“Review” of what we studied so far

We have studied 2 reasons why banks (more generally a financial system) are useful:

1. *by monitoring firms and making it harder for entrepreneurs to shirk banks allow projects that otherwise could not be financed to be implemented (as we studied in the Holmstrom- Tirole model)*

2. *by transforming maturities they allow the savings that households wish to keep “liquid” (i.e. immediately accessible) to be used to fund long-term projects (as we studied in the Diamond-Dybvig model)*

We have also learned (with the Tirole model) that it is important that banks be diversified, otherwise too much liquidity may end up in some places that do not need it, and too little where it would be needed

Finally we have learned how financial contracts may amplify macro shocks

We now ask why this helps us understand the origin of financial crisis exploded in 2007-08 and not yet over

Background reading

Promises that proved ultimately empty

“Unless banks can better demonstrate their usefulness to society, they face a debilitating battle against new regulation.”

John Gapper, *Financial Times*, January 10, 2012.

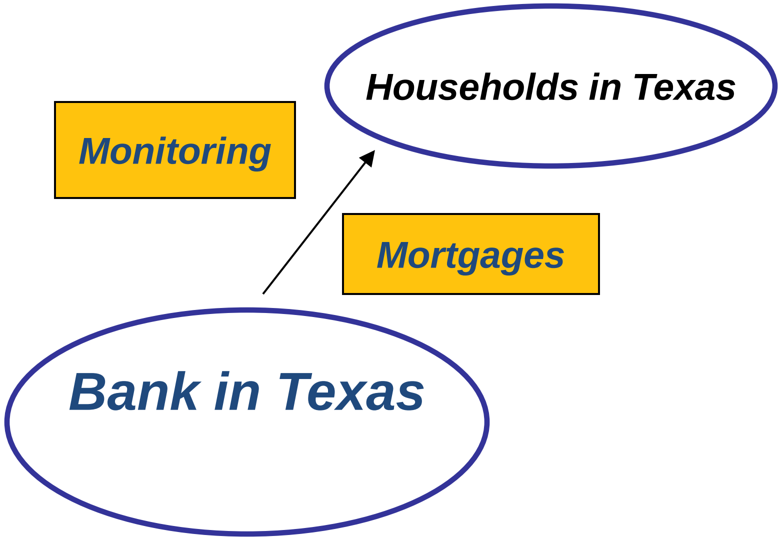
Playing with Fire

“Financial Innovation can do a lot of good. It its tendency to excess that must be curbed”

Andrew Palmer, *The Economist,* February 25, 2012.

Lack of diversification increases exposure to risk

Example: local bank with local risk exposure



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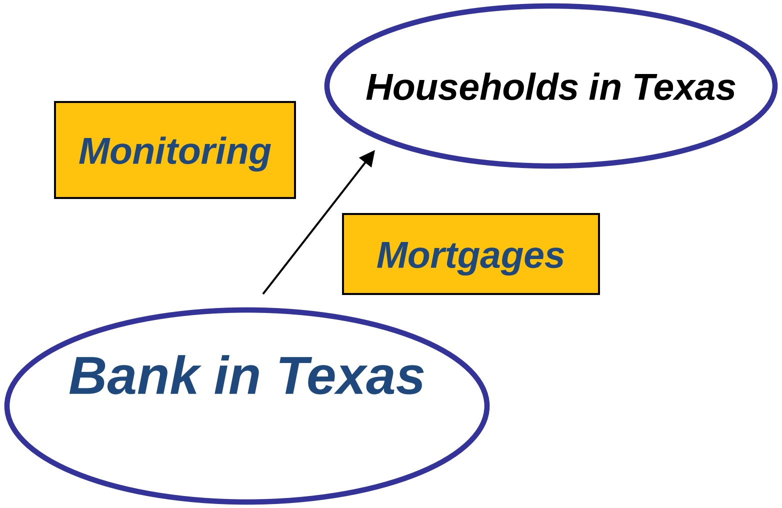


- This actually happened in Texas in the late 1980s. When the price of oil fell, many Texans companies and households (Texas being an oil-based economy) were unable to keep paying their mortgages. Texas banks collapsed

