Chinese Shadow Banking: Bank-Centric Misperceptions

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Motivation

China is second largest economy, biggest trading nation, has largest currency reserves and fastest growing middle class

China will be one of the dominant players in global finance

Its financial system is in fast transition

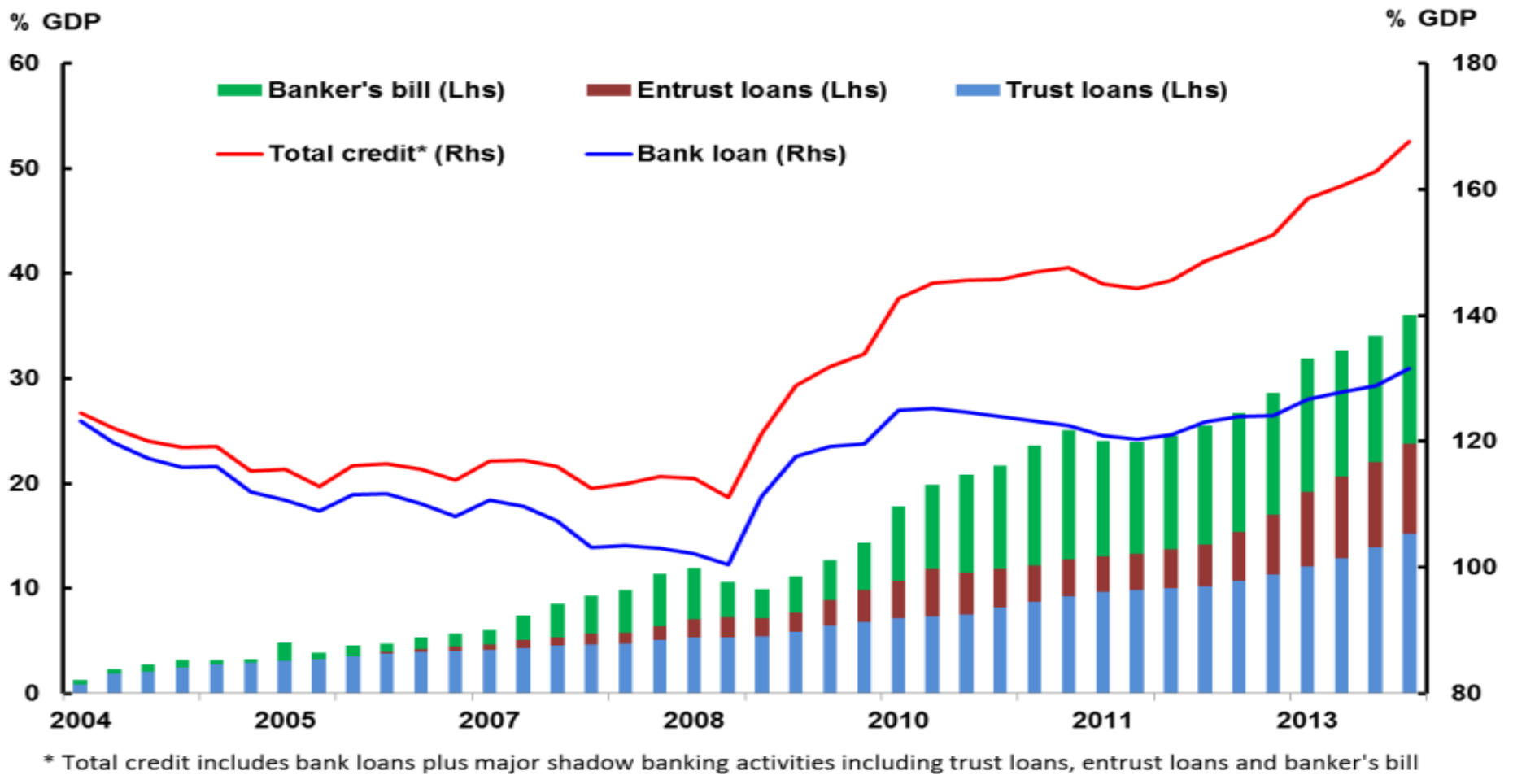
Financial structure changed dramatically due to fast growth of non-bank finance

Credit intermediation outside the formal banking system experienced rapid growth since the global financial crisis

Non-bank finance 45% of total social finance (2013) versus ~ 0% (2003)

Non-bank finance 40% of GDP (2013) versus ~ 0% (2003)

Credit Intermediation in China



Definition of Shadow Banking

FSB:

A system of credit intermediation that involves entities and activities outside the regulated banking system

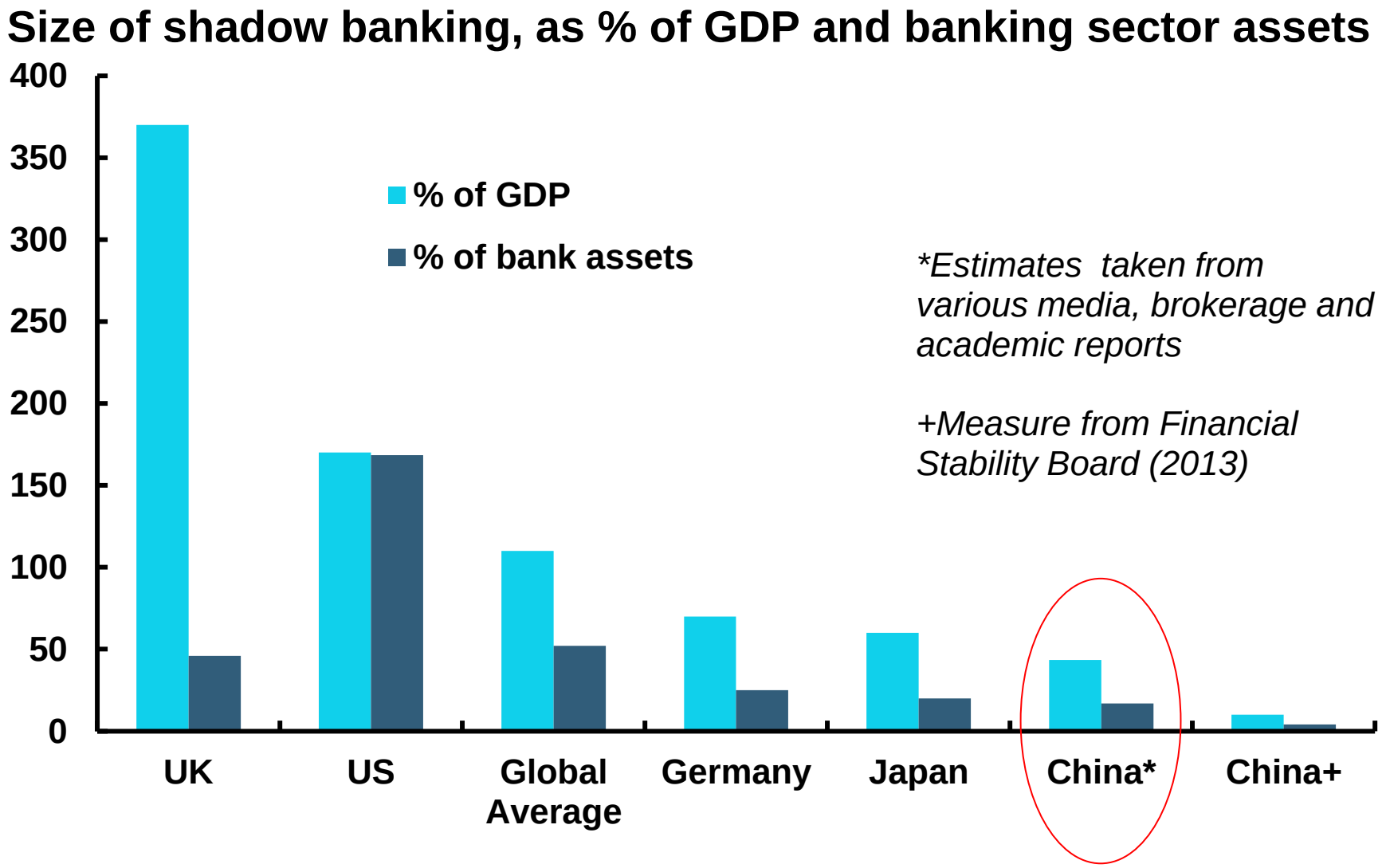
Bernanke:

