies stabilize in response to each other's actions. In this context, the Nash equilibria occur under two distinct scenarios: when both depositors either decide to withdraw their deposits or both choose to keep their deposits invested.

The first Nash equilibrium arises when both depositors opt to withdraw their investments. This scenario is referred to as a bank run. In this equilibrium, the anticipation of a potential bank run leads each depositor to act in a way that, while individually rational, collectively results in an undesirable outcome. Due to the nature of the game being a dynamic one with imperfect information, neither depositor has complete knowledge about the other's intentions. Each investor must make a decision without knowing whether the other will withdraw or stay. Given this uncertainty, if at least one depositor believes that the other is likely to withdraw their deposit before the project completes, the best strategy for the concerned depositor is to also withdraw. This creates a situation where both investors end up withdrawing their deposits, leading to the bank run scenario.

The second Nash equilibrium occurs when both depositors decide to keep their investments in the bank. In this equilibrium, both investors opt to wait until the project is completed. This strategy leads to the successful realization of the project's payoff, and each depositor receives the agreed-upon amount R once the project concludes.

The Diamond-Dybvig model does not account for several practical elements that influence real-world banking systems. Notably, the model does not incorporate discounting of future cash flows. In reality, the time value of money often affects decision-making, as future payments are generally valued less than immediate ones. The absence of discounting in the model simplifies the analysis but also limits its applicability to real-world scenarios where the time value of money is a significant factor. The model also does not include mechanisms for deposit protection that are commonly implemented in developed countries. Deposit insurance schemes are designed to safeguard depositors' funds and prevent bank runs by providing a safety net (Vassilyev, 2023).

To address these limitations and provide a more comprehensive understanding of bank runs, the subsequent chapter introduces a new model that incorporates these additional factors. This new model aims to offer a more nuanced analysis by integrating elements such as discounting, deposit protection, and more accurate value assessments, thereby enhancing the applicability and relevance of the theoretical framework to real-world banking situations.

6. GAME MODEL WITH DEPOSIT RATES AND FALL IN THE STOCK INDEX

In this game, there are two investors, referred to as Investor 1 and Investor 2, each of whom deposits an amount D into a bank. The model considers the financial dynamics affecting these investments and incorporates several critical parameters to capture realistic scenarios. Thus, he expected payoff for each investor at the end of the investment period is given by the formula $D(1 + i) – w$, where:

- i represents the net deposit rate after adjusting for inflation, expressed as i = deposit rate –inflation rate, and is assumed to be non-negative, $i \geq 0$;
- w is the withdrawal fee imposed by the bank, and is also non-negative, $w \geq 0$.

This formula reflects the returns each investor would receive from their deposit, adjusted for inflation and any fees incurred.

Bank runs are typically more likely to occur during financial crises, when stock indexes are rapidly declining, leading to a heightened sense of financial instability. In the event of a bank run, the bank may be forced to liquidate its assets under duress, which significantly impacts the value it can realize from these assets. If a bank run happens, the bank is compelled to sell its assets at a substantial discount. For example, if the total initial investments amount to 2D, the discounted price at which the bank can sell its assets during the period 1 is $2D(1 – f)$, where f denotes the magnitude of the decline in the stock index due to the financial crisis, with f being a positive value ($f > 0$) . This discount reflects the reduced value of assets in distressed market conditions, which in turn affects the amount available for distribution to the investors. An additional parameter in this model is DI, which represents the amount covered by deposit insurance. This expanded version delves deeper into the parameters and implications of the game model, providing a thorough understanding of how various factors affect the investors and the bank.

In this game model, depositors also have two key opportunities to make withdrawal decisions from their deposits at the bank. During period 1, which occurs before the deposit expiration time, each depositor faces the decision of whether to withdraw their deposited amount or leave it in the bank. The decisions made in this period lead to the following outcomes:

- If one investor decides to withdraw their deposit, then:
  - the bank is required to sell its assets at a discounted price of $2D(1 – f)$;
  - the investor who chooses to withdraw will receive $D – w$,
  - the remaining investor, who did not withdraw, will receive an amount calculated as $\min\{DI, 2D(1 – f) – (D – w) – w\} = \min\{DI, D(2 – 2f) – D + w – w\} = \min\{DI, D(2 – 2f – 1)\} = \min\{DI, D(1 – 2f)\}$. Here, $D > D – w > D(1 – f) > D(1 – 2f)$.
  - after the payouts are determined, the game ends.
- If both depositors decide to withdraw their deposits, each will receive $\min\{DI, D(1 – f) – w\}$, and the game ends.
- If both investors choose to keep their deposits in the bank until the end of the deposit period, the game progresses to the period 2.

