Money and Banking
Lecture 12: Shadow Banking System II

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Outline

1 Introduction

2 Investment Banks: Liquidity Transformation

3 Money Market Mutual Funds

4 Flaws in Shadow Banking System
- Worse Asymmetric Information Problem
- Regulatory Arbitrage
- Highly-Levered Non-Bank Institutions

INTRODUCTION

- In last lecture, we discuss how *securitization* combines a wide range of financial institutions to connect end borrowers and end investors more efficiently (supposedly).
- Investment banks play a vital role in it, because it provides liquidity in this market by trading securities.
- In this lecture, we first discuss ways for investment banks to finance MBS trading, i.e., *liquidity transformation*.
- Second, we discuss *fragility* in this securitization process, i.e., fragility of *shadow banking system*.

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INVESTMENT BANKS: LIQUIDITY TRANSFORMATION

- The first way for investment banks to finance securities trading is *repurchase agreements* or *repos*.
- What is a*repo*? Repo consists of two agreements: sale and buy-back.
- In the sale agreement, fund borrower sells *securities* (e.g., MBS), as *collateral*, to fund provider.
- In the buy-back agreement, fund borrower would buy securities back from fund provider within a specific time.

INVESTMENT BANKS: LIQUIDITY TRANSFORMATION

- A numerical example is as follows: Goldman Sachs gets an overnight (couple of hours) repo with Morgan Stanley.
- In the repo, Goldman borrows $1 million from Morgan Stanley with $1.5 million MBS as collateral, and promises to buy those MBS back with $1.01 million next day.
- Two things need to mention: (1)*haircut*, in this case is $0.5 million; and (2) *interest payment*, $1,000 is the cost of borrowing in this repo.
- The *haircut* provides cushion against potential price downswing in collateral.
- When the market value of collateral declines, Morgan Stanley would call a margin, i.e., to ask Goldman to put more MBS so that the value of collateral unchanged at least. *Margin call* means increasing cost of borrowing.

Investment Banks: Liquidity Transformation

- How to use a repo to do investment? A hypothetical case: Goldman intends to trade Citi-MBS in the next day for 1% price increase.
- Adam wants sell $1.5 million worth Citi-MBS. Goldman gets a repo with Morgan Stanley as in previous case, and buys Citi-MBS from Adam with $1 million, and then send it to Morgan Stanley.
- At the same time, Goldman contacts HSBC in London, and gets a deal to deal it at $1.52 million next day.
- In the next day, HSBC wires $1.52 million to Goldman, and the latter uses $1.01 million to buy back Citi-MBS and send those securities to HSBC.
- In this trade, Goldman earns $52,000 without actual pay.

Investment Banks: Liquidity Transformation

- Morgan Stanley also can take this repo with Goldman Sachs to make profit through *short selling*.
- Morgan Stanley bets the price of Citi-MBS will decline by 13% in one day.
- It borrows $1.5 million worth MBS from Goldman Sachs by paying $1 million, and then sells it outright and receive $1.5 million.
- Next day, the price of Citi-MBS declines to $1.3 million. Morgan Stanley buys it back, return it to Goldman, and receives $99,000.
- The cost of securities is $1,000, and the profit from short sale is $2,000, so the profit is $1,000.

Investment Banks: Liquidity Transformation

- Morgan Stanley in the repo is a security borrower, pay first and sell next. Such repos are called *reverse repos*.
- In either case, repos use *collateral* to prevent default risk, and thus lowers the cost of borrowing.
- However, interbank borrowing costs more than repos, because the former has no collateral.
- That is why repo rates are heavily monitored.
- More efficient repo used in financial market is *tri-party repos* by introducing a third party. Yet, the discussion of tri-party repo mechanism is beyond the scope of this course.

Investment Banks: Liquidity Transformation

- The second way for investment banks to finance investment in securities is *commercial paper* issuance.
- *Commercial papers* are unsecured promissory notes issued by big famous companies.
- Commercial papers, in some cases, can be used as *bridge finance* for long-term investment.
- Suppose a company wants to invest a 5-year project, but it takes 3 months to issue 5-year corporate bonds. The company then could issue 1 month commercial papers and use proceeds from issuance to finance the project.
- It just needs to roll over commercial papers twice, and when corporate bonds issued, it uses funds raised from bond issuance to pay off commercial paper investors.