Shadow banking, as usually defined, comprises a diverse set of institutions and markets that, collectively, carry out traditional banking functions, but do so outside, or in ways only loosely linked to, the traditional system of regulated depository institutions

Main Categories in US:

Money market funds (MMF), loan securitization (ABS, MBS), repos

International Comparison (2013)



Shadow Banking in China

Wealth management products (WMPs)

Trust products/loans

Entrusted loans

Informal lending

Interbank market lending

Repo

Remark: Our paper focuses on WMPs and trust products

WMPs

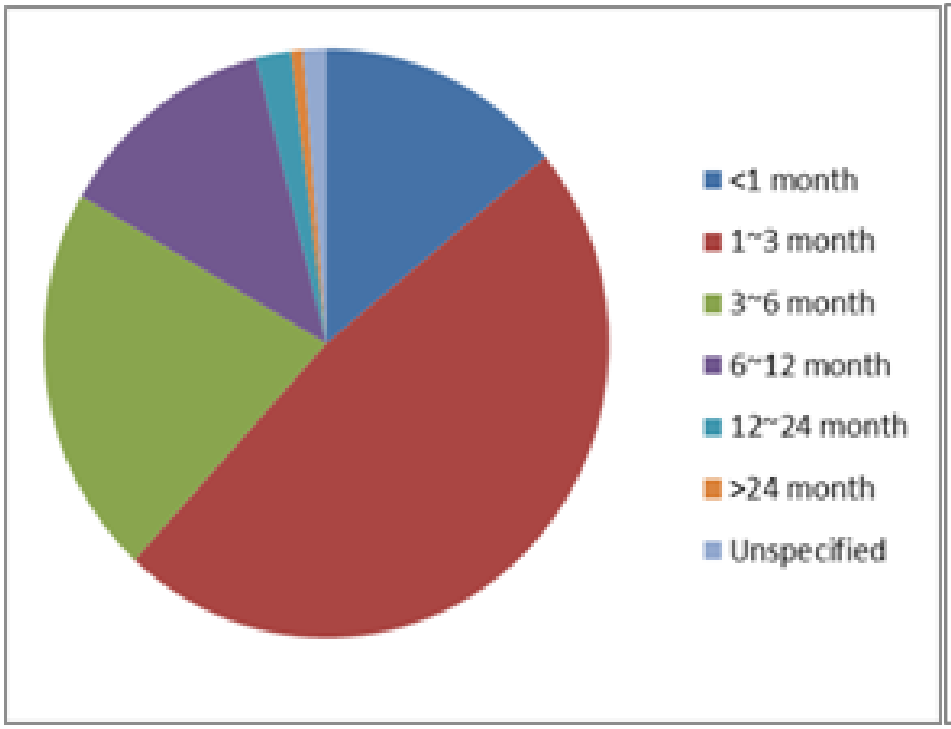
Sold by banks as off balance sheets transactions and not subject to official oversight

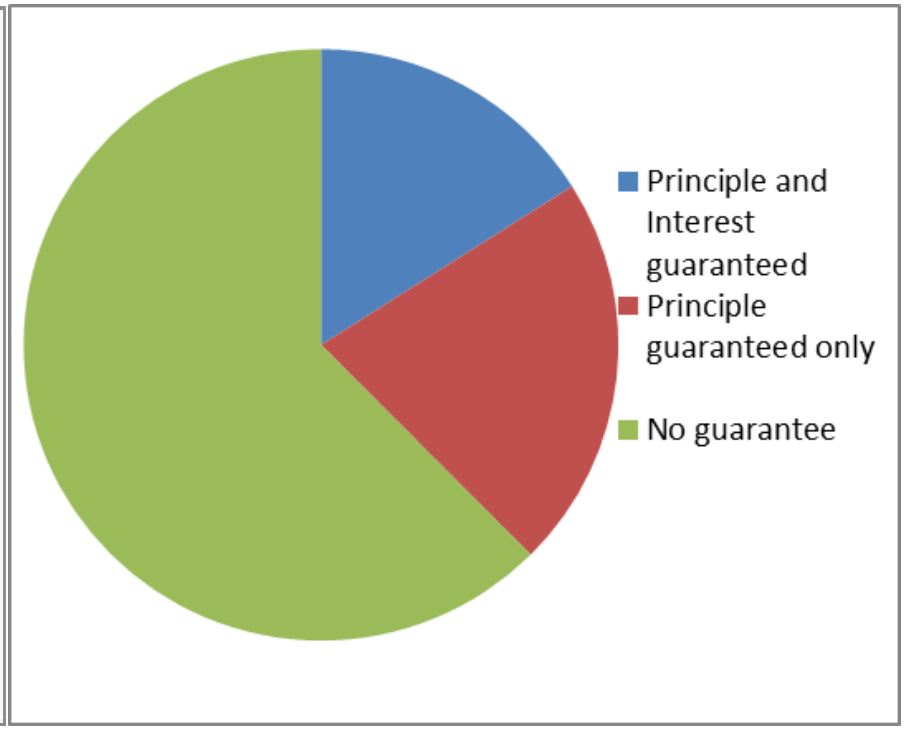
Funds raised from investors (high net worth individuals) are mainly invested in interbank lending and interbank bond markets and repo markets (with higher rates)

These products are usually structured as short-term investment, typically less than 6 months.