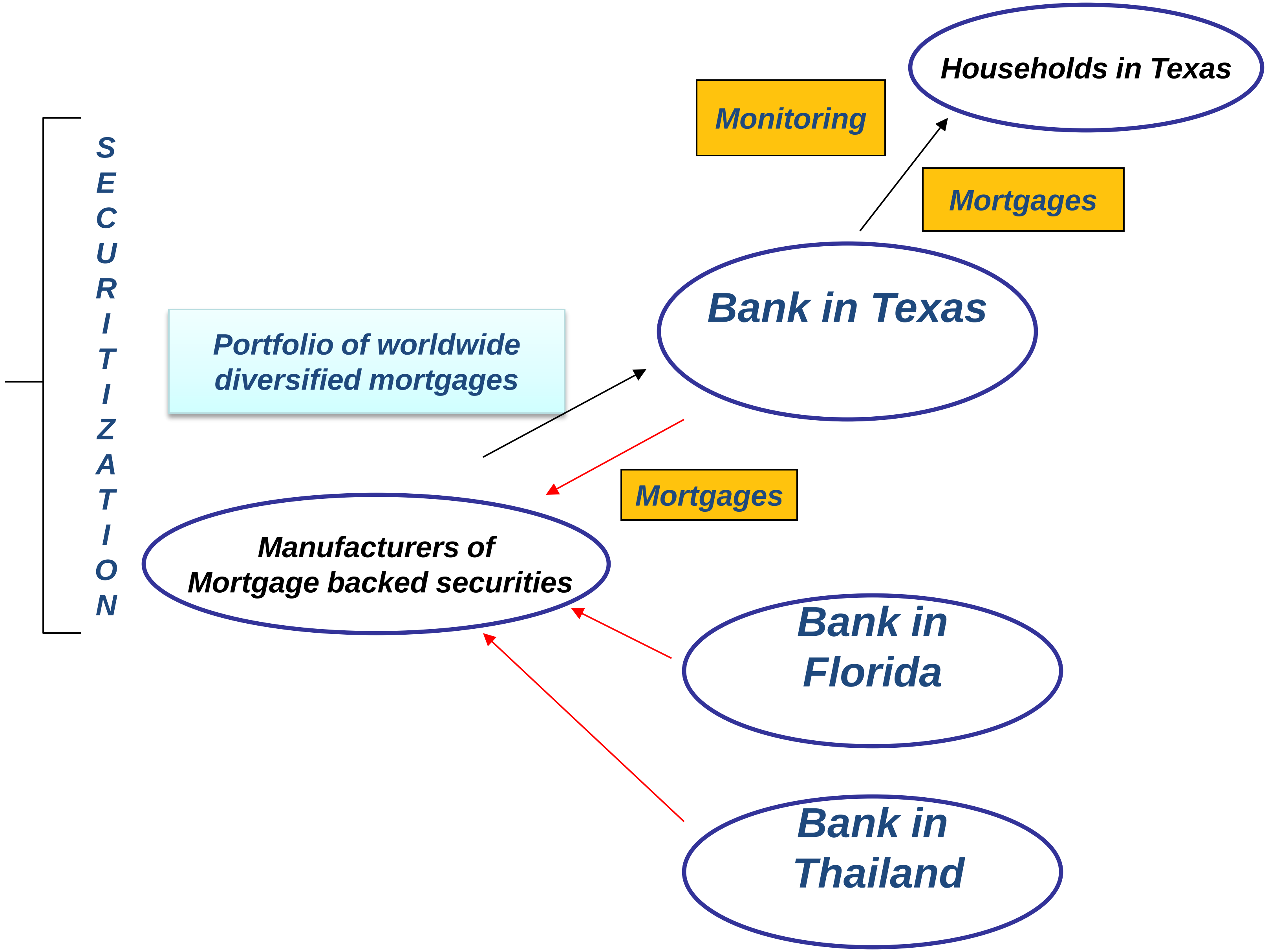
- To address the problem, two solutions were tried:

    1. build cross-state banks which lend in many different states: the BankofAmerica model

    2. diversify via securitization

Diversification reduces exposure to idiosyncratic risk

Securitization is an avenue to diversification for banks



Securitization: transforming mortgages into claims to diversified pools of money

- Recall that owning a mortgage means owning a cash flow: the flow of interest payments

- A bank can sell a mortgage to a specialized firm (a "factory") that collects thousands of mortgages and issues claims to the cash flows they generate (a security)

- If the cash flows are uncorrelated, buying these ensuing securities allows investors to get rid of "local" risk (diversify)

