Andreas Krause

Bank runs and deposit insurance

- We will see how fragile banks are to the sudden withdrawal of deposits, even if no apparent reason for such a development can be identified.
- The effect such bank runs have on the economy can be substantial and for this reason deposit insurance scheme have been introduced, which prevent depositors from making losses if banks fail.
- We will look at the impact such deposit insurance has on banks's behavior and their profits.

Fractional reserve banking

Fractional reserve banking

→ Banks have the important task of maturity transformation or liquidity insurance and in this role they only retain a small fraction of deposits in cash, lending out the remainder.

- Modern banks are using a small fraction of their deposits as cash reserves to meet any deposit withdrawals and lent out the remainder.
- This is commonly known as fractional reserve banking as only a small fraction of the deposits are at the direct disposal of depositors.
- Withdrawals exceed this small cash reserve can lead to the failure of banks as they cannot meet their obligation to repay deposits on demand.
- A situation in which deposits are withdrawn without any apparent cause is known as a bank run.

→ We will look at banks runs and their causes, but also at a measure introduced to prevent them, namely deposit insurance.

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Causes and prevention of bank runs

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→ We will discuss the causes of such banks runs as well as measures to avoid them.

- Loans that banks give might not be repaid and these losses might put the ability of banks to repay deposits into question.
  - Depositors knowing about such losses would be expected to withdraw deposits so as to not incur losses themselves. These deposit withdrawals are efficient in that they discipline banks to not take excessive risks.
- However, we can have a bank run without such information being available and we will see how expectations about the behaviour of other depositors can trigger a bank run. It is sufficient that depositors believe that other depositors will withdraw; this belief that they will withdraw might in turn be based on them believing that others will withdraw.
- The key to a bank run emerging is that by not withdrawing deposits, the depositor will suffer a larger loss than when withdrawing deposits. If depositors are not facing any losses from retaining their deposits with the bank, a bank run should not emerge.
- One way to achieve such a situation is through deposit insurance. We will, however, see that introducing deposit insurance has an effect on the risk-taking behaviour of banks.
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Expectations about other depositors

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→ The first model assess the impact the expectations on the behaviour of other depositors have on the decision by a depositor to withdraw.

- Deposits withdrawn consumption should be covered by existing cash reserves.
- If deposit withdrawals are higher, they might obtain additional cash reserves, for example through emergency lending from other banks or the central bank, but also the selling of assets such as loans.
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  - Deposits are repaid as these withdrawals are requested until no more deposits can be repaid.
  - In this case it would be costly to wait for too long until withdrawing deposits as the bank might have no funds left. Anticipating the behaviour of other depositors is therefore essential to not withdraw deposits too late.
- If withdrawals are expected to be high and exceed the resources of the bank, withdrawing early might be beneficial to avoid any losses.

→ We will look at such a model where expectations about the behaviour of other depositors, rather than information about the bank, are an essential element in the cause of bank runs.

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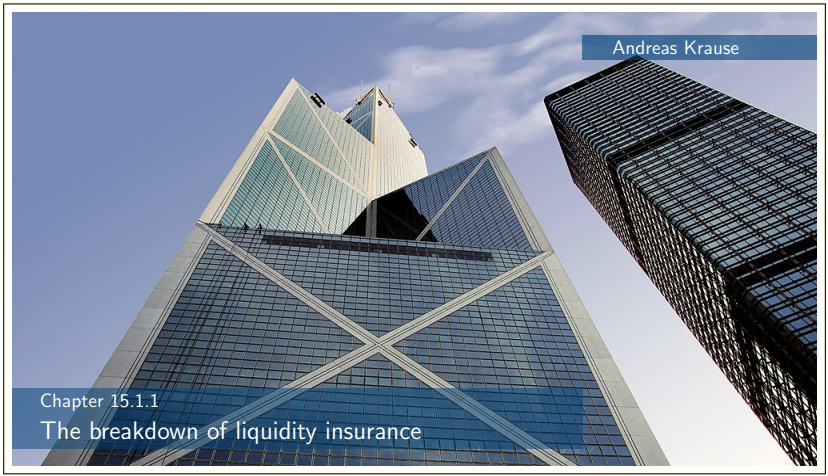
Andreas Krause
Chapter 15.1.1
The breakdown of liquidity insurance

→ The model we are going to discuss is based on Chapter 14.1.1 of the book 'Theoretical Foundations of Banking'. A more detailed description of the model, additional steps for its solution, and a more in-depth discussion of results can be found there.