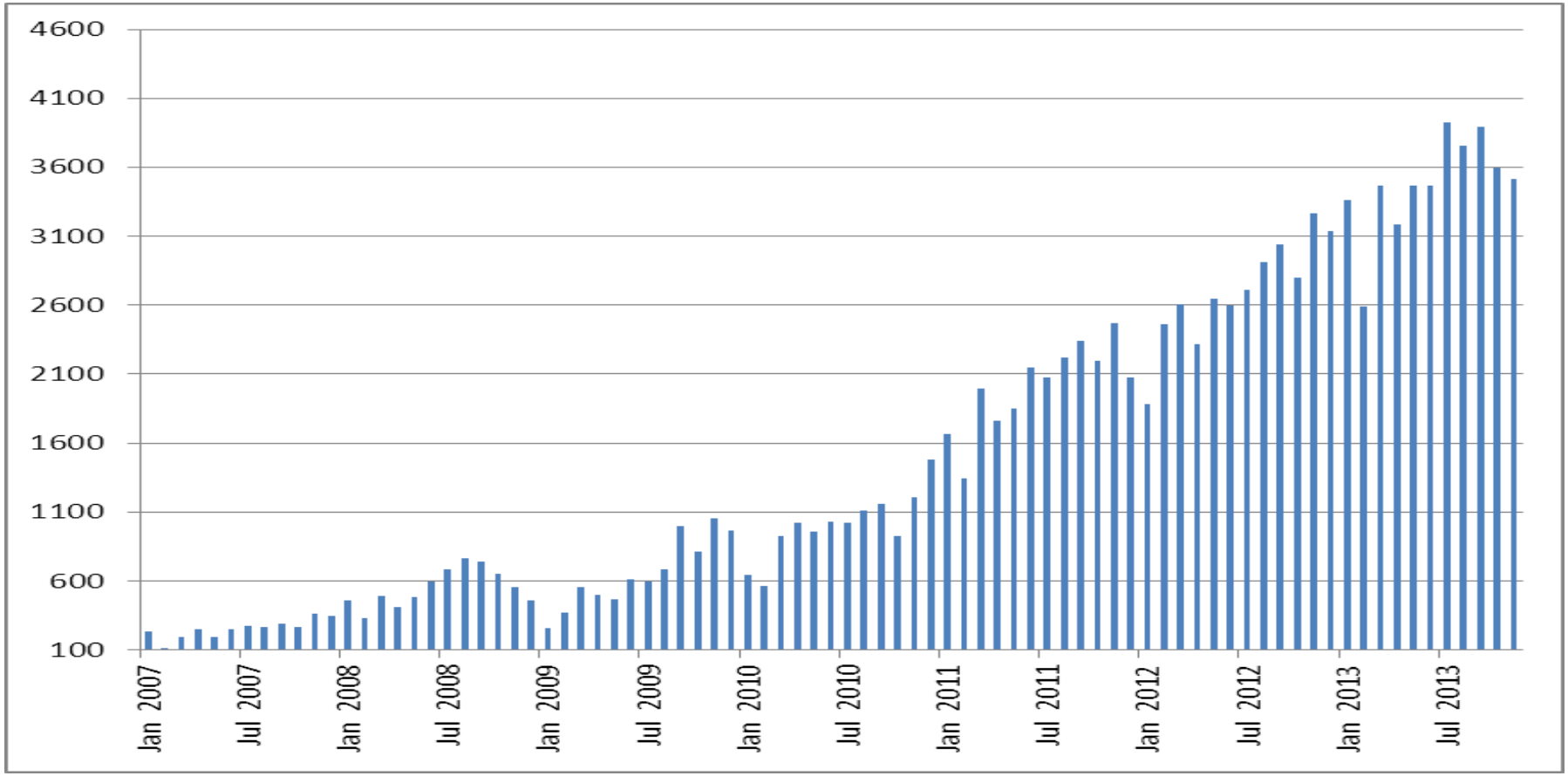
Majority is not guaranteed by banks

Characteristics of Outstanding WMPs (2013)





Number of Issuance of WMPs



Trust Products

Structured by Trust Companies

Sold through banks

Funds raised from retail investors (high net worth individuals) channelled to more risky borrowers with restricted access to banks

De facto corporate bonds labelled as trust products

Example

China Credit Trust company raised RMB 3 billion through a trust product called "Credit Equals Gold No.1" in 2011

sold to 700 hundreds of high net worth investors

through the private banking arm of Industrial and Commercial Bank of China (ICBC).

The fund channelled to Zhenfu Energy company for new projects in coal mining industry in Shanxi province and the product promised investors a yield of 10 per cent in the next three years

Business model: Zhenfu pays 15% → 10% to investor, 2% to CCT, 3% to ICBC

Remark: First high profile near default case in 2/2014 (later more on resolution)

Research Objective

Understanding the rapid growth of shadow banking in China in the context of its overall financial reforms

Main Questions

(1) What drives the rapid growth of Chinese shadow banking?

(2) What is unique about Chinese shadow banking compared to US counterpart?

(3) What is the reason for the Chinese system to evolve into different path?

(4) What are the risks and the implications for regulation and reforms?

→ Focus is on the theoretical model of Chinese shadow banking

Plan of Talk

Drivers of Chinese shadow banking (3 common and 2 specific drivers)

Chinese system is bank centric and different from US market based system

A model of Chinese shadow banking using some new concepts

Information sensitivity as a tail risk measure

Micro-foundation for why Chinese shadow banking is bank centric

System is built on the *asymmetric perception of information sensitivity* between banks and investors (~variant of “agreeing to disagree” in banking)

Steps toward more transparency of tail risks and market based system

Drivers of Chinese Shadow Banking

Three common drivers

Regulation on liabilities side (deposit rate ceiling)