The payment matrix for period 1, which summarizes the outcomes based on the decisions made by the depositors, is presented in Table 2.

	Withdraw deposit	**Keep invested**
Withdraw deposit	$(\min\{DI, D(1 – f) – w\}, \min\{DI, D(1 – f) – w\})$	$(D – w, \min\{DI, D(1 – 2f)\})$
Keep invested	$(\min\{DI, D(1 – 2f)\}, D – w)$	The second period

Table 2. Payment matrix at the period 1

Source: Author’s own

In period 2, decisions are made after the deposit period has expired and the project has been completed. The outcomes for each investor are as follows:

- If both Investor 1 and Investor 2 decide to keep their deposits until the end of the deposit period, they will both receive their original deposit amount adjusted for the deposit rate and any withdrawal fee. The payoff for each investor is D(1 + i) – w.
- If both investors choose to withdraw their deposits at this stage, they will each receive D(1 – f).
- If one investor decides to withdraw while the other decides to keep their deposit, the outcomes are D(1 + i) – w for the withdrawing depositor and min{DI, D(1 – f)} for the second one.

The payment matrix for period 2, illustrating the outcomes for each possible combination of decisions by the two investors, is detailed in Table 3.

	Withdraw deposit	**Keep invested**
Withdraw deposit	(D(1 – f), D(1 – f))	(D(1 + i) – w, min{DI, D(1 – f)})
Keep invested	(min{DI, D(1 – f)}, D(1 + i) – w)	(D(1 + i) – w, D(1 + i) – w)

Table 3. Payment matrix at the period 2.

Source: Author's own.

Due to min{DI, D(1 – f)} ≤ D(1 – f) and D(1 – f)) ≤ D(1 + i) – w, in the context of the game with two periods, the analysis shows that the "Withdraw" strategy strongly dominates the "Keep invested" strategy. This means that choosing to withdraw is preferable and thus rational, regardless of the choices made by the other investor. This dominance implies that, irrespective of what the other investor does, choosing to withdraw is a more advantageous or at least not worse strategy compared to keeping the deposit invested.

We can simplify the game from the two-periods model to a single period model. In this simplified model, the decision-making process is condensed into a single stag and illustrated in the Table 4.

	Withdraw deposit	**Keep invested**
Withdraw deposit	(min{DI, D(1 – f) – w}, min{DI, D(1 – f) – w})	(D – w, min{DI, D(1 – 2f)})
Keep invested	(min{DI, D(1 – 2f)}, D – w)	(D(1 + i) – w, D(1 + i) – w)

Table 4. Summarized payment matrix for the game

Source: Author's own.

6.1. Deposit insurance covers the invested amount

It is required to consider two different scenarios based on the relationship between the deposited amount D and the deposit insurance coverage DI. The cases are:

- Case 1: D ≤ DI
- Case 2: D > DI

In the first case, where the deposited amount D is either less than or equal to the amount covered by the deposit insurance, we are given the following inequalities: D(1 – 2f) < D(1 – f) – w < D ≤ DI. From these inequalities, the min functions can be solved as follows:

- min{DI, D(1 – f) – w} = D(1 – f) – w
- min{DI, D(1 – 2f)} = D(1 – 2f)

Based on the calculations, the payment matrix for this scenario is illustrated in the Table 5.

	Withdraw deposit	**Keep invested**
Withdraw deposit	(D(1 – f) – w, D(1 – f) – w)	(D – w, D(1 – 2f))
Keep invested	(D(1 – 2f), D – w)	(D(1 + i) – w, D(1 + i) – w)

Table 5. Summarized payment matrix with deposited amount less than insurance

Source: Author's own.