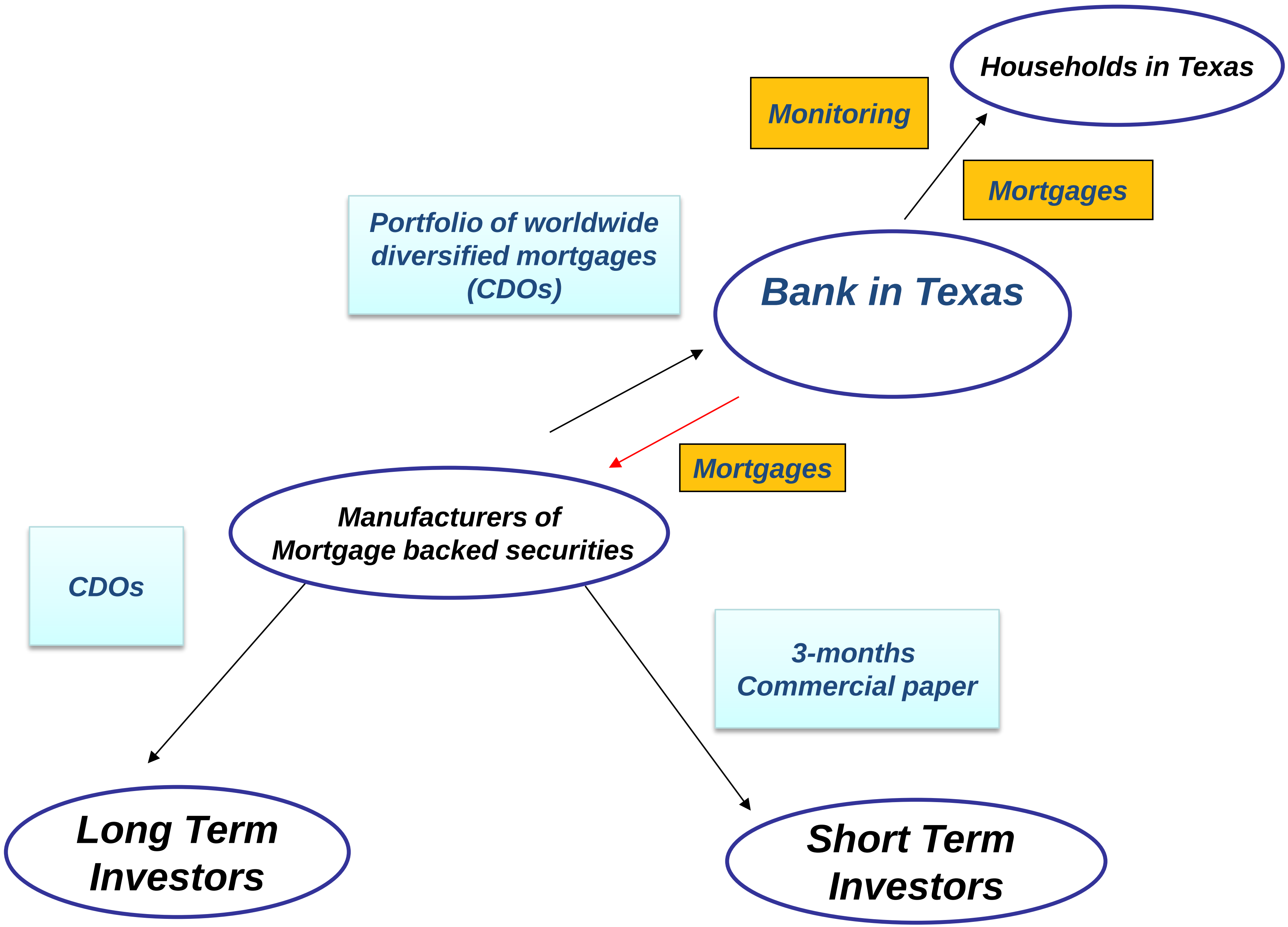
- These securities are sometimes called Collateralised Debt Obligations (CDOs)

  - Collateralized: because guaranteed by an asset, the house
  - Debt: because they are a debt of the “factory”

Securitization: transforming mortgages into claims to diversified pools of money

- *The "factory" finances its purchase of mortgages by*
  - *Selling CDOs to the market and the banks*
  - *Borrowing from the market issuing a special kind of deposits: 3-Months Commercial Paper*
- *Thus the "factory" does two things at the same time:*
  - *diversification through the bundling of mortgages*
  - *maturity transformation, when it issues deposits to buy long-term mortgages*