→ Demand for save products with higher yields

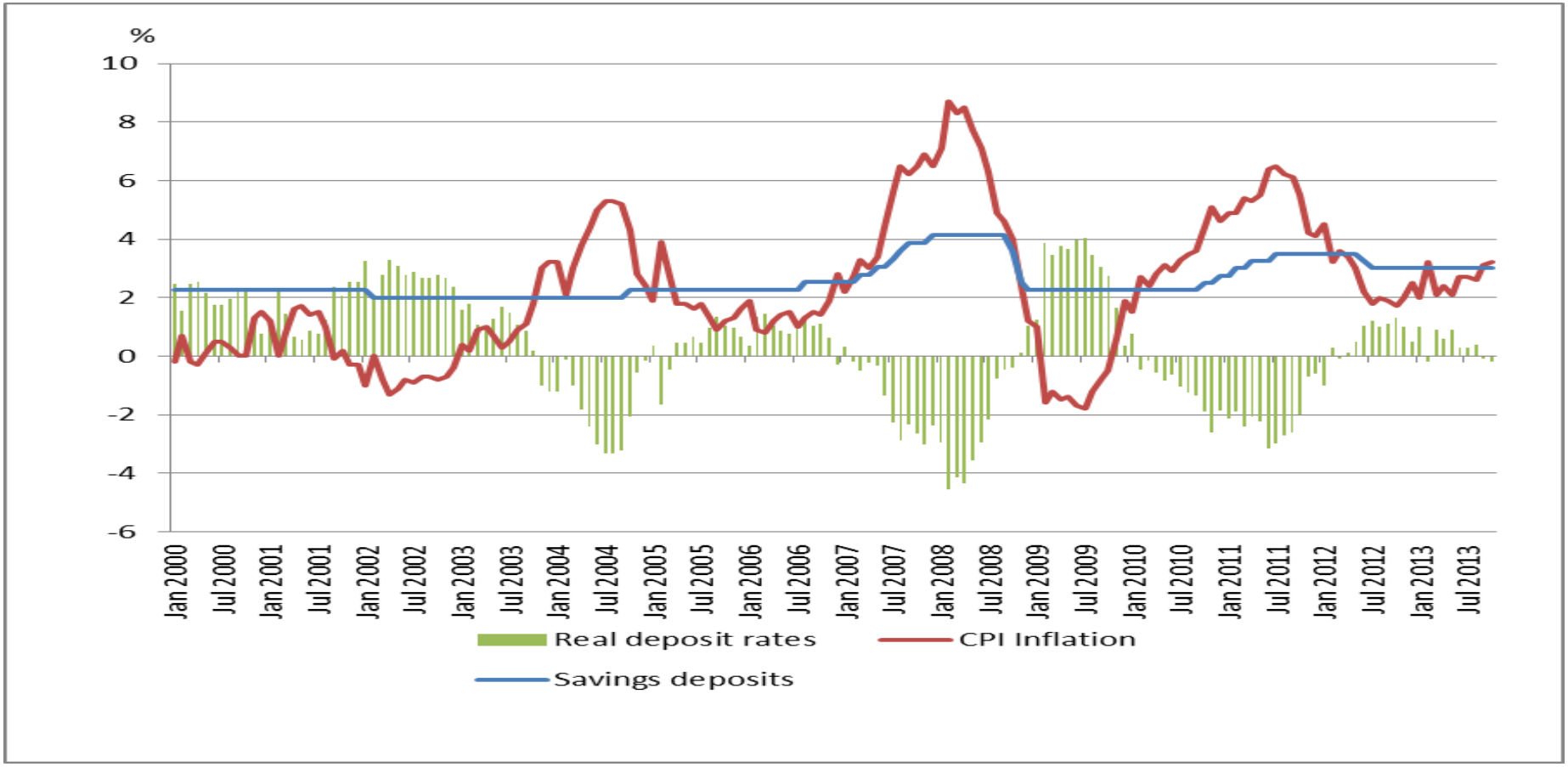
Regulation on assets side (loan quota, high reserve requirement, loan deposit ratio)

Loan demand by risky borrowers that do not get bank finance

→ Off balance-sheet transactions can circumvent these restrictions

→ Our paper discusses how it works in China and what is special?

Real Deposit Rates



Two China specific drivers

Economic stimulus package (RMB 4 trillion) after the global financial crisis

- Plus expansive monetary policy created many long-term projects, which demand funding from shadow banking after PBOC tightened monetary policy

Endorsement by government

- Shadow banking is a mean to foster interest rate liberalization
  - For high net worth individuals (WMPs), small savers (Alibaba YuEBao)
- Financial institutions to become more familiar with market force while keeping banks under relatively strict regulation (dual track framework)

→ Shadow banking is integral part of overall financial reform

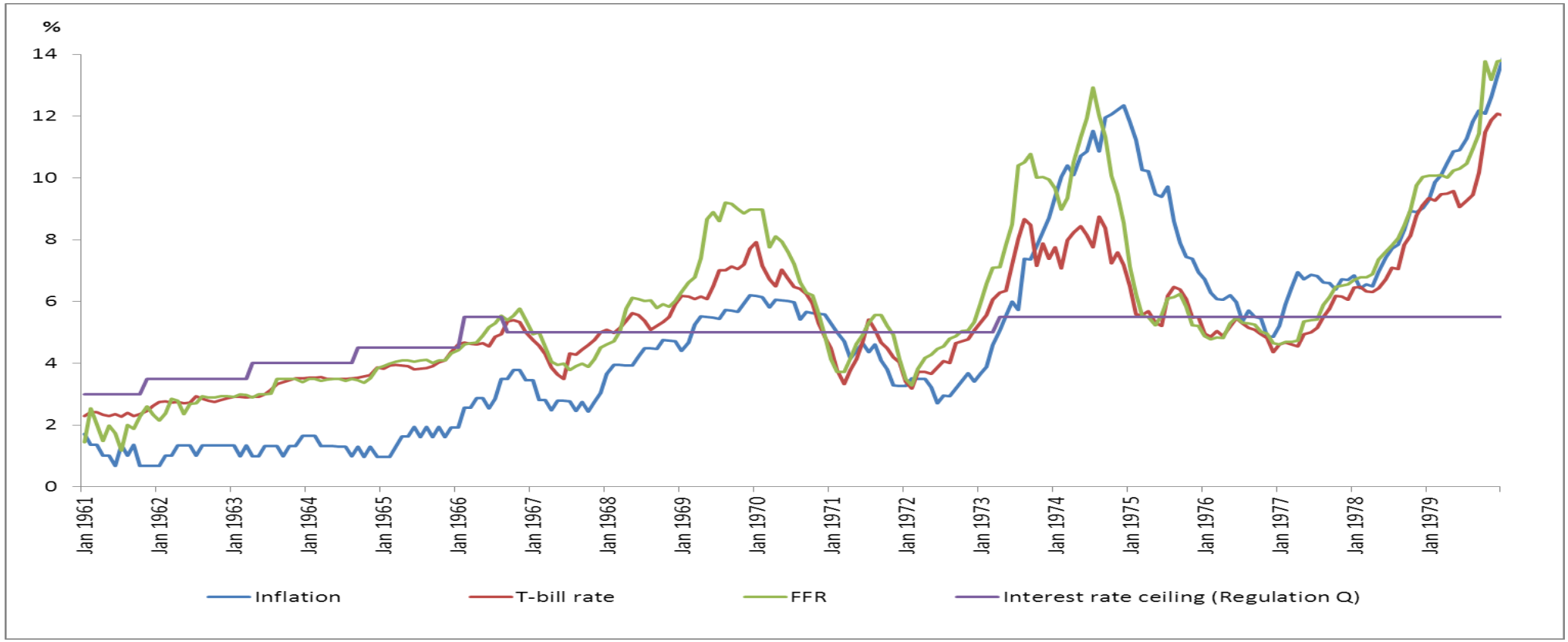
Comparison between Chinese and US Shadow Banking