Discussion of model results

Discussion of model results

→ Now that we have derived the main results of the model, as far as relevant for us, we will briefly discuss some implications as well as limitations of this model. This will allow us to interpret the model in its context of the initial problem and enables us to apply it appropriately in a realistic context.

- We have seen that a bank run can emerge only because depositors expect a bank run; if the expectation would be that no bank run would e=happen, it would not happen.
  - It is only expectations that matter for this result, the soundness of the bank is irrelevant in this case.
- If other depositors withdraw, or are expected to withdraw, the losses are minimised if a depositor withdraws itself.
- If you expect others to withdraw their deposits, are there ways in which you might be able to retain deposits with the bank without making losses?
- As long as the bank is sound, this is a pure liquidity problem and the bank might be able to get loans from other banks or the central bank. This is comparable to replacement deposits by these lenders and the bank does not need to sell other assets at a loss; it is this sale of assets at a loss that makes a bank run rational.

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- As long as the bank is sound, this is a pure liquidity problem and the bank might be able to get loans from other banks or the central bank. This is comparable to replacement deposits by these lenders and the bank does not need to sell other assets at a loss; it is this sale of assets at a loss that makes a bank run rational.

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Discussion of model results

- Bank runs can become self-fulfilling, no fundamental reason needs to exist
- Expecting others to withdraw, makes it rational to withdraw

? If a bank faces a liquidity problem from deposit withdrawals, is it always best to withdraw yourself?

! Banks might obtain liquidity support from the central bank or other banks through interbank loans, making staying with the bank more attractive

Discussion of model results

→ Now that we have derived the main results of the model, as far as relevant for us, we will briefly discuss some implications as well as limitations of this model. This will allow us to interpret the model in its context of the initial problem and enables us to apply it appropriately in a realistic context.

- We have seen that a bank run can emerge only because depositors expect a bank run; if the expectation would be that no bank run would e=happen, it would not happen.
  - It is only expectations that matter for this result, the soundness of the bank is irrelevant in this case.
- If other depositors withdraw, or are expected to withdraw, the losses are minimised if a depositor withdraws itself.
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Bank risks and withdrawals

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→ Bank runs in the previous model were the result of expectations about other depositors' decisions. We will now look a little bit closer at an interaction of deposit withdrawals and the soundness of the bank, most notably the risks it is taking and how this might affect the emergence of bank failures and bank runs.

- Banks cannot repay deposits of too many loans are not repaid; they would not have the necessary assets to do so. If deposit withdrawals are high, they might not be able to obtain sufficient cash reserves to make payments to depositors as necessary.
- If banks are short of liquidity they can sell assets to increase their liquidity, although often they will incur a loss in doing so.
- The cash generated is used to repay withdrawn deposits and the smaller amount of remaining deposits are then repaid from the assets not sold.
- We look at this trade off between these aspects and when banks fail and how bank runs can emerge in this situation.

→ The model considered is similar to the breakdown of the liquidity insurance, but we will not consider the effect of expectations as the primary reason for a bank run.

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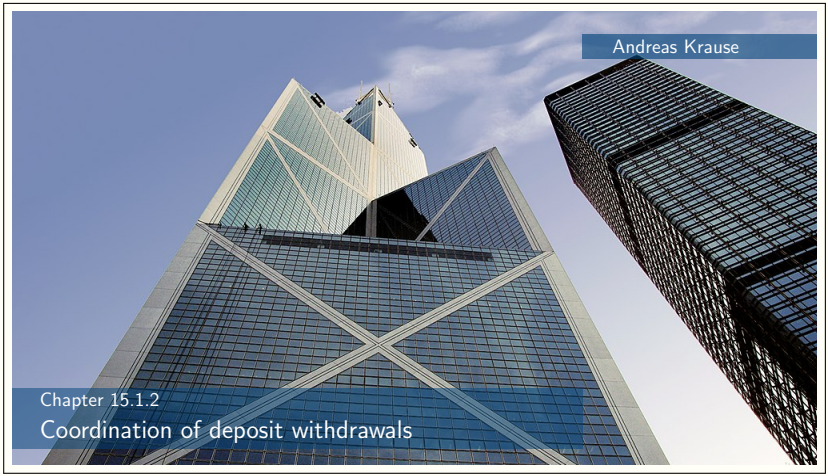
Andreas Krause
Chapter 15.1.2
Coordination of deposit withdrawals

→ The model we are going to discuss is based on Chapter 14.1.2 of the book 'Theoretical Foundations of Banking'. A more detailed description of the model, additional steps for its solution, and a more in-depth discussion of results can be found there.