The “factory” finances the purchase of mortgages issuing CDOs and short term deposits (Commercial paper)



The structure of a CDO: who gets what, at what risk

Subprime mortgage loans

Subprime mortgage bonds

AAA	80%
AA	11%
A	4%
BBB	3%
BB-unrated	2%

<u>Representative Pool:</u>
$1 billion par value
4000 mortgages

High-Grade Structured CDO

Senior AAA	88%
Junior AAA	5%
AA	3%
A	2%
BBB	1%
Unrated	1%

Mezzanine Structured CDO

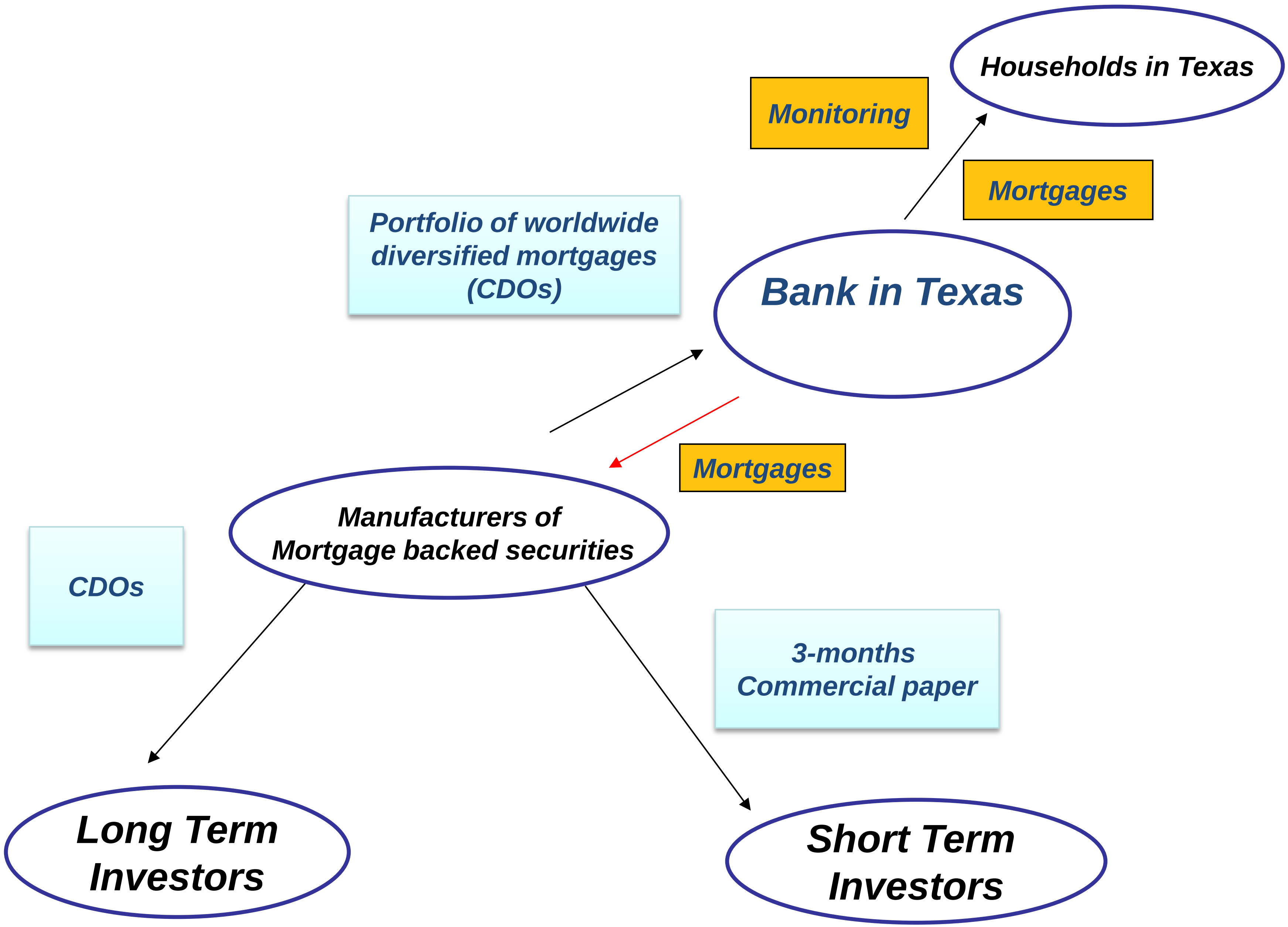
Senior AAA	62%
Junior AAA	14%
AA	8%
A	6%
BBB	6%
Unrated	4%