US shadow banking

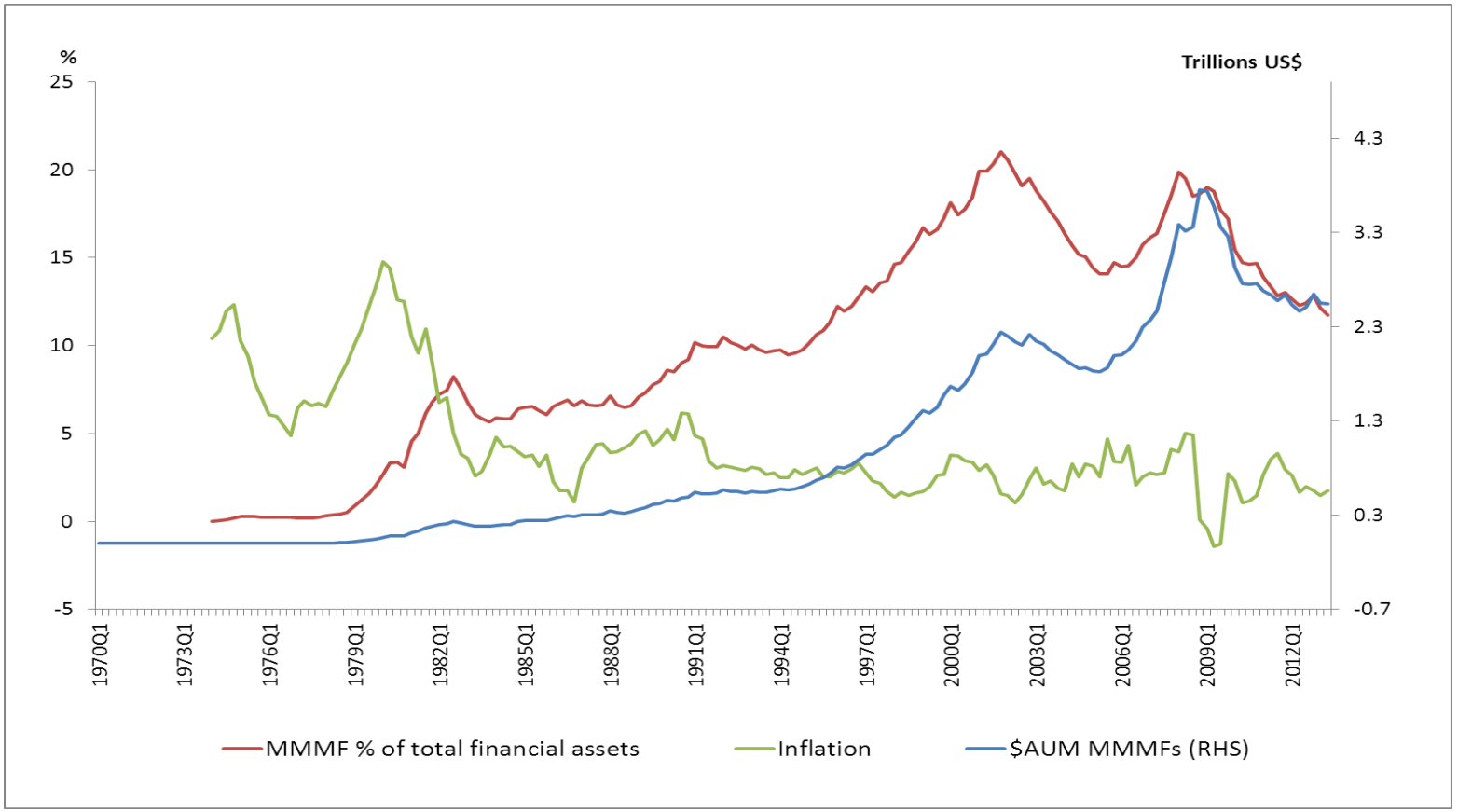
Regulation Q and high inflation led to creation of shadow banking

Demand for save assets (MMF, Repos, Securitization) with higher yields

Real Interest Rate in US



MMF in US


%
Trillions US$
25
20
15
10
5
0
-5
4.3
3.3
2.3
1.3
0.3
-0.7
1970Q1
1973Q1
1976Q1
1979Q1
1982Q1
1985Q1
1988Q1
1991Q1
1994Q1
1997Q1
2000Q1
2003Q1
2006Q1
2009Q1
2012Q1
MMMF % of total financial assets
Inflation
$AUM MMMFs (RHS)

Some Important Features of US Shadow Banking

MMFs and securitization had been increasing even after interest rate liberalization

Size is large: 20-25 trillion US$ in 2008 (MMFs: 4 Trillion, Repos: 8-10 Trillion, Loan securitization: 8-11 trillion)

Funding mostly from wholesale capital market

Shadow banking exists parallel to banks

No deposit insurance

De jure central bank is not the lender of last resort for shadow banking system

Differences

China	US
Products	
WMPs, trust products, trust loans	MMF, securitization
Product structure and characteristics	
Simple	Financial design
Backed by risky loans (TP)	Pooling and tranching (securitization)
Invests in interbank market (WMP)	Backed my high quality loans (MMF)
Investors	
Retail investors	Institutional investors
High net worth individuals, firms	Financial institutions

Key Differences

China	US
Selling Platform	
Traditional banks	Capital markets
Risk Transfers	
No effective risk transfer Banks are not liable by contract	Through security design ABCP: Pooling of commercial papers ABS: Senior tranche with loss absorption by junior claims

Two Key Questions

Why are commercial banks so dominant in Chinese shadow banking?

How does Chinese shadow banking create safe assets out of risky loans and who bears risks?

→ Our model addresses these two and further questions

Banking Theory Based on the Concept of Information Sensitivity

Observations and central questions

A number of financial products can be considered as privately-produced money like securities (certificates of deposits (CDs), senior MBS tranches, ABCP, repo)

Agents accept those “private money” at par when transacting and expect to be able to redeem them at par

Demand for higher yields

Depositors expect their money back plus interests in future; otherwise, bank run

To banks, deposit is their liability, which is supposed to be (almost) risk-free

On asset side, loans are risky asset. So how can banks convince depositors their money is safe? Or, the face value of the private money issued by banks is stable?

Remark

An important function of banking is the creation of safe (stable, information insensitive) liabilities under regulatory oversight

An important function of shadow banking is the creation of safe (stable, information insensitive) liabilities without regulatory oversight

Information Sensitivity (IS) as a Tail Risk Measure

Need an economic measure that links assets (loans to firms) and liabilities (demand deposits) so as to model balance sheet dynamics

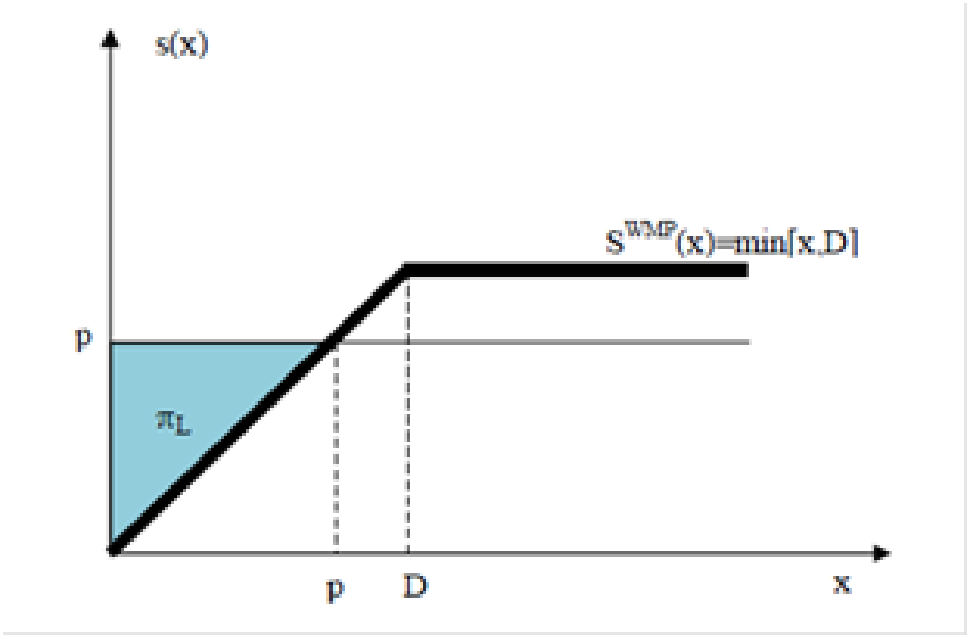
Dang, Gorton and Holmstrom (2013) define IS as

