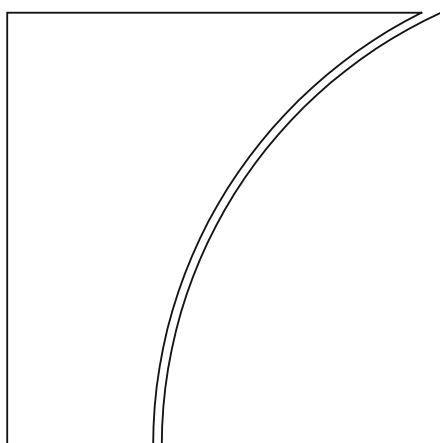




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China's Shadow Banking