CDO-squared

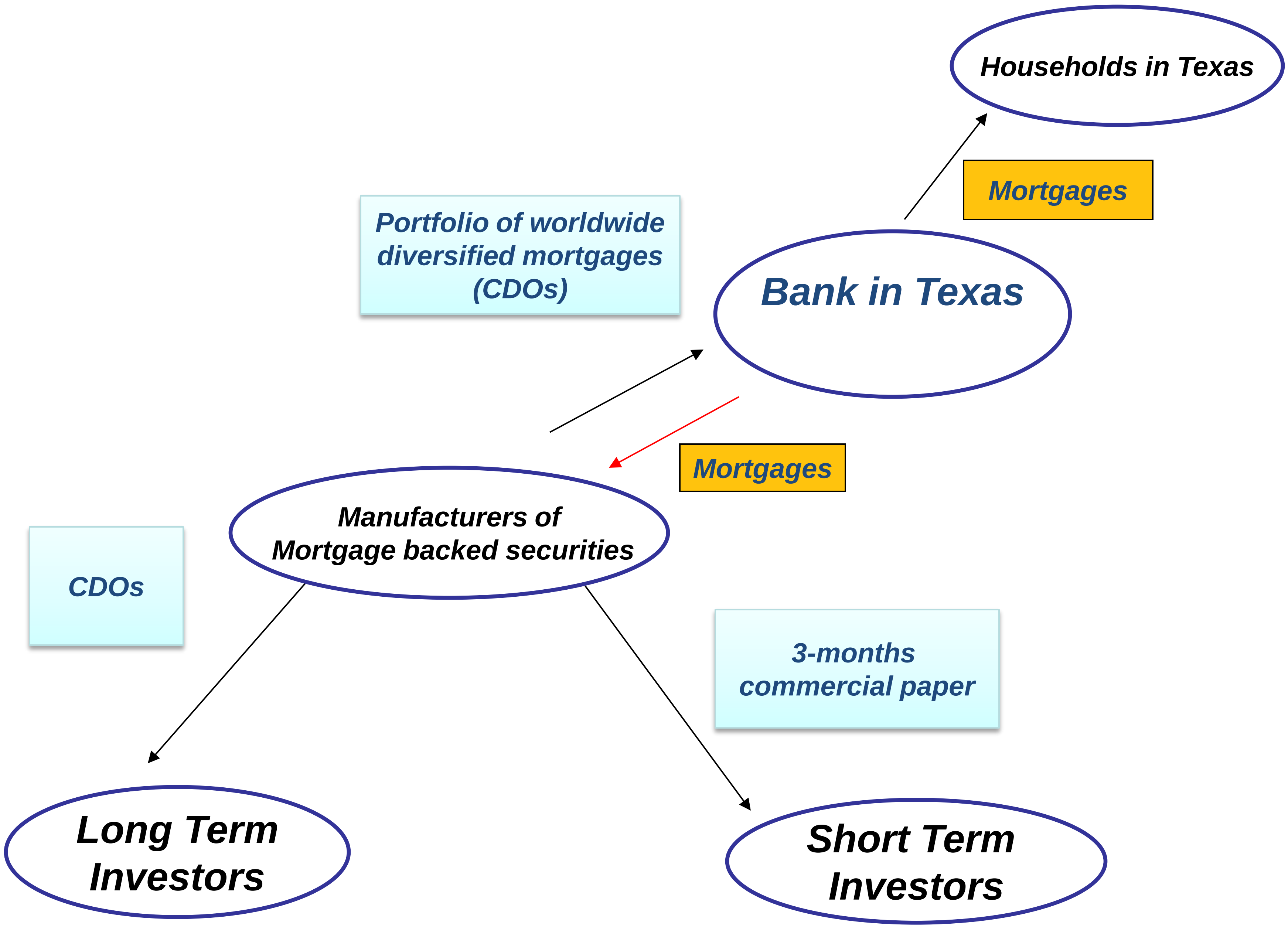
Senior AAA	60%
Junior AAA	27%
AA	4%
A	4%
BBB	3%
Unrated	2%