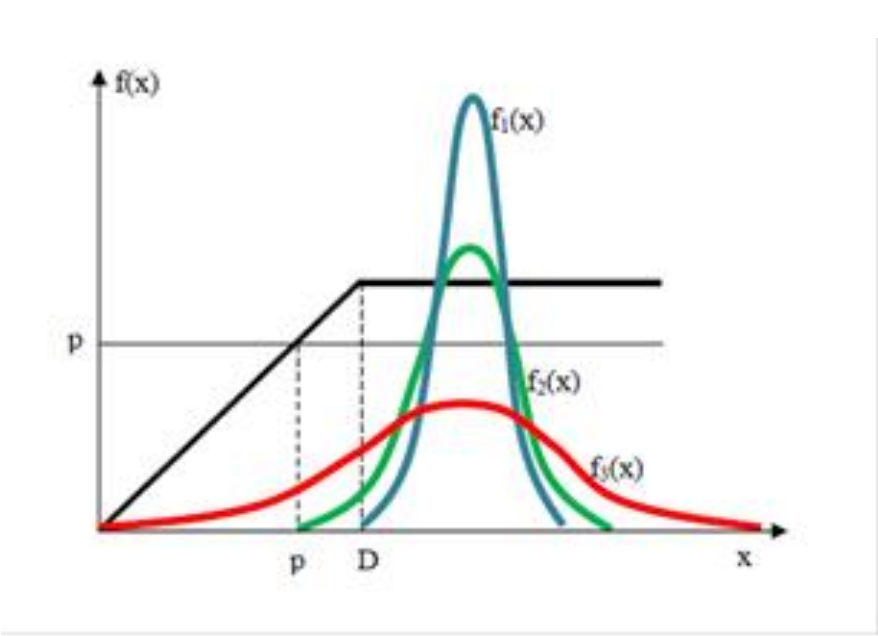
$$\pi_L = \int_{x_L}^{x_H} \max[p - s(x), 0] \cdot f(x) dx$$

where

x is the asset (loans) with distribution f(x) that backs
s(x) a security (liability, demand deposit)
p is the price of the security or the amount invested

Example: s(x) is debt

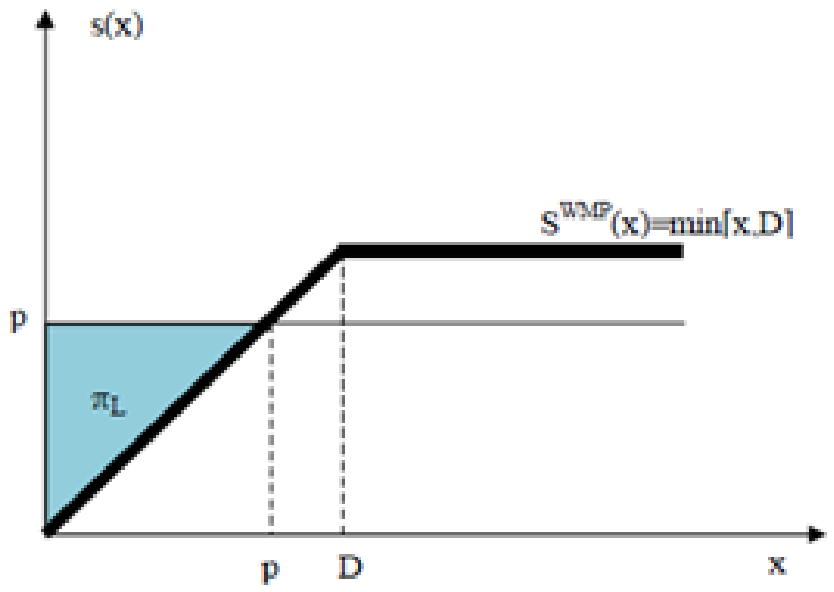


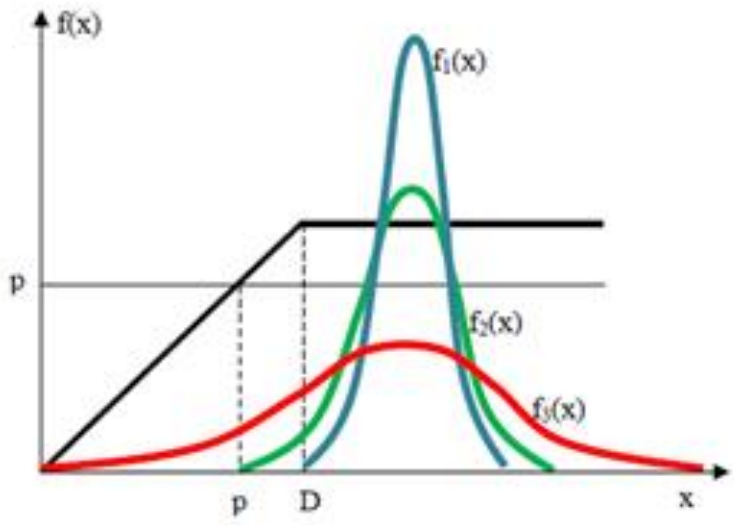


$$\pi_L = \int_{x_L}^{x_H} \max[p - s(x), 0] \cdot f(x) dx$$

measures expected loss in low payoff states (tail risk measures)

Example: s(x) is WMP





D=p*(1+r)

Blue distribution: Principal and interest are safe (π=0)
Green distribution: Principal is safe
Red distribution: Neither principal nor interest is guaranteed

Remark

We use this measure as a unifying concept to address:

What drives the growth of Chinese shadow banking?

Why are commercial banks so dominant in Chinese shadow banking?

How does Chinese shadow banking create safe assets out of risky loans and who bears risks?

Commercial banks are reluctant to finance projects with high IS

Proposition 1

A commercial bank holds a portfolio of assets (i.e. finance projects) such that its information sensitivity $\pi_L \leq \gamma$ where γ measures information costs of depositors.

Proof (Sketch)

T=0: Bank that obtains deposit of w and gives a loan to a firm that invests in a long term project which pays off x at T=2.

T=1: The first depositor withdraws w from the bank. Since the fund is lent out, the bank needs to attract a new depositor.

A bank will only be able to obtain new deposits if new depositors will deposit.

This depends on the information sensitivity of the asset of the bank.

The project has information sensitivity of π_L and depositors can learn about the bank before depositing at costs γ.

If the second depositor learns that the payoff of the asset is low he does not deposit which means the first deposit cannot withdraw.

Anticipating this, the first depositor either demands for a higher interest rate or does not deposit.

In order to avoid information production by late depositors the loan must be information insensitive.

We can also interpret π_L as a measure of "suspicion".

If π_L is larger than a threshold value γ then depositors have more reason to become concerned about how safe their deposits would be.