Discussion of model results

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→ Now that we have derived the main results of the model, as far as relevant for us, we will briefly discuss some implications as well as limitations of this model. This will allow us to interpret the model in its context of the initial problem and enables us to apply it appropriately in a realistic context.

- We might observe a bank run even if not withdrawing deposits would yield a higher outcome. It is more profitable to retain deposits, as long as everyone does so, than to withdraw deposits. However, for each depositor individually it is more profitable to withdraw deposits than to retain them with the bank.
- This situation is akin to the Prisoner's dilemma and we face a coordination problem where if all depositors agreed to not withdraw, then all would be better off.
- A crucial assumption in these models was that banks can sell their assets, pricipally loans, quickly, even though they might make a loss in doing so. Is this a realistic assumption?
- Valuing a loan is difficult and valuing a large portfolio of loans does not simplify the task as data about loans are rarely readily available and each loan has to be assessed on its own merit. In addition, buyers are exposed to adverse selection as banks will see to sell their worst performing loans first. All this makes agreeing a sale of loans a slow process.

→ We have seen that banks are fragile and subject to runs. We will now turn to the principal way this problem has been addressed, deposit insurance.

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Insuring deposits

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- Deposit insurance would provide depositors with repayment of their deposits if the bank is unable to do so. In principle each depositor could purchase such insurance for themselves, or banks could purchase this insurance to re-assure depositors that they will not face any losses.
- If depositors face no losses from banks not repaying their deposits, there should be no bank run as there is no benefits from withdrawing deposits.

- Deposit insurance is in many cases not bought by banks, and even less commonly by depositors themselves. It is common for governments to guarantee deposits without a charge or banks are charged a levy which typically is based on the total assets of a bank.
- With a such deposit insurance in place, deposits are risk-free and deposit rates should be reflecting this situation.
- With lower costs to banks from lower deposit rates, we will investigate how the lending behaviour of banks is influenced. We will look particularly at the level of risks banbks are taking.

→ The coming model will therefore assume that deposit insurance is provided at a fixed premium to see which effect it has and then we will look at the effect if the premium reflects any risks banks take.

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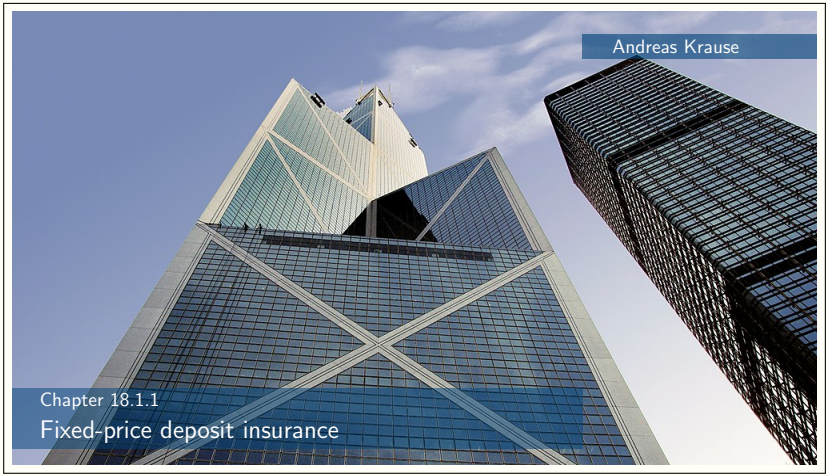
Andreas Krause
Chapter 18.1.1
Fixed-price deposit insurance

→ The model we are going to discuss is based on Chapter 17.1.1 of the book 'Theoretical Foundations of Banking'. A more detailed description of the model, additional steps for its solution, and a more in-depth discussion of results can be found there.

Discussion of model results

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→ Now that we have derived the main results of the model, as far as relevant for us, we will briefly discuss some implications as well as limitations of this model. This will allow us to interpret the model in its context of the initial problem and enables us to apply it appropriately in a realistic context.

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  - If the deposit insurance premium does not reflect the risks the bank takes, it provides incentives to banks to increase risk-taking. Banks do so as they retain the profits if the loans are repaid, but they do not bear the losses as the deposit insurance repays depositors in this case.
  - We have thus a classical case of deposit insurance creating a moral hazard.
- ▶ If the premium of deposit insurance is based on the risks of the bank, then no moral hazard emerges. It is most common, however, to have deposit insurance regimes that have either no premium or a premium that is not reflective of the risk individual banks take.
- ▶ We have seen that free deposit insurance increases the risk-taking of banks. Should bank failure, not losses to depositors, be much more frequent than what we observe?
- ▶ Banks are not free in how much risk they can take; capital requirements will limit any risks and hence failures. In addition, the repayment through deposit insurance scheme will often lead to significant delays until depositors receive payment; this means that depositors will not see deposits as entirely risk free and still demand a risk premium, increasing the costs of banks when increasing risks, offsetting the impact of moral hazard at least partially.

