# Instituciones Financieras

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Clase 1

UTDT Maestría en Finanzas

# Objetivo

- El objetivo es proporcionar el marco conceptual para analizar y comprender los problemas actuales que enfrentan tanto los gerentes de las instituciones financieras como los reguladores encargados de supervisarlas.

- El enfoque es global. No es un curso sobre el sistema bancario argentino.

- En cada uno de estos temas, se estudiarán casos reales específicos

# Contenido

- El estudio del rol que cumplen los intermediarios financieros en la creación de liquidez
  - TBTF
  - Seguro de depósito

- **Riesgo de liquidez** y la crisis Covid-19

- **Riesgo de tasa de interés**, **riesgo de crédito** y regulaciones de capital. Aplicación al contexto de la crisis del 2008/2009
  - Política monetaria
  - Calificadoras de riesgo

- Crédito bancario y pequeñas empresas
  - Ley de bancarrota
  - Crisis en el mercado interbancario

- Innovación Fintech: Beneficios y riesgos de P2P lending

# Bibliografía


- Anthony Saunders and Marcia Cornett, *"Financial Institutions Management: A Risk Management Approach"*, McGraw-Hill

- **Papers**

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- Penas, M.F, and H. Ünal, Gains in Bank Mergers: Evidence from the Bond Markets, *Journal of Financial Economics*, 2004, Vol.74, No.1, 149-179.

# Material del curso

¿Dónde?: **En Campus Virtual**

- Programa
- Filminas en inglés
- Pdfs de papers

# Consulta

- Arreglar via email
- Email: **fpenas@utdt.edu**

# Evaluación

- Examen final basado en el contenido dado en clase
- En caso de ir al recuperatorio, nota final máxima es B-

# Agenda de hoy

- Introducción corta a los intermediarios financieros ¿Qué los hace especiales?

- Creación de liquidez:
  - ¿Cómo funciona?
  - ¿Qué vulnerabilidades crea?
  - Garantías implícitas: TBTF
    - Ola de fusiones de bancos de US en los 90.
  - Garantías explícitas: Seguro de depósito
    - Introducción del seguro de depósito en Bolivia en 2001

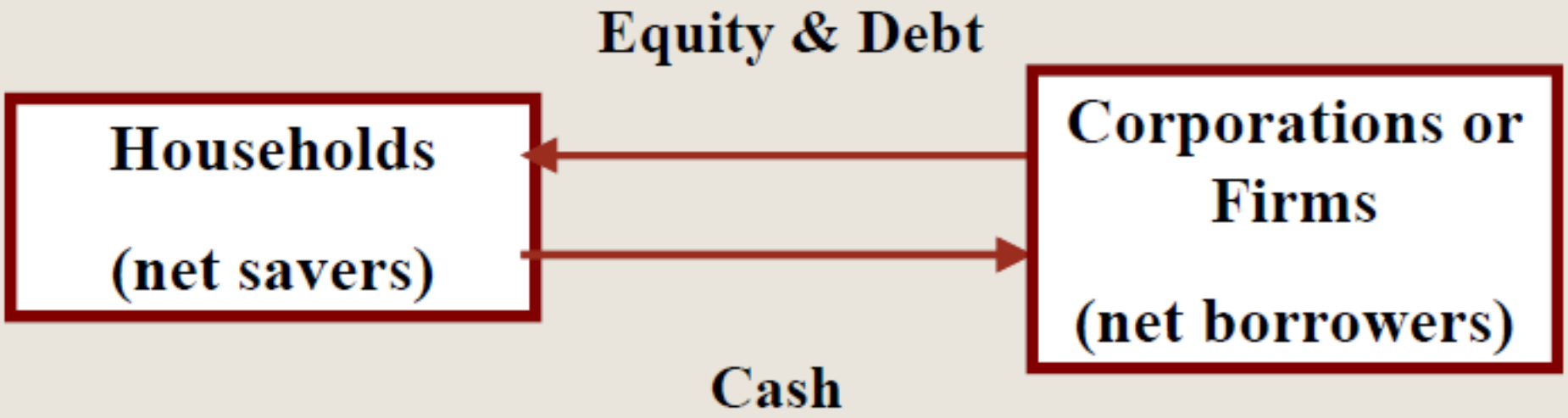
# Introduction

# Why are financial intermediaries (FI) special?

- Explain the special role of FI in the financial system and the functions they provide