Remark: See Dang, Gorton, Holmstrom and Ordonez (2014) for full model.

Implications

Information sensitive projects (that leads to $\pi_L > \gamma$) are not financed by commercial banks.

Chinese commercial banks prefer to lend to state owned companies since these loans have a low information sensitivity because state owned companies are implicitly backed by the government.

Since loans to small and medium size enterprises and developers have higher information sensitivity per unit capital, they do not get bank loans.

Corollary 1.1

Lending quota magnifies the shortage of funding for risky projects.

Numerical Example

Consider an economy with two dates (t=0,1,2) and three equally likely possible states (s_1, s_2, s_3) at t=2. The bank has a safe asset and two potential projects with the following cash flow at t=2.

	s_1	s_2	s_3	Investment amount
Project 1	0.5	1	2	1
Project 2	0.4	1	2.1	1

$$\pi_L(\text{Project}1) = \tfrac{1}{3}(1-0.5) = \tfrac{1}{6}$$

$$\pi_L(\text{Project}2) = \tfrac{1}{3}(1-0.4) = \tfrac{1}{5}$$

$$\pi_L(\text{Project}1+\text{Project}2) = \tfrac{1}{3}(2-0.9) = \tfrac{11}{30}$$

Illustration (Proposition 1)

Suppose $\gamma = \frac{1}{5.6}$

Bank will finance project 1 but not project 2.

Illustration (Corollary 1.1)

Suppose $\gamma > \frac{11}{30}$, bank will finance both projects and lend L=2.

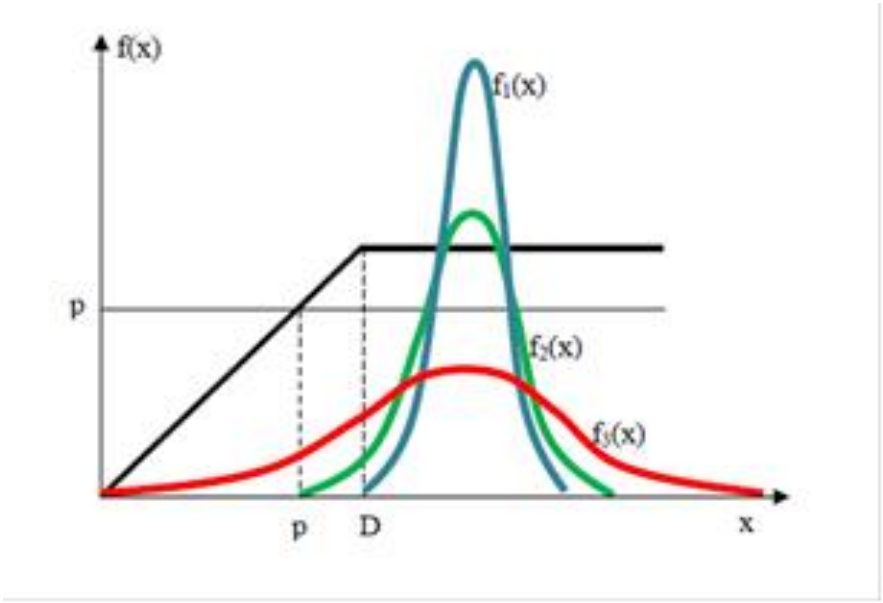
If Q=1, then project 2 will not get funding.

Demand for information insensitive products and shadow banking as a bank-centric phenomenon

Proposition 2

Suppose investors are looking for information insensitive financial products and the information sensitivity of a financial product that is backed by a risky project is $\pi_L > 0$. A sufficient condition for $\pi_L^{Investor} = 0$ is that the seller or distributor provides credit guarantee.

Proof



Bank has asset y such that $y+s(x) \geq D$ for all x.

Corollary 2.1

Since state owned commercial banks are the few entities that investors trust, the involvement of commercial banks is needed.

Proof

Investors have expectation about $f^{Bank}(y)$ or that y_{Min} for bank is sufficiently large.

In contrast, investors have little information about $f^{Trust}(y)$ or y_{Min} of a trust company.

If it is costly to learn about $f^{Trust}(y)$ then investors do not buy from trust company.

Shadow banking based on the asymmetric perception of information sensitivity

Most WMPs and trust products are not guaranteed by banks (by contract).

Investors think trust products are safe.

Who bears tail risk?

Proposition 3

Suppose the information sensitivity of a trust product is $\pi_L^{Trust} > 0$. In an "asymmetric tail risk perception equilibrium", $\pi_L^{Bank} = \pi_L^{Investor} = 0$ and trust product is sold.

Proof

Use “Agreeing to Disagree” argument.

Since banks only distribute the trust product it is not liable.

A default of trust product does not affect the information sensitivity of the assets on the balance sheet of the banks.

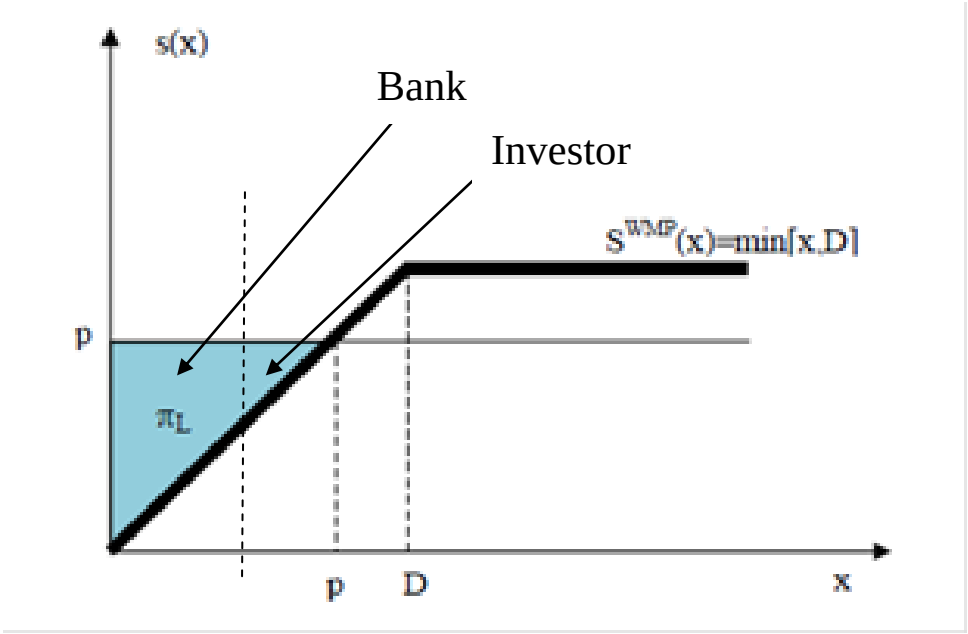
The trust product contributes zero information sensitivity to the bank’s portfolio, i.e. $\pi_L^{Bank} = 0$.

From Proposition 2, $\pi_L^{Investor} = 0$ if they believe banks are liable.

Since $\pi_L^{Bank} = \pi_L^{Investor} = 0$, investors buy and banks sells trust products.