CDO: Collateralized Debt Obligation

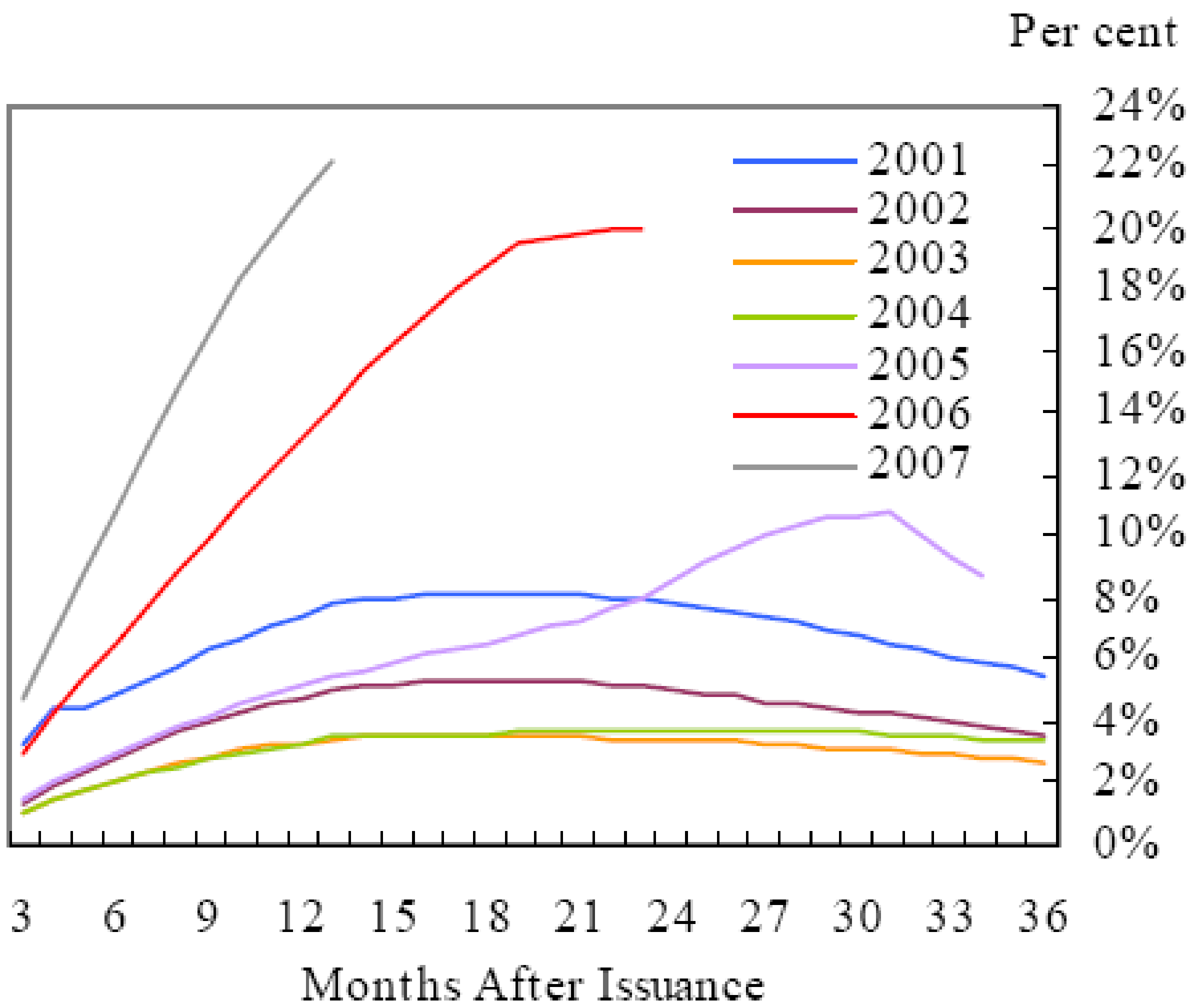
When the bank has sold the mortgage, does it still have an incentive to monitor homeowners ?