- Explain why FIs receive special regulatory attention

# A world without FIs



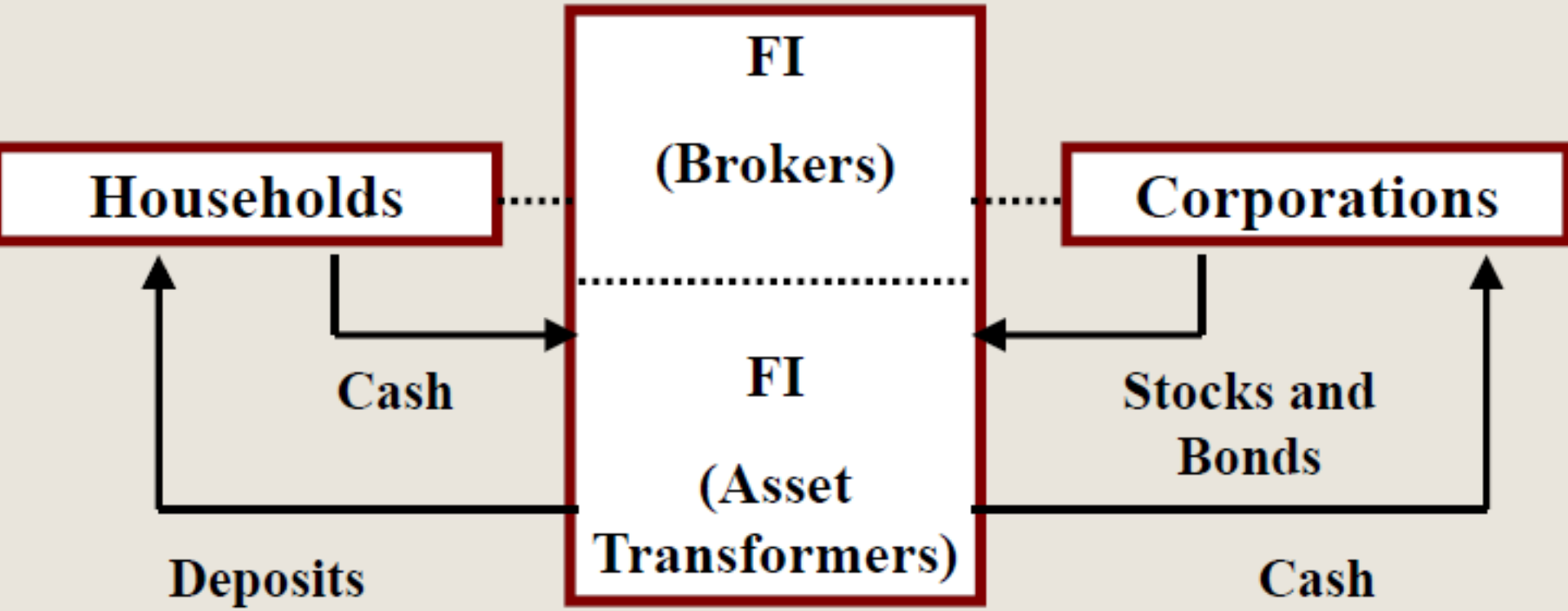
# Potential problems in a world without FIs

- Adverse selection
  - Prior to purchasing a firm´s debt or equity, each individual must incur costs of **screening**
- Moral hazard
  - After purchasing a firm´s securitites, each individual needs to **monitor** the firm´s managers
- Maturity, liquidity and denomination mismatches
  - The firm´s debt or equity may have characteritics that may not be attractive to individual savers

# Potential problems in a world without FIs

- Summing-up, without FIs:
  - Higher information costs
    - Economics of scale reduce the costs for FIs to screen and monitor borrowers
  - Lower level of funds available
    - Savers would prefer not to lend

# A world with FIs



# Major functions of FIs

- Pure broker
  - An FI provides information about the quality of security issues
  - Reduces costs through economies of scale when the broker needs to incur costs to screen quality of firm´s issues.

# Major functions of FIs

- Asset Transformer
  - It **transforms illiquid** assets (e.g., loans to firms) into **liquid** assets (e.g., bank deposits)
  - The FI can pool risks by lending to many firms and exploiting the law of large numbers, providing **diversification**
  - The FI can split the cash flows of its underlying assets, **creating new securities** whose risks and denominations may be more attractive to different investor clienteles
  - **Maturity transformation**: maturities of assets differ from the maturities of its liabilities (households hold securities with short maturities)

# FI specialness does not always work

- **S&L** (savings and loans) debacle of 1980s linked to inadequate diversification
  - By law forced to invest in long-term fixed rate mortgages
  - Expanded both interest rate risk and credit risk, while did not diversify, resulting in a huge bailout

- Recent **subprime crisis** linked to inadequate diversification
  - By choice, overinvested in real estate loans and mortgage-backed securities, often based on poor assumptions about the future of housing prices. Resulted in a huge bailout