→ While deposit insurance is common, it is also limited to a certain amount per person per bank. We will explore why such an arrangement is optimal.

Discussion of model results

- Fixed-price deposit insurance induces banks to increase risks

Discussion of model results

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- Banks are not free in how much risk they can take; capital requirements will limit any risks and hence failures. In addition, the repayment through deposit insurance scheme will often lead to significant delays until depositors receive payment; this means that depositors will not see deposits as entirely risk free and still demand a risk premium, increasing the costs of banks when increasing risks, offsetting the impact of moral hazard at least partially.

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Incomplete deposit insurance coverage

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- Limits on the amount of deposits insured at each bank are imposed in most deposit insurance schemes and we week to determine why this is the case.
- We will argue that insured deposits are worth more than uninsured deposits and through the higher value of insured deposits competition to attract these is increased.
- Increased competition will generally reduce the profits and hence insuring deposits will affect bank profits. Thus banks might have preferences for the extent of coverage that deposit insurance provides such that competition is not increased too much, but while they can still benefit from paying lower deposit rates due to their risk being eliminated.

→ We will now look at a model determining the optimal deposit insurance coverage from the perspective of banks.

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Andreas Krause
Chapter 18.2.1
The optimality of deposit insurance limits

→ The model we are going to discuss is based on Chapter 17.2.1 of the book 'Theoretical Foundations of Banking'. A more detailed description of the model, additional steps for its solution, and a more in-depth discussion of results can be found there.

Discussion of model results

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- It turns out that bank profits are highest if no deposit insurance is provided.
- Some banks have as their main market retail customers, most of which will have very small deposits only; their deposits would therefore fall under any reasonable limit for deposit insurance cover. Would the advocate for a limit on the deposit insurance cover?
- Small retail depositors are usually not well informed and that might expose the bank to significant risks from a bank run; having deposit insurance effectively rules out such bank runs, which might induce banks to consider it.

→ We have seen that banks would prefer no deposit insurance, while depositors would prefer full coverage, giving rise to a conflict of interest between these two groups.

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- Banks balance lower deposit rates due to deposit insurance with higher competition due to offering a more valuable 'product'

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Summary of key results

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→ We can now summarize the key results we have obtained about bank runs.

- We have seen that banks are fragile in that expectations that a bank run will occur cause a bank run.
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  - We thus showed that bank runs can be self-fulfilling prophecies. It is therefore important to retain trust into each bank to ensure expectations do not switch.
  - This change of expectations does not have to have a reason in the risks of the bank being able to repay deposits that are not withdrawn, assuming no bank run emerges; the mere existence of a rumour is sufficient.
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  - Deposit insurance eliminate potential losses to depositors and makes bank runs irrational.
  - Deposit insurance has, however, side effects that provides banks with incentives to increase the risks they are taking.
- Deposit insurance also affects the degree of competition between banks and banks seek to limit the increase in competition by the lowest possible deposit insurance coverage.

→ Banks are fragile and can be exposed to bank runs without any discernable reason; the remedy of providing deposit insurance leads banks to increase the risks they are taking and as deposit insurance increases competition between banks, they seek to limit the amount of deposits covered.

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- Bank runs can occur due to depositors forming expectations about other depositors' behaviour

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- Deposit insurance also affects the degree of competition between banks and banks seek to limit the increase in competition by the lowest possible deposit insurance coverage.

→ Banks are fragile and can be exposed to bank runs without any discernable reason; the remedy of providing deposit insurance leads banks to increase the risks they are taking and as deposit insurance increases competition between banks, they seek to limit the amount of deposits covered.

Summary of key results

- Bank runs can occur due to depositors forming expectations about other depositors' behaviour
- Bank runs can be self-fulfilling and need not have a fundamental reason
- Deposit insurance prevents bank runs, but it affects the incentives of banks to take higher risks
- Banks are also concerned about the impact deposit insurance has on competition between them and seek to limit the amount of deposits insured

Summary of key results

→ We can now summarize the key results we have obtained about bank runs.

- We have seen that banks are fragile in that expectations that a bank run will occur cause a bank run.
  - We thus showed that bank runs can be self-fulfilling prophecies. It is therefore important to retain trust into each bank to ensure expectations do not switch.
  - This change of expectations does not have to have a reason in the risks of the bank being able to repay deposits that are not withdrawn, assuming no bank run emerges; the mere existence of a rumour is sufficient.
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