With no more capital invested in the mortgage ($I_B = 0$)
the bank has no incentive to monitor



Defaults on sub-prime mortgages by year of mortgage approval

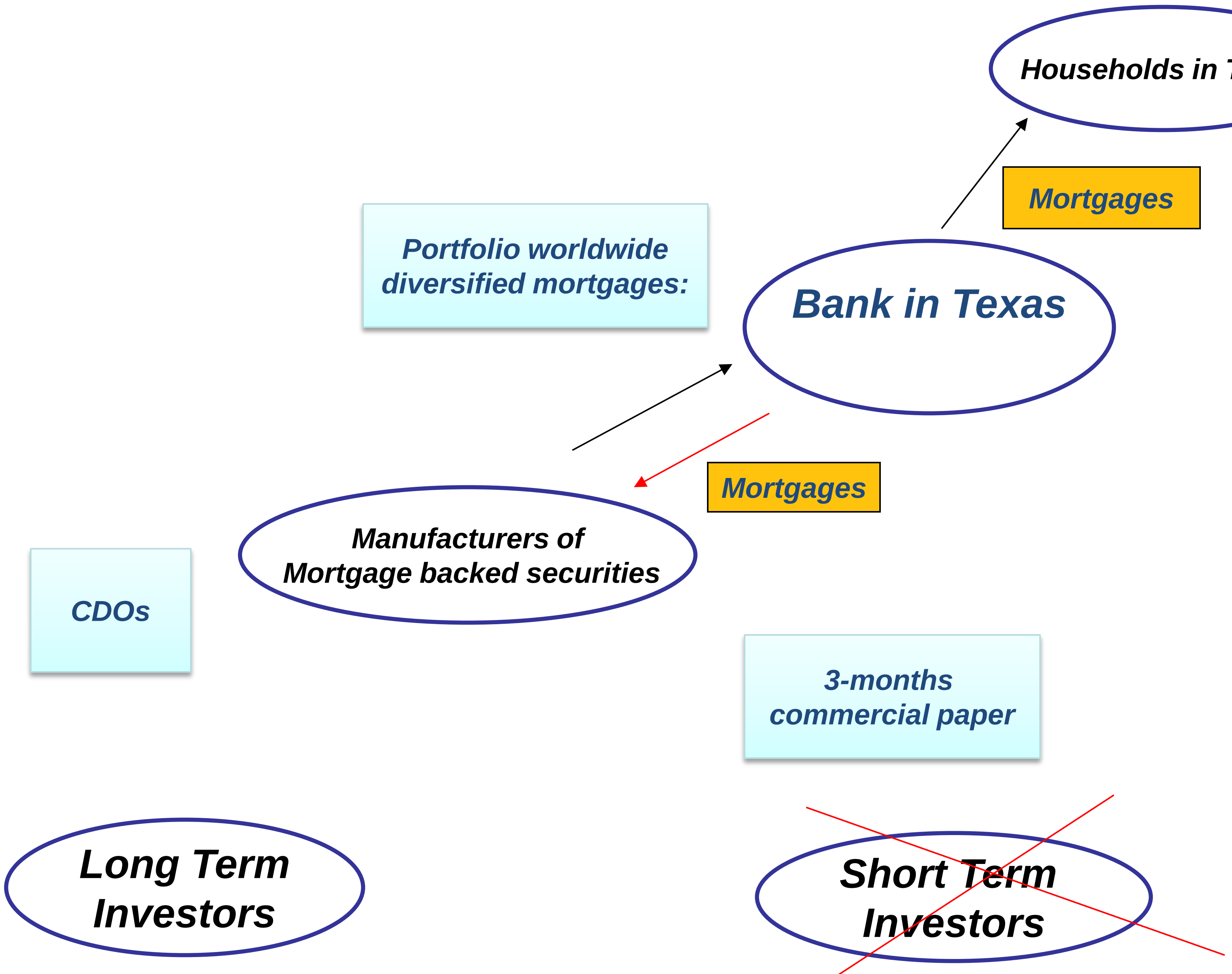


Source: Moody's Investors Service.