# Vulnerability to crisis calls for regulation

- The important services FIs provide make them worth of receiving special **regulatory** attention

- The **negative externalities** when something goes wrong in the FI sector make a case for regulation

- Examples:
  - A bank failure may destroy household savings and restrict firm´s access to credit
  - This has contagious effect on the rest of the economy (lower sales, production, employment)

# Aim of FIs regulation

- Increase **diversification**
  - Ex: No more than 5 percent equity exposed to a single borrower

- Deter **risk-taking** and produce capacity to absorb losses
  - Ex: Minimum capital requirements

# Liquidity creation

# Theoretical explanation

Douglas W. Diamond, 2007, "Banks and Liquidity Creation: A Simple Exposition of the Diamond-Dybvig Model", Federal Reserve Bank of Richmond *Economic Quarterly*, 93(2): 189-200.

- The model explains why banks choose to issue deposits that are **more liquid** than their assets

| Assets | Liabilities + Equity |
|---|---|
| Loans | Deposits |
| | Equity |

- The model also explains why banks are subject to **bank runs**

- Two-period model, only one asset, and one type of investor (saver)

# Model inputs/assumptions

Investors who have a **demand for liquidity** prefer to invest in a bank rather than hold asset directly.

Investors demand liquidity because they are **uncertain** about **when** they need to consume (and so how long they wish to hold assets).

Creating liquid (**demand**) deposits is an important function of banks.

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# Model inputs/assumptions

Consider the returns of the following **asset**.

- T = 0 Investment of $1 unit
- T = 1 Return is *r(1)*
- T = 2 Return is *r(2)*

We have $r(1) < r(2)$.

The lower *r(1)/r(2)* the **less liquid** is the asset.

# Model inputs/assumptions

Investors face uncertainty on **when** to consume.

Each investor will consume **either** at T=1 **or** at T=2.
However, at T=0 nobody knows when he/she will consume.

What can provide an **insurance** against this uncertainty? Can the bank offer a **contract** that is convenient for everybody?

# Model inputs/assumptions

Call **early consumers** (type 1) those consuming at T=1.
Call **late consumers** (type 2) those consuming at T=2.

The **ex-ante** probability of being an early consumer is *t* (so *1-t* is the probability of being late consumers).

Assume there are **100** investors, and ***t*=1/4**. Therefore there will be **25** early consumers and **75** late consumers.
Again, at T=0 is not known **which** investors will be of each type.

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# Model inputs/assumptions

Investors derive **utility** from consumption: $U(c)$.

Early consumers consume at T=1 then $U(c(1))$. Late consumers consume at T=2 then $U(c(2))$.

Holding the asset with returns $[r(1),r(2)]$ implies that $c(1)=r(1)$ and $c(2)=r(2)$.

Investor's **expected utility** is $tU(r(1)) + (1-t)U(r(2))$

Assume $U(c) = 1 - (1/c)$

# Model inputs/assumptions

Compare two assets:

- A **less** liquid (illiquid) asset with $r(1) = 1$ and $r(2) = R = 2$.
- A **more** liquid asset with $r(1)=1.28 > 1$ and $r(2)=1.813<R$.

[We will see later how the bank can "create" the more liquid asset and why it takes these returns]

The **expected utility** of holding the illiquid asset is

$U(c) = 1-1/c$

$1/4U(1)+3/4U(2) = 0.375$

$1/4*(1-1/1) + 3/4*(1-1/2) =$

$= 1/4*0 + 3/4*1/2 \quad = 0.375$

The **expected utility** of holding the more liquid asset is

$1/4*(1-1/1.28) + 3/4*(1-1/1.813) = 0.391$

$1/4U(1.28)+3/4U(1.813) = 0.391 > 0.375$

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A risk-averse investor prefers a **smoother** pattern of returns.

The illiquid asset is **riskier** since delivers a low return in T=1

# Deposit example

A bank can offer the returns of the more liquid asset **even if** the bank invest in the illiquid asset!

How? By offering **demand deposits**.

Suppose that in return of \$1 unit of deposit at T=0, the bank promises to pays $r(1)$=1.28 at T=1 and $r(2)$=1.813 at T=2.

At T=0, the bank receives **\$100** in deposits.

# Insurance example

At T=1, the 25 early consumers withdraw \$1.28 each. In **total** the bank pays 25(1.28) = \$32.

At T=2, the bank has resources equal to (100 – 32) = \$68 which are worth $R$=2 each. Therefore a **total** of \$136. The 75 late consumers each can withdraw 136/75 = 1.813.