Since D(1 – 2f) < D(1 – f) – w, the strategy "Keep invested" dominates strategy "Withdraw deposit" and leads to better both individual and overall outcomes.

6.2. Deposit insurance doesn't cover the invested amount

In this case, the deposited amount D exceeds the deposit insurance coverage DI. We have here the following results of the min functions:

- min{DI, D(1 – f) – w} = D(1 – f) – w
- min{DI, D(1 – 2f)} = D(1 – 2f)

The resulting payment matrix for this case, is presented in Table 6.

	Withdraw deposit	**Keep invested**
Withdraw deposit	(D(1 – f) – w, D(1 – f) – w)	(D – w, DI)
Keep invested	(DI, D – w)	(D(1 + i) – w, D(1 + i) – w)

Table 6. Summarized payment matrix with deposited amount more than insurance

Source: Author's own.

Given the matrix in Table 6, we can identify the Nash equilibria:

- Equilibrium (D(1 – f) – w, D(1 – f) – w) represents a bank run where both investors decide to withdraw their deposits. It occurs when an investor believes the other will withdraw, so that the withdrawing is the best response.
- Equilibrium (D(1 + i) – w, D(1 + i) – w) represent the case when both investors decide to keep their deposits.

Since DI < D(1 – f) – w, the strategy " Withdraw" strategy strongly dominates the "Keep invested" strategy and leads to bank runs.

This means that, with higher deposit insurance, investors are more likely to retain their deposits rather than withdrawing them. The presence of deposit insurance decreases the incentive to participate in a bank run, as investors feel more secure about their deposits being protected.

7. RESULTS AND DISCUSSION

The model shows that as the amount of deposit insurance increases, the likelihood of depositors withdrawing their funds decreases. Higher insurance coverage provides greater security, thus reducing the incentives for investors to act on fears of bank insolvency and, consequently, reducing the frequency of bank runs. In case 2, where D > DI, the payment matrix in Table 6 illustrates that deposit insurance plays a critical role in shaping investor behavior. If at least one depositor believes that the bank is not able to pay back and/or the other depositor is going to withdraw their funds, the best strategy for them is also to withdraw their funds, which leads to the case called bank runs.

Nevertheless, the bank runs occur even with the deposit insurance introduced as a measure against it. Both cases, Sberbank and SVB, shows us that the deposit insurance sometimes doesn't help. Even if it was destined for Sberbank to close due to political circumstances, SVB had a chance to avoid the bank run and pay off its debts on the agreed time. But it did not happen. People tend to act impulsively, especially when it comes to their own finances. Moreover, modern technology makes it easier to withdraw funds from a financial institution: transferring money to another bank through online banking or withdrawing funds via an ATM takes just a few minutes, ensuring that account holders can secure their funds in another institution.

As a result, regardless of the measures taken within the macroprudential policy, whether it's capital requirements or deposit insurance, or withdrawal fees imposed by the bank, if depositors perceive their deposits to be at risk, they will withdraw them instantly. Current measures help reduce the likelihood of a bank run in straightforward scenarios but simultaneously limit the banks' freedom in investing and, consequently, minimize the potential profit from investments. Since the bank run is a coordination problem, but not regulation, these measures seem to be not effective. As future research, it is important to investigate two cases: when a central bank plays as a lender of last resort; and impact of an aggressive media campaign on the people's behavior.

8. CONCLUSIONS

This article examines the root causes of bank runs and evaluates the impact of deposit insurance on depositor withdrawal behavior. It explores why depositors might choose to withdraw their funds at a loss rather than leave them in the bank with the hope of future profits, using a game theory model. The findings reveal that, in a scenario with two investors, the game has two Nash equilibria, one of which involves withdrawing funds. If one investor believes the other will withdraw, the rational choice for both is to withdraw, which can lead to a bank run. Introducing deposit insurance policies may reduce the likelihood of such withdrawals, though this is not guaranteed. The higher the insured amount, the lower the depositor's incentive to withdraw. This study provides insights into how deposit insurance can stabilize banking systems by reducing the risk of bank runs. Additionally, the paper demonstrates that bank runs are more of a coordination problem than a regulatory one.

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