

# Marshall Lecture 1: Why Banks?

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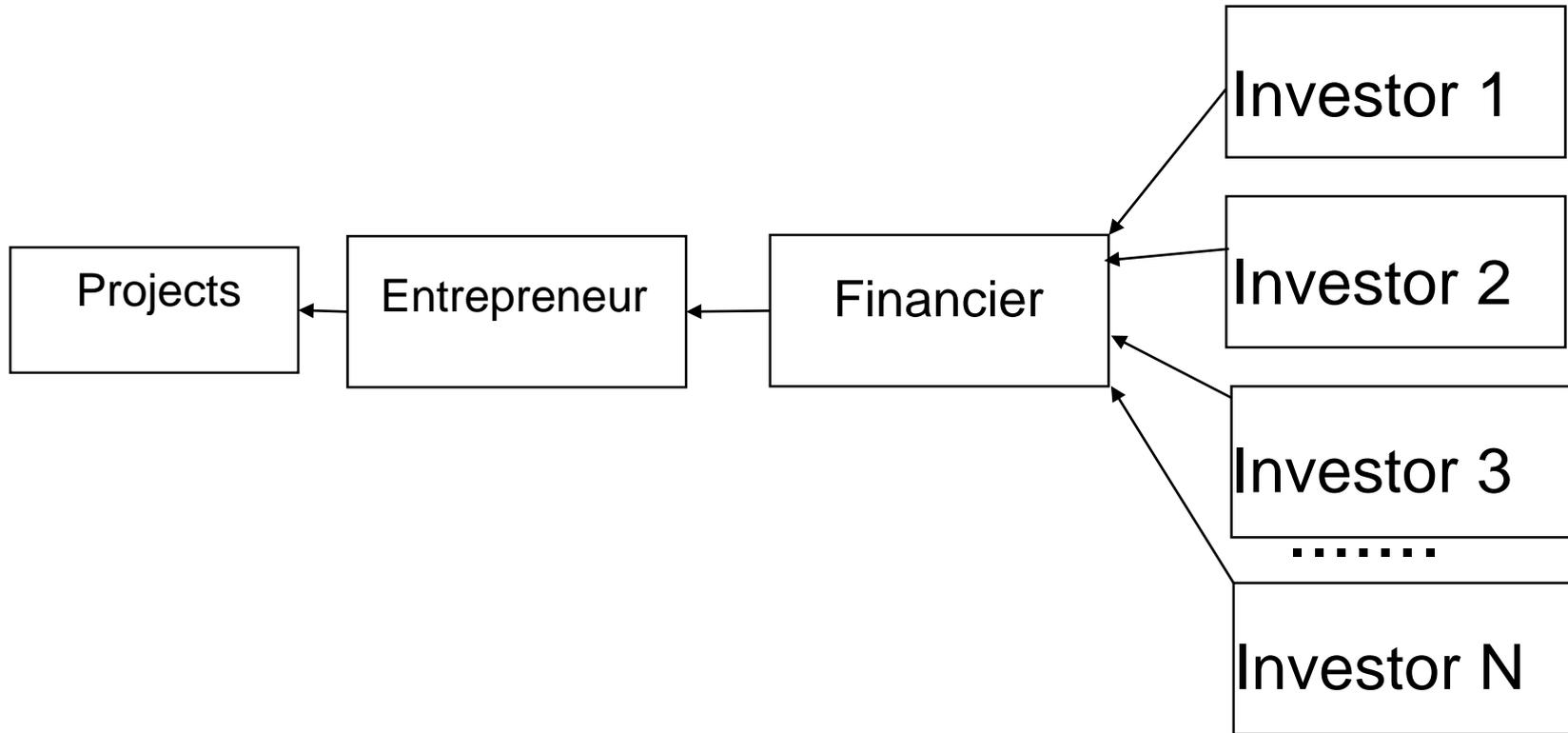
# Why banks?

- Banks have illiquid financial assets (unlike money market mutual funds) funded by demandable liabilities (unlike finance companies).
- Banks are prone to runs.
- Why is this structure so prevalent historically and across societies?
  - Tax advantage to debt?
  - Deposit insurance?
  - Too big to fail?
- Why is this question important?
  - Do we need banks? Narrow banking
  - How much do we raise bank capital?
  - What are the consequences?

# This lecture draws on 3 papers

- “Liquidity Risk, Liquidity Creation and Financial Fragility: A Theory of Banking”, 2001, with Douglas Diamond, *Journal of Political Economy*, vol 109, 2, 287-327.
- "A Theory of Bank Capital", 2000, with Douglas Diamond, *Journal of Finance*, vol 55, no 6, 2431-2465.
- “Liquidity Shortages and Banking Crises”, with Douglas Diamond, *Journal of Finance*, 2005, 60, (2), 615-647.