A bank **can** therefore provide the returns of the more liquid asset, through a deposit contract. This service of **liquidity transformation** is the most important functions of banks.

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The bank can create a more liquid asset that allows investors (uncertain on when they consume) to **share the risk** of liquidation losses.

The bank's demand deposit guarantees:

1.28

- at T=1 to the fraction *t* of investors *r(1)*.
- at T=2 to the fraction *1-t* of investors $r(2) = [1-tr(1)]R/(1-t)$

((100-25*1.28) * 2) / 75 = 1.813

((1-0.25*1.28) * 2) / 0.75 = 1.813

How to determine the **optimal** demand deposit? I.e., the optimal amount of liquidity to create?

The optimal $r(1)$ and $r(2)$ maximize the ex-ante (at T=0) expected utility of the investors $tU(r(1)) + (1-t)U(r(2))$ subject to $r(2) = [1-tr(1)]R/(1-t)$.

Objective function

Restriction

The **optimal values** satisfy the FOC: $U'(r(1)) = RU'(r(2))$

Marginal utility equal to the marginal cost of liquidity R.

Given the utility $U(c) = 1 - (1/c)$ the marginal is $U'(c) = 1/c^2$

and the FOC becomes $\frac{r(2)}{r(1)} = \sqrt{R}$.

Since $r(2) = \frac{[1-tr(1)]R}{1-t}$, we have $r(1) = \frac{\sqrt{R}}{1-t+t\sqrt{R}} = 1.28$

(using the values $R = 2$ and $t = 1/4$)

Finally, $r(2) = 1.28\sqrt{2} = 1.813$

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This good equilibrium is **not the only** one!

If **not only** the proper amount of depositors (25 in our example) withdraw at T=1, the bank may have problems.

At T=1, the information about the consumer needs is **unverifiable** private information. Also late consumers can withdraw at T=1 **pretending to be** early consumers.

This implies the existence of a **bad equilibrium** (bank run)

The bad equilibrium all depositors withdraw at T=1 because all expect each other to do the same.

The bank **fails** at T=1 since if all 100 depositors withdraw at T=1 the bank has to pay \$1.28(100)= \$128 > \$100.

The bank can be liquidated for **at most** \$100 at T=1. Nothing is left at T=2. All depositors rush to withdraw!

What can **cause** this large change in belief?

You need **something** that (almost) all depositors can see (and believe that other see).

Example: **newspaper/TV** story about bank performing badly.

A run can occur **even if** the story is **false**, as long as everybody believe that depositors will withdraw based on that story!

- Northern Rock UK Sep 2007
- https://www.youtube.com/watch?v=sKjdT8I6TnE

- The queues that formed outside Northern Rock, the country's fifth-biggest mortgage lender, represented the first bank run in Britain since 1866.
- The panic was prompted by the very announcement designed to prevent it. When the Bank of England said that it would stand by the stricken Northern Rock, depositors started to run for the exit.
- Attempts by Alistair Darling, the chancellor of the exchequer, to reassure savers served only to lengthen the queues of people outside branches demanding their money.
- The run did not stop until Mr Darling gave a taxpayer-backed guarantee on September 17th that, for the time being, all the existing deposits at Northern Rock were safe.

- IndyMac Bank: July 2008 US
- https://www.youtube.com/watch?v=In9rbjeH1-4

## Liquidity Risk

- IndyMac Bank was **taken over** by the FDIC on July 11, 2008 after a run and was sold to OneWest Bank.
- One of the **largest** bank failures in history, cost the FDIC $13 billion dollars.
- The cause of the deposit run was the **public** release of a June 26, 2008 letter to the FDIC from Senator Charles Schumer of New York.
- The letter expressed **concerns** about IndyMac's viability.
- In the following **11** business days, depositors withdrew more than **$1.3 billion** from their accounts.

# How to avoid a bank run?

**Deposit insurance** is a [redacted] option. It is a promise to pay the amount promised **no matter** how many depositors withdraw.

For example, a promise to pay 1.28 at T=1 and 1.813 at T=2.