Investment Banks: Liquidity Transformation

- Investment banks, however, do not usually get into a long-term project, but would use commercial paper issuance when holding long-term securities, e.g., MBS.
- The third way is to issue *asset-backed commercial papers* (ABCP).
- Different from commercial papers, cash flows of ABCP is based on underlying assets, rather than on issuer's payback ability.
- ABCP is more favorable in the eyes of issuers, because it can get higher rating if the quality of asset pool is good. Higher credit rating, lower cost of borrowing.

INVESTMENT BANKS: LIQUIDITY TRANSFORMATION

- Aforementioned three ways to finance MBS investment: *repos*, *commercial papers*, and *asset-backed commercial papers* are all short-term financial instruments.
- Those financial instruments are heavily traded in *money market* where the maturity of financial instrument is less than one year (financial instruments with maturity over one year are traded in *capital market*).
- Long-term securities on asset side, and short-term liabilities on liability side, *investment banks provide liquidity service to the market by taking liquidity risk in their balance sheets*.

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Money Market Mutual Funds

- Investment banks provide liquidity for long-term asset-backed securities by issuing money market instruments.
- Those short-term securities are exchanged by investment banks, commercial banks, and *money market mutual funds*.
- Money market mutual funds issue shares to end investors who prefer high liquidity and invest short-term securities.
- Due to high liquidity, money market mutual funds are considered as safe as deposits.

MONEY MARKET MUTUAL FUNDS

- Since money market mutual funds provide higher return than deposits, and also favorable for small investors, it witnesses a huge amount of money flows from commercial banks to other financial institutions, e.g., money market mutual funds.
- Such a dispatch from conventional financial intermediaries, i.e., banks, is called *disintermediation*.
- Disintermediation just means short-term funds leave banks and does not mean independence from financial institutions.

MONEY MARKET MUTUAL FUNDS

- Till now, we see a big picture of *market-based* shadow banking system.
- It encompasses *money market* and *capital market*, and has commercial banks, investment banks, rating agencies, insurance companies, pension funds, hedge funds, and money market mutual funds at least to play.
- In this system, it generates *credit* in mortgage market, and finances such lending by issuing *deposit-like* short-term securities.
- *Maturity transformation, liquidity transformation, and risk transformation* are completed with the work of whole shadow banking system.

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Flaws in Shadow Banking System

- There are several flaws in shadow banking system.
- Overextended credit supply chain and complex financial instruments make *asymmetric information problem* worse.
- The business model of *rating agencies* may mislead investors.
- Non-bank financial institutions are highly levered up to pursue higher profits, whereas banks seek profits by *regulatory arbitrage*.
- High leverage of non-banking system makes the whole liquidity system vulnerable.

Worse Asymmetric Information Problem

- Financial institutions profit, to some extent, from holding *private information*.
- If the financial system is *bank-based*, i.e., banks provide most credit, *asymmetric information* mainly in the banking system.
- When mortgage financing through banks, investment banks, insurance companies, pension funds, and money market mutual funds, there are so many financial institutions between end borrowers and end investors.
- *End investor* are potentially *information-sensitive* specially when markets go south.

WORSE ASYMMETRIC INFORMATION PROBLEM

- Asset pools set up by SPVs for MBS and CDOs are supposed to diversify individual risks related to specific assets.
- A large pool of assets make end investors hard to understand, sliced securities seems attractive, but when under suspicion, they are also "lemon" to dump.
- *The business model of rating agency is controversial*. Rating agencies are supposed to protect investor interests; however, the latter does not pay services provided by the former. Instead, financial institutions selling MBS and CDOs are paying for rating agencies.

Worse Asymmetric Information Problem

- Besides *conflicts of interest*, rating agencies rely on "bad" mathematical models to measure default risk of MBS and CDOs.
- The models use historical data, and don't take dynamic changes in housing market into consideration.
- Rating only alters when markets actually start to disturb. In other words, rating is not a leading indicator.
- Moreover, models for measure MBS and CDOs those complex financial products are not reliable.