# The set up



# Basic Idea

- Specific skills are needed in entrepreneurship and in loan monitoring/collection.
- Financier cannot trust entrepreneur to deploy production skills -- Hart and Moore (1994)
- Investors cannot trust financier to deploy collection skills
- Debt commits entrepreneur to pay financier
- Demandable debt commits financier to repay arm's length investors

# Just before date 2

<p>Date 2—</p> <p>Entrepreneur has promised to pay <math>P_2</math>.</p> <p>a) Entrepreneur threatens to quit unless payment is negotiated down.</p> <p>Or</p> <p>b) Entrepreneur pays <math>(E,F) = (C_2 - P_2, P_2)</math></p>	<p>Date 2-</p> <p>Financier liquidates firm for <math>X_2</math> giving payoff <math>(E,F) = (0, X_2)</math>.</p>	<p>Date 2</p> <p>With prob. <math>\mu</math> the entrepreneur makes a take-it-or-leave-it offer for cash flows and with prob. <math>(1-\mu)</math> the financier makes a take-it-or-leave-it offer.</p> <p><math>(E,F) = (\mu C_2, (1-\mu)C_2)</math></p> <p>Assume <math>\mu=1</math> so entrepreneur has all bargaining power</p>
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The entrepreneur will renegotiate if he owes debt face  $P_2 > X_2$

# Real Assets are Illiquid

- Because the entrepreneur is the first best manager of the project, it is illiquid: The entrepreneur cannot borrow more than  $X_2$  even though he generates  $C_2 > X_2$
- Assuming market interest rate=0, project will not get financed if  $X_2 < 1$ .

# Loan to project is also illiquid

- The financier acquires project specific knowledge after lending, which is what allows him to liquidate for  $X_2$
- Investors are numerous, less skilled in lending, and can liquidate only for  $\beta X_2$  where  $\beta < 1$ .
- Following same logic as earlier, financier can raise only  $\beta X_2$  against a loan promising to pay  $X_2$ .

# Costs of financial illiquidity

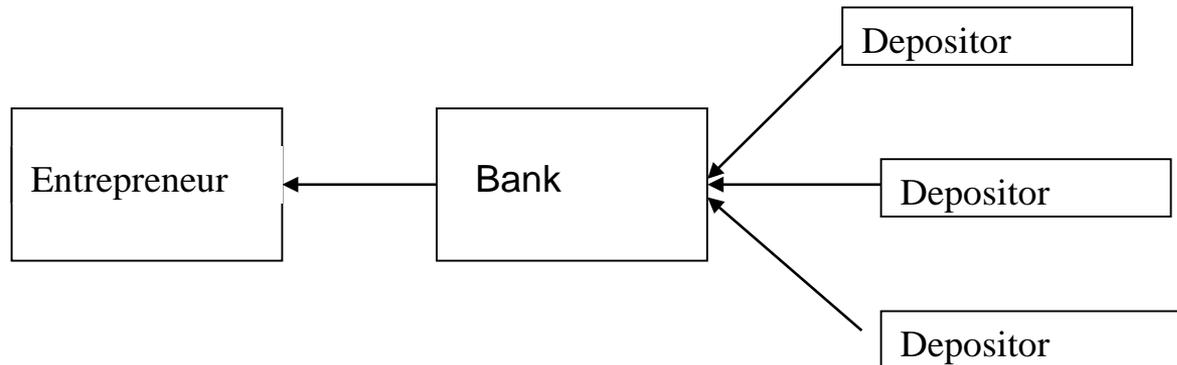
- If financier has no money, project will now not get financed if  $\beta X_2 < 1$ .
- Alternatively, if the financier has just enough money to lend but could get a wonderful investment opportunity at date 1 paying  $R > 1$  but less than  $C_2/X_2$ 
  - If project loan is repayable on demand, financier will liquidate project for  $X_2$  to fund his opportunity, diminishing social welfare
  - If not repayable on demand, financier will sell loan to investors at a discount for  $\beta X_2$  and invest that but demand a illiquidity premium up front from the entrepreneur for the lost opportunity to invest  $(1 - \beta)X_2$ . This may prevent the project getting financed.

=> Financial illiquidity has costs

# How to create liquidity

- If the financier can borrow  $X_2$  from investors against the project loan rather than  $\beta X_2$  then he avoids the costs of financial illiquidity.
- To do this, he has to promise to repay investors  $X_2$  and commit to not renegotiate the payment down when it comes time to collect from the entrepreneur.
- Equivalently, investors should not agree to lower payments if the financier threatens to not collect on their behalf.
- Turns out that the way for the financier to do this is to issue first-come-first-served demand deposits to the investors.
- **Although financial assets (project loans) are illiquid, claims on a bank which holds project loans are liquid**