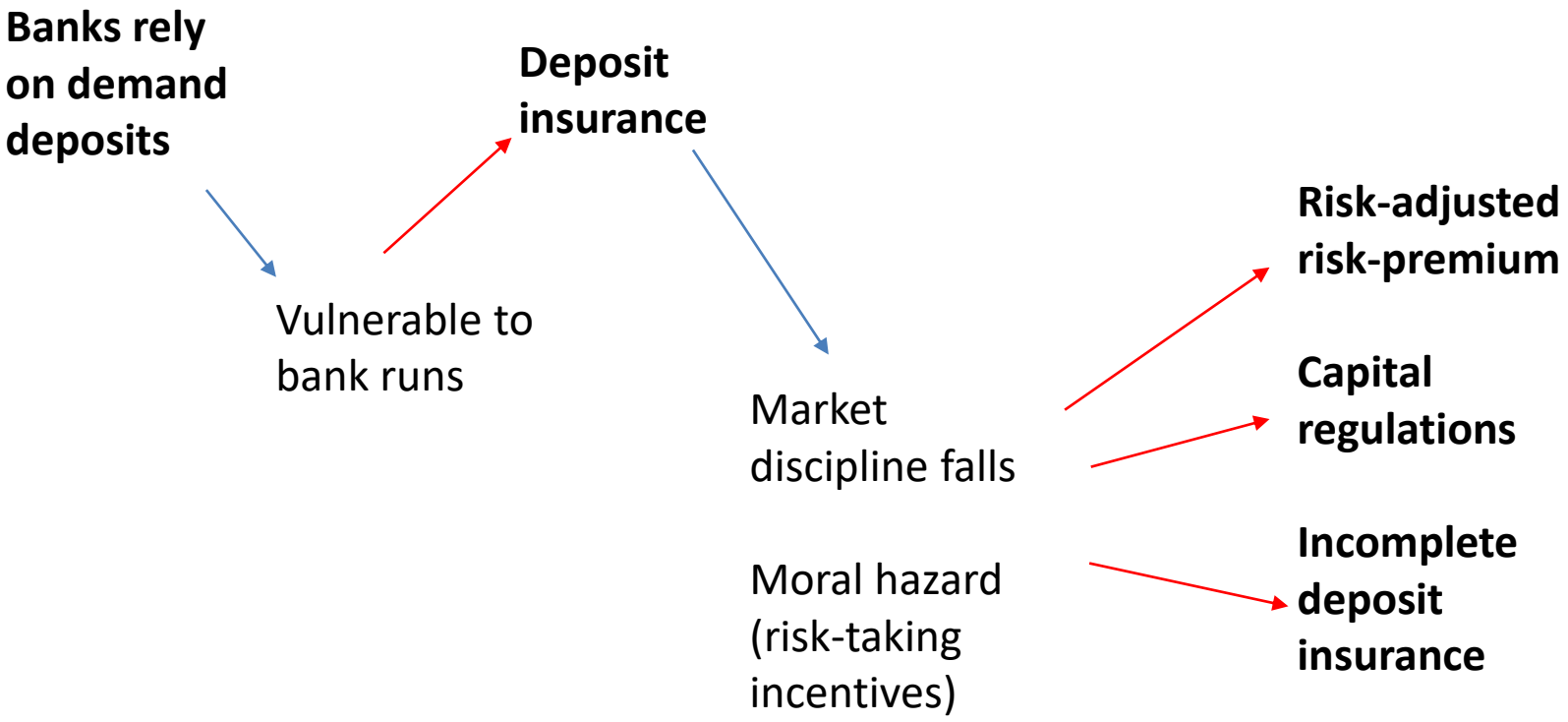
What if everybody withdraws? Deposit insurance is backed by the **government**, who has tax authority and can take resource from those who run. It can **credibly** offer deposit insurance.

If deposit insurance is **credible** then bank runs are avoided. Beliefs would converge to the good equilibrium, and nobody would run.

Deposit insurance **solves problems** of discretionary intervention (like suspension of convertibility) but has its own problem.

Its guaranteed bailout of depositors may cause incentive problem (excessive **risk taking**), especially if bank regulation is poorly structured. But this is another story…

# Roadmap


**Banks rely on demand deposits**
Vulnerable to bank runs
**Deposit insurance**
Market discipline falls
Moral hazard (risk-taking incentives)
**Risk-adjusted risk-premium**
**Capital regulations**
**Incomplete deposit insurance**

# Implicit and explicit guarantees

- Deposit insurance (explicit guarantee)
- TBTF (implicit guarantee)

- They **reduce** the cost of funds, **the sensibility of the cost of funds to banks´risk-taking**

- Increases bank risk-taking incentives !

# Market discipline: Implicit guarantees (Too Big To Fail)

Slides based on:

- “Gains in Bank Mergers: Evidence from the Bond Markets”, by Penas, M.F. and Unal, H. in Journal of Financial Economics, 2004, Vol.74, No.1, 149-179

# TBTF - Bank mergers in the US during the 90s

- Motivation of the paper:
  - To test whether banks that become very large after a merger decrease their cost of debt due to government implicit guarantees (TBTF)
  - A merger implies a large increase in bank size
- Popular press:
  - "Consolidation is doubling the number of TBTF (too big to fail) banks that regulators in the past have kept alive no matter what the cost to taxpayers." (Business Week, April 27, 1998).
  - "In this brave new world of banking, suppose a financial-services firm should run into trouble, even to the brink of collapse. Do the Fed and its regulatory counterparts allow one of the largest banks in the country - in the world - to fail? The answer is no" (Barrons, 1998).