Worse Asymmetric Information Problem

- *More serious and fundamental problem is caused from the root*: lowered lending standards pursued by bankers or other monoline mortgage lenders, e.g., Countrywide.
- To compete in the mortgage market, some lenders who target low-income families with predatory lending. For example, tricky mortgage products - 3/27 mortgage, which means the first three year low interest payments, and the rest 27 years interest rate raised gradually.
- Even worse, some lenders even fake the credit history, e.g., NINJA (no income no job and asset) mortgage.
- When packed into an asset pool, it is very hard for rating agencies and investors to distinguish potential default risk.

Regulatory Arbitrage: Low Bank Capital

- *Bank capital* is an indictor for *solvency*. Yet, the return on equity (interests of shareholders) always will win out the safety of banks.
- International regulators set up a series of bank regulations called *Basel Accord*.
- Under the Accord, "adequately capitalized" banks were required to hold, against total risk-weighted assets, no less than *8%* capital.
- At least half of it was supposed to be tier-1 or "core" capital (e.g., retained earnings and common stocks) plus teir-2 capital.
- The capital requirement is Basel capital ratio $= \frac{\text{capital}}{\text{weighted assets}} = \frac{\text{capital(tier 1 + tier 2)}}{\text{assets (weighted by credit risk)+credit risk equivalence}}$.

REGULATORY ARBITRAGE: LOW BANK CAPITAL

- In U.S., *Resource Rule* sets the right weighting as follows:
  1. No risk (0%): cash, gold, and bonds issued by OECD governments
  2. 20% risk: AAA- and AA-rated ABSs; claims on OECD banks etc..
  3. 50% risk: A-rated ABSs, and mortgage loans.
  4. 100% risk: investments in real estate, and BBB-rated ABSs.
  5. 200% risk: BB-rated ABSs.
- Regulatory arbitrage could take the form of restructuring a bank's portfolio so that it had the same or even greater risk as before, yet produced a lower capital requirement.

Regulatory Arbitrage: Low Bank Capital

- For example, Zhejiang Gongshang UniBank with "originate-and-hold" model. It has 100 RMB mortgage. Risk weighted asset is 50 RMB (50% risk). If Unibank puts 5 RMB as core capital, then the capital ratio is 10%. Such an indicator means "well capitalized".
- Now Unibank securitizes 20 RMB, and has 80 RMB mortgage. Risk weighted asset is now reduced to 40 RMB. Bank capital is still 5 RMB, then the capital ratio is 12.5%.
- If Unibank purchases 20 RMB MBS (a kind of ABSs), and then the capital ratio is $\frac{5}{80\times 50\%+20\times 20\%} = 11.36\%$. It is still higher than "originate-and-hold" case.
- It encourages banks to do more securitization and hold more MBS or ABSs.
- However, the risk concentrating in banking system again.

Highly-Levered Non-Bank Institutions

- We take SPV as an example to illustrate how highly levered non-bank institutions are vulnerable.
- Non-bank institutions are operating under a few regulations.
- Profit-maximization motives SPV to have lower capital to reap higher return on equity.
- In addition, SPVs are "mark-to-market": *their assets are valued daily or weekly by reference to the most recent market prices for similar securities*.
- This determines SPV's credit rating, which affects the rates at which they could borrow. It also determines the leverage.

Highly-Levered Non-Bank Institutions

- Suppose the target leverage is 20:1.
- SPV's MBS market value is 100 RMB. To meet leverage target, SPV issues 5 RMB equity, and 95 RMB short-term debt (e.g., ABCP).
- When market value of MBS increases to 110 RMB. The value of short-term debt is unchanged, and the value of equity increases to 15 RMB.
- The leverage ratio after value increase in MBS falls to 7:1 (110/15). In other words, SPV has "excess capital".
- It encourages SPV to take more assets.

Highly-Levered Non-Bank Institutions

- To maintain its leverage at 20:1, SPV needs to have $15 \times 20 = 300$ RMB asset totally given 15 RMB equity.
- It means that SPV needs to take additional 190 RMB (300 - 110) assets.
- From this case, you can see higher leverage makes this SPV triples its assets after 10% increase in its initial asset pool.
- The underlying reason is 200% ($\frac{15-5}{5}$) increase in equity return.