# Bank



# If the banker threatens renegotiation...

- **The banker issues demand deposits of face value  $X_2$  when he raises money.**
- **If the banker threatens to renegotiate...**
  - **The depositors can either withdraw cash or, equivalently, seize sufficient bank loans to make whole the date 2 payment they have been promised.**
  - **Because the market value of loans without the bank is  $\beta X_2$ , and less than  $X_2$ , only fraction  $\beta$  of depositors will succeed in seizing loans as collateral.**
  - **Anyone who does not run to withdraw will get nothing, while those in front of the line will come out whole.**
  - **Bank will be run! Any call for renegotiation will extract all loans from the bank.**
- **But a bank run is, by itself, no guarantee that the banker will not attempt to renegotiate.**
- **The bank has been dis-intermediated, but the loans have not yet been negotiated with the entrepreneur.**

# The aftermath of a run: an unhappy banker

- **Once the loans are in the hands of depositors (or loan buyers), they can negotiate directly with the entrepreneur.**
- **He will offer exactly what the depositors could net if they later hired the banker to negotiate on their behalf.**
- **Depositors will accept, because they know they will get the same amount even if they hire the banker.**
- **Dis-intermediation kills the banker's rents even though he has not lost his skills!**
- **Therefore the banker will not call for renegotiation. Bankers do not benefit from bank runs!**
- **Key to the logic: Ex post, the banker is only better at collecting, does not add real value – dis-intermediation is not inefficient, only shifts rents.**

# Demand deposits have special bite in banks...

- **Threat of a run is useful to discipline banks, not useful to extract cash from firms**
- **Bank runs transfer rents from bargaining ability**
- **“Firm runs” lead only to change in the ownership of claims on the firm, without removing a good entrepreneur from control if he or she renegotiates**
  - Entrepreneur continues to add value
- **Banks optimally choose a fragile capital structure to “liquify” illiquid financial assets.**
  - **Can provide liquidity to those who need it because can borrow fully against assets whenever needed.**
  - **Demand deposits provide both discipline (Calomiris and Kahn (1990)) and liquidity.**

# Why ineffective for other financial firms?

- Venture capitalists continue to add management value to start-ups
  - Not simply more efficient collection agents.
  - Demand deposits ineffective when the income to the financier stems from real ability to add value rather than bargaining power.
- Marked-to-market mutual funds do not create liquidity
  - Suppose mutual funds held loans and investors had a proportional claim on the fund's assets.
  - If an investor has  $1/N$ th of the deposits, she has claim on  $1/N$ th of the loans.
  - Such a claim can be renegotiated down to the market value of loans.
  - Thus the mutual fund cannot create liquidity in excess of market value.

# In sum

- Banks create liquidity and reduce risk that borrowers might be liquidated
  - Two related notions of liquidity: pledgeability and immediacy
- Deposits can serve as inside money (circulate) or can provide liquidity directly by option to withdraw on demand -- are more liquid than direct loans
- Provide more reliable source of funding than markets
- Allow marginal entrepreneurs to raise more funds at a lower illiquidity premium (lower cost of capital)
- Requiring greater bank use of long-term funding or capital will reduce firms access to credit

# “A Theory of Bank Capital” (JF 2000)

- What if bank loans are risky?
- A bank that promises all value out through demand deposits would be prone to solvency-induced runs.
  - Too much project liquidation
- Need to buffer deposits with softer, potentially renegotiable, claims – bank capital.
- More capital => Bank less risky
  - => Banker absorbs more rents and creates less liquidity
  - => Trade-off

# Risky Loans and Runs

- **With uncertain future value, banks will be run to the collective harm of depositors**
- Suppose that the date 2 liquidation value  $X_2$  is

$X_2^H = 1.28$  with probability  $\frac{3}{4}$  and

$X_2^L = 0.9$  with probability  $\frac{1}{4}$

- Now if deposits are set high (above 0.9 but below 1.28) there will be a run in state L, which reduces liquidity creation.

# Deposits of $d$

- Banker and holders of capital negotiate over the excess surplus over demand deposits,  $d$ . Can't get concessions from demand depositors because they will run.
- Capital holders will get:  
$$\mu(\text{Max}\{C_2-d,0\})+(1-\mu)(\text{Max}\{X_2-d,0\}).$$
- Bad times pay investors  $d$ , Good times pay  $d + \mu(1.28-d)$ : Capital has value in good times
- Expected payment to deposits plus capital is  $\frac{1}{4}(d) + \frac{3}{4}(d + \mu(1.28-d))$
- Can see that  $d=0.9$  is more than high enough to raise 1 up front if  $\mu$  moderate (say 0.5).

# Implications

- Why bank capital is costly:
  - not due to asymmetric information
  - not just a problem with raising outside equity
- Why making banks completely safe is not without cost=> credit crunch
- Why bank capital has fallen with development
- Capital is not the inside equity residual incentive claim that makes it worth monitoring, as in Holmstrom Tirole 1997, but instead is an outside claim that provides a buffer against un-hedged aggregate risks.
- Further work: Aggregate liquidity shortages and contagion through markets – Diamond and Rajan (2005)