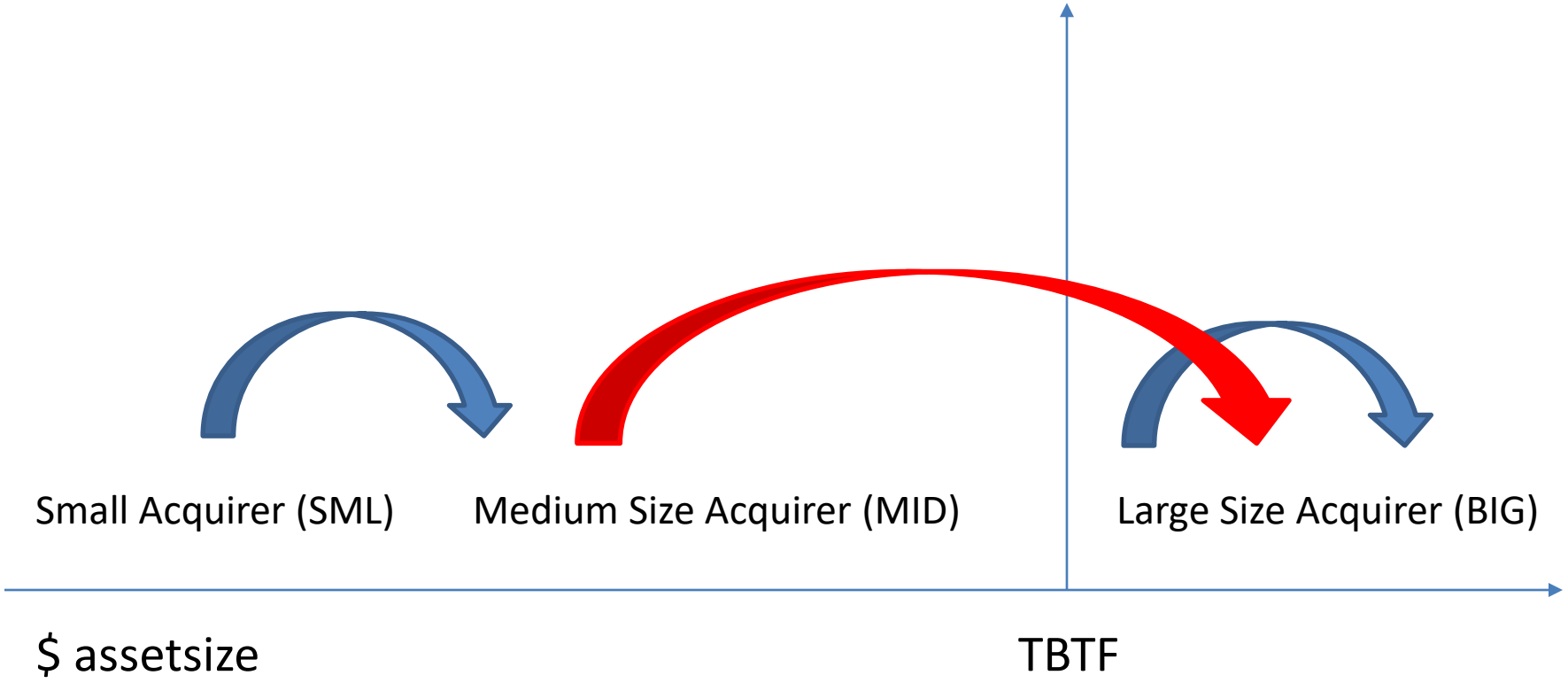
# Empirical strategy

- Test if bonds abnormal returns at the announcement of the merger (event study) increase significantly
  - Test the factors that determine the increase in bonds abnormal returns

- Test if bond spreads at issue (bank cost of debt) are lower after a merger
  - Test the factors that determine the decrease

# TBTF - Bank mergers in the US during the 90s

Key test: Effect should be significant ONLY for the medium-size banks (**those acquirers that are not TBTF before the merger, but become TBTF after the merger**)