Corollary 3.1

If banks and investors have consistent beliefs, then $\pi_L^{Bank} = \kappa\pi_L^{Trust}$ and $\pi_L^{Investor} = (1-\kappa)\pi_L^{Trust}$ where $\kappa \in [0,1]$ denotes how banks and investors and investors share tail risks.



Remark

Conceptually our notion is similar to dogmatic beliefs in stock market trading

E.g. Harris and Raviv (1993), Pearson and Kendal (1995), Geanakoplos (2009)

Traders have mutually inconsistent priors and also posteriors

High profile example: Herbalife

Ackman Pershing Square: “pyramid scheme”

Icahn: “very undervalued”

→ Ex post only one can be right

→ Ex ante disagreement generates trade

Examples of asymmetric risk perception equilibrium

Example 1 (Trust products)

China Credit Trust company raised RMB 3 billion through a trust product called “Credit Equals Gold No.1” in 2011, which was sold to hundreds of high net worth investors through ICBC.

Investors believed they were buying something with an implicit guarantee from the bank. There are anecdotal evidences that local bank branch managers told investors that the product is safe.

The fund raised by the trust product was channelled to Zhenfu Energy company for new projects in coal mining industry in Shanxi province and the product promised investors a yield of 10 per cent in the next three years.

In the end of 2013, it became clear that the Zhenfu cannot pay 3 billion back to the trust company due to deteriorating profits in the coal mining industry.

The market became more nervous when ICBC refused to bail out.

Under this intense glare, China Credit Trust announced in the last minute that it had reached an agreement with an unnamed third party to sell the shares it held in the Zhenfu so that the investors is offered a deal to recoup their principle and only three percent of interest.

Example 2 (Yu'E Bao)

Before the internet giant Alibaba entered the money market funds (MMF) business in June 2013, the MMF sector was small and did not attract many retail investors.

After Alibaba acquired about 50% of the MMF provider Tian Hong and offered MMF types of products through YuE Bao, these investment products sold online gained huge popularity: AUM of RMB500 billion by the end of February 2014.

Since Chinese consumers and investors are very familiar with Alibaba and its online market place, they might implicitly assume that in case of default Alibaba will bail out the failed investments products because of reputational concerns.

Investors have information about the financial strength of Alibaba that it is able to rescue any failed product although legally Alibaba does not provide any credit guarantee.

Example 3 (Agency MBS)

Ginnie Mae is the only mortgage-backed securities (MBS) issuer with explicit government guarantee.

Although there were no such guarantees for Fannie Mae and Freddie Mac before the financial crisis, MBS investors seemed to have implicitly assumed this.

As long as the market is functioning well and there were no defaults of the AAA rated Agency MBS tranches, investors may have no reason to question that MBSs were information insensitive.

When the losses of Fannie and Freddie accelerated as housing prices continued to decline, the US government took both enterprises into conservatorship in early September 2008 and provided explicit guarantee so as to avoid a potential collapse of the primary and secondary Agency MBS markets (FHFA, 2008).

ABCPs also exhibit such features. Despite their off-balanced sheet characteristics banks provide credit guarantees. (Acharya, Schnabl and Gustavo (2013))

Remark

Gennaioli, Shleifer and Vishny (2012) propose the notion of neglected risks by both investors and financial intermediaries.

Chinese shadow banking is different.

Banks are aware of the risks so they are not surprised since these products are not complicated financial products (see Example 1).

Also, banks do not face additional risks since they are not liable by contractual design.

Rather than neglecting risks, investors overlook or (intentionally) neglect the contractual clause that banks are not liable.

Financial institutions are not the buyers of shadow banking products and they are not traded in secondary markets so the implication for systemic risks is different.

Towards more transparency of tail risks and market based shadow banking

System is built on the asymmetric perception of information sensitivity (tail risks) and thus not sustainable.

Since the underlying projects and loans that back WMPs and trust products are intrinsically risky, default risks do not vanish despite the asymmetric perception of tail risks.

If banks and investors have mutually consistent perception of tail risks then they have to share it among themselves.

Proposition 4

Suppose investors are aware that WMPs and trust product are information sensitive and they bear default risks. The more information sensitive the product the higher the required expected return.

Proof

See Dang, Gorton and Holmstrom (2013a): The Information Sensitivity of a Security

Corollary 4.1

Market participants need (credible and independent) institutions to determine the information sensitivity of shadow banking products.

Proof

The argument is similar to the proof of Corollary 2.1.

In order to determine the information sensitivity of a financial product s(x) which payoff is backed by project x investors need to determine distribution f(x).

Investors typically do not have enough financial sophistication and knowhow to do that.

So they need third party institutions to provide information about f(x) and thus the information sensitivity of s(x).

Corollary 4.2

Tranching can provide a better information sensitivity-return profile and more investment products to investors.

Proof

See Dang, Gorton and Holmstrom (2013a)

The European Central Bank and Bank of England (2014)

A market for prudently designed asset backed securities (ABS) has the potential to improve the efficiency of resource allocation in the economy and to allow for better risk sharing.

It does so by transforming relatively illiquid assets into more liquid securities.

These can then be sold to investors thereby allowing originators to obtain funding and, potentially, transfer part of the underlying risk, while investors in such securities can diversify their portfolios in terms of risk and return.

This can lead to lower costs of capital, higher economic growth and a broader distribution of risk.

→ Call for revival of ABS markets

Remark

We started a new project on loan securitization in China and its implications for the effectiveness of monetary policy.

Concluding Remarks

Shadow banking in both US and China was motivated by regulations on interest rates and developed rapidly.

However, the systems have evolved into different paths because of different existing financial infrastructure and legal system.

Chinese shadow banking is bank centric and invests mainly in information sensitive products, while US shadow banking is market system and mainly invests in information insensitive products.

Chinese shadow banking is partly driven by misperceptions, which could add tail risks to Chinese financial system

Short Term Risks

Default risks of shadow banking products can trigger contagious panic among investors

Possible collapse of issuance of these products

Dry up of funding for risky borrowers and affect economic growth

Since shadow banking products are not bought by institutional investors and not used as collateral in wholesale banking there is no immediate direct effects on banking system

Remark

Regulator can ask banks to provide funding (assets of RMB 150 trillion)

Some Policy Implications: Correction of Misperception (1)

Make “implicit guarantee” by banks “explicit” by requiring banks to bring the information-sensitive assets back on their balance sheets

Consequences

- Increase the risks of the banking sector

- Bank will reduce funding for risky borrowers

Some Policy Implications: Correction of Misperception (2)

Educate investors about risks by allowing for some defaults

WMPs backed by more risky projects should be labelled as having higher default risks.

Supportive actions

Promote third party institutions (rating agencies, market analysts)

Securitization to create information sensitive assets

Some wealthy investors should be willing to bear tail risks for higher returns

→ In our opinion this is more desirable

Some Policy Implications: Full Interest Rate Liberalization

Shadow banking (or other financial innovations) is likely to remain

Commercial banks are still reluctant to fund (too) risky projects

Some Policy Implications: Market Psychology

Market psychology is an important determinant of financial stability.

China has more than RMB24 trillion currency reserves.

The credibility of PBOC is key for maintaining stability.

The announcement to save the system whatever it takes can suffice to maintain stability of the financial system.