From the absence of monitoring to a “Bank Run”

- When investors realized that mortgages were no longer monitored (and thus that banks were giving them out without properly screening borrowers), they lost confidence in mortgage-backed securities
  - Long Term Investors were stuck with the mortgages they had bought
  - Short term investors, who had financed the manufactures buying 3-month commercial paper, all withdrew their deposits, like in a **bank run.** (More precisely they stopped rolling over short term commercial paper, which is the same thing)
- The manufacturers of CDOs were broke because part of the mortgages they had bought had been financed with short term borrowing

When investors realized that mortgages were no longer monitored, they lost confidence in mortgage-backed securities CDO manufacturers went broke

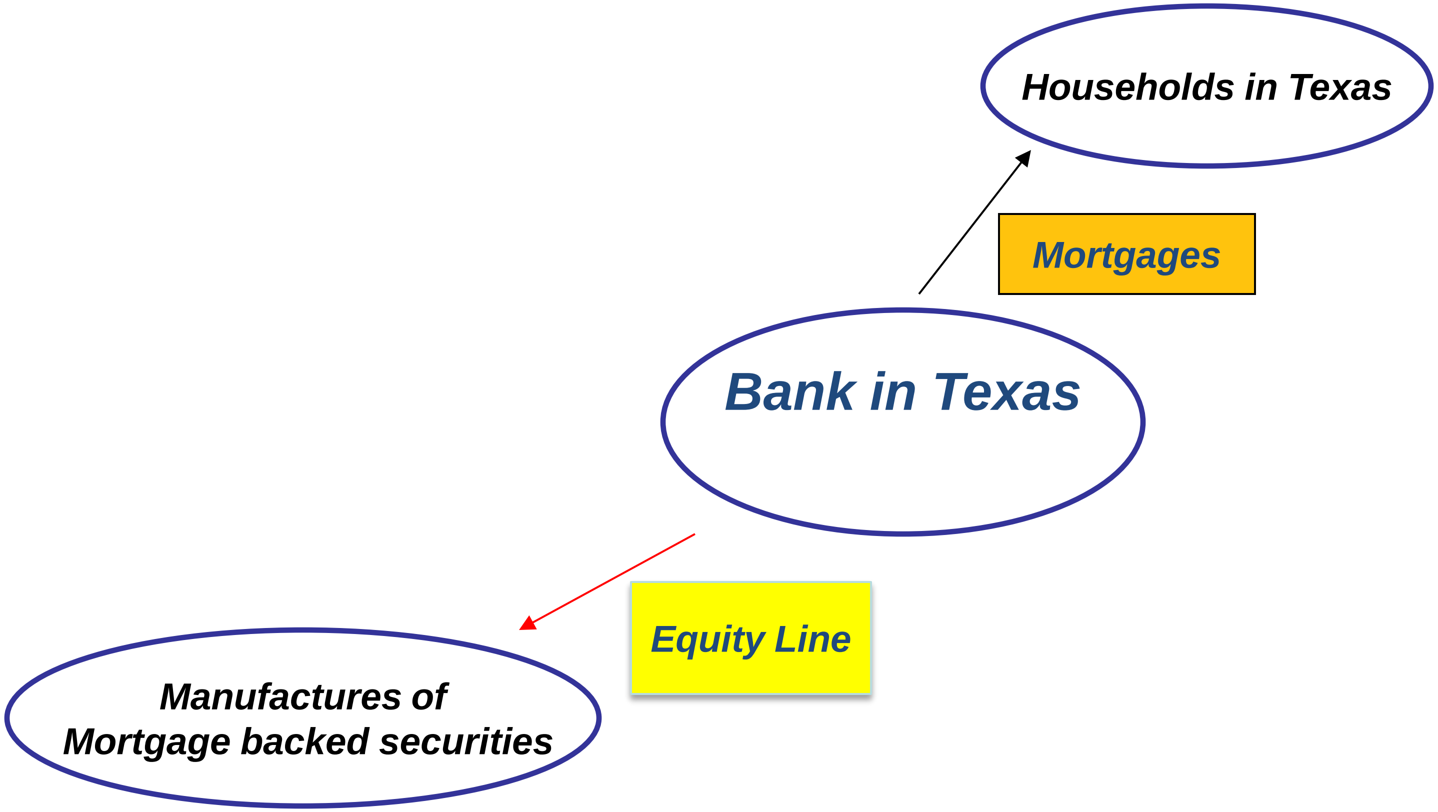


Balance sheet of CDO manufacturers

Assets	Liabilities
30-year mortgages	3-months deposits

- Long term assets and short term liabilities made them vulnerable to shifts in confidence

Further complication: banks had given CDOs manufacturers a guarantee which was triggered when they were hit by the recall of loans



Some banks did not have enough capital to keep CDO manufacturers alive: both went broke.

Bottom line: securitization gave the illusion of diversification

- **Diversification is a wonderful idea -- provided it is done right**

- **Banks thought they had reduced their risk selling the mortgages, but they had not**

Eventually the Government saved the banks