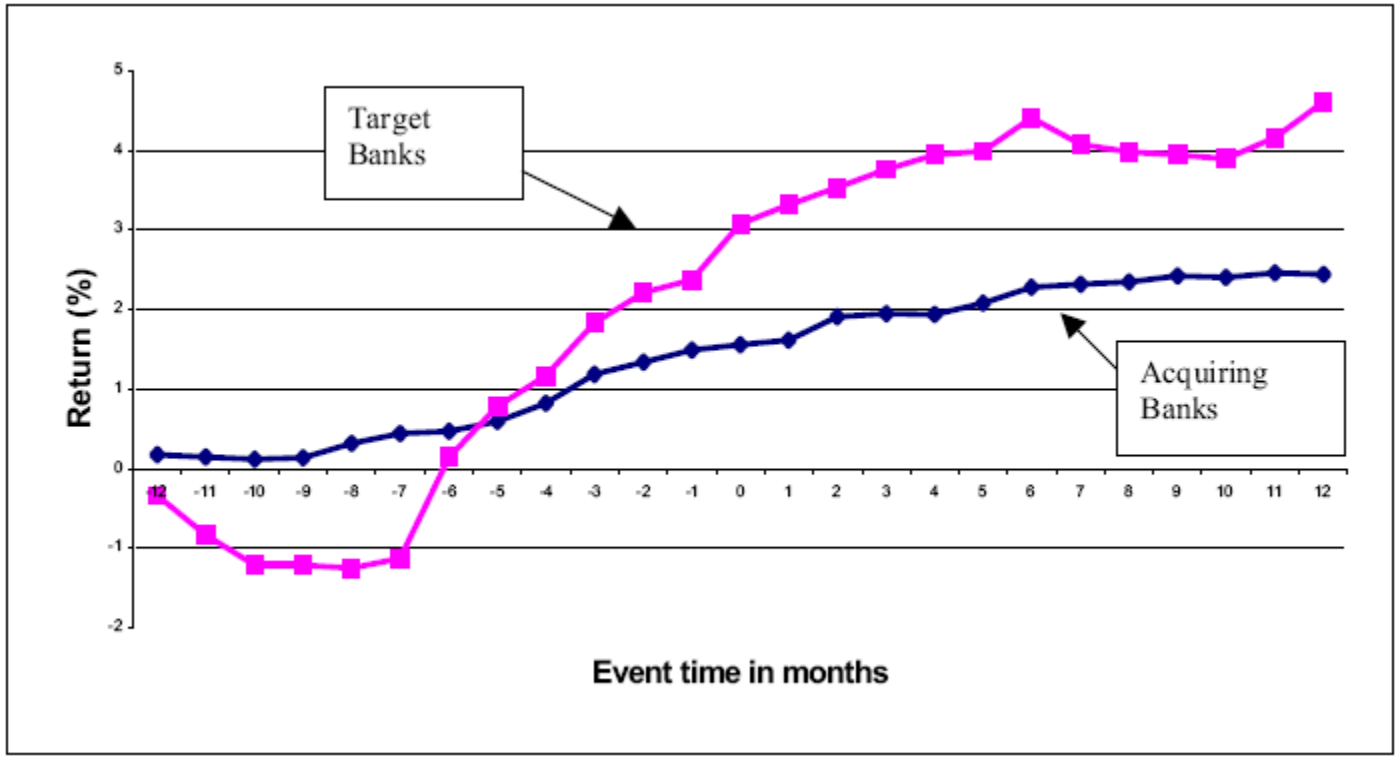


# TBTF - Bank mergers in the US during the 90s

- Bank merger cases are included in the analysis if:
  - They are for the period: 1991-1997
  - The acquirer and target are both commercial banks.
  - The target bank's assets are equal to at least 5 percent of the acquiring bank’s assets before the merger.
  - 66 merger cases
    - Among the largest ones: BankAmerica-Continental, Banc One-First Commerce, Chase Manhattan-Chemical

# Bond CARs (66 mergers)

We compute debt returns from traded-quoted prices of the Lehman Brothers Database. We adjust each return by subtracting the return of an equivalent Merrill Lynch bond index that matches bond maturity and rating. We first average returns across all bonds belonging to the same firm, then across firms.



# TBTF - Bank mergers in the US during the 90s

- Potential reasons for the increase in bond returns (fall in default probability and/or recovery rates):
  - Diversification
  - Synergies
  - Market power
  - TBTF

# TBTF - Bank mergers in the US during the 90s

## Regression analysis

- Controls for diversification gains
  - Volatility of equity returns of the combined bank

- Controls for synergies/market power
  - Whether the merger is in state (increase in market power, potential for reducing costs of overlapping branches) or out of state

- Controls for nonperforming loans and leverage
  - Accounting ratios

# TBTF - Bank mergers in the US during the 90s

## Key variable: dummy for each size category

- BIG: Banks with premerger size more than 2% of industry assets
- SML: Banks with premerger size less than 0.35% of industry assets
- MID: Banks with premerger size less than 2% but more than 0.35%

- Conjecture: Only the banks that are NOT TBTF before the merger and BECOME TBTF after the merger (MID group) should experience a drop in the cost of funds

# TBTF - Bank mergers in the US during the 90s

## Findings

- Diversification is one of the factors that explains the increase in abnormal returns and the fall in bond spread after a merger
- Some evidence of synergies being a determinant
- Strong evidence of bondholder gains due to achieving TBTF status.
  - Only the medium-sized banks experience a fall in the cost of funds
  - Specifically, those banks that are able to push the combined bank´s asset size to the $100 billion threshold
  - The **mega-banks** (that were already considered TBTF at the time of the merger) and the **smaller banks earn less than the MID banks**

# TBTF - Bank mergers in the US during the 90s

## Policy implications

- Banks that are very large are not subject to strong market discipline

- Regulator announcement of no bailout is not credible (time inconsistency)

- After the 2008/2009 crisis, regulators publish a list of systematically important financial institutions (SIFI or G-SIBS) that are subject to stricter regulations

# Market discipline: Explicit guarantees (Deposit Insurance)

Slides based on:

- “Deposit Insurance and Bank Risk-Taking: Evidence from Internal Loan Ratings”, by Ioannidou, V., and Penas, M.F. in Journal of Financial Intermediation, 2010, Vol.19, 95-115

# Deposit Insurance Introduction – Bolivia in 2001

- Motivation of the paper:

Introduction Deposit Insurance → Bank risk-taking ?

To test directly if the introduction of a government guarantee leads to higher bank risk-taking

- Previous paper suggests that this may be the case (as bank´s cost of funds risk premia falls banks have more incentives to take risks)

- But it is not a direct test of bank risk-taking

# Empirical strategy

- Compare bank risk-taking before and after the introduction of deposit insurance on December 20, 2001
  - Before there were no explicit guarantees
  - Average insurance coverage was 60%. No deposit insurance limit

- Measure of risk taking: Loan internal rating at loan origination

  - Ratings: 1 (best) to 5 (worst)
  - Subprime: if rating >1

# Deposit Insurance Introduction – Bolivia in 2001

- Data source:
  - Public credit registry of Bolivia:
    - Contains detailed loan contract information, on a monthly basis, on all loans granted by any formal financial institution operating in Bolivia

- Data consists of 31652 loan originations to firms between March 1999 and December 2003 (before and after DI)

# Deposit Insurance Introduction – Bolivia in 2001

## First we check

- Are loans with worse ratings really riskier?
  - Pricing at loan origination
    - Subprime risk premiums: up to 190 basis points
  - Ex-post loan performance
    - Subprime: 3 times more likely to go past due and 6 times more likely to default

# Deposit Insurance Introduction – Bolivia in 2001

## Regression analysis

- Test the determinants of the probability of originating a subprime loan

- Controls for macro factors ( GDP growth rate, inflation rate, market interest rate, ICRG country risk indicator, aggregate NPL ratio, etc)
  - Better conditions should decrease the prob of a subprime loan

- Controls for bank market competition

- Key test variable: Dummy DI (1 after Dec 2001, 0 otherwise)

# Deposit Insurance Introduction – Bolivia in 2001

## First findings

- The introduction of deposit insurance increases the probability of originating a subprime loan by 6.8 percentage points
  - Given predicted probabilities of 12%, this implies an increase of 56% in the probability of subprime

- Banks do not compensate for the extra risk by requiring more collateral or shortening maturities

# Deposit Insurance Introduction – Bolivia in 2001

## Share of large depositors

- Large depositors have more at stake, tend to be more sophisticated, expect to gain less in case of bailouts (governments impose coverage limits per account)

- They are the ones to impose market discipline.

- But they were also covered by deposit insurance in Bolivia (no coverage limit in Bolivia, and average coverage rate 60%)

# Deposit Insurance Introduction – Bolivia in 2001

## Share of large depositors: Findings

- Before DI, banks with larger share of large depositors (more than USD 30000, 30 times Bolivia GDP per capita) were less likely to originate subprime loans (imposed market discipline)

- After DI, large depositors make no difference (fall in market discipline)

# Deposit Insurance Introduction – Bolivia in 2001

## Policy implications

- Deposit insurance reduces the risk of bank runs, but diminishes market discipline

- There should be a coverage limit above which all is at risk:
  - Europe: up to € 100000
  - US: up to USD 250000
  - UK: up to £ 85000
  - Argentina: up to $ 1500000 (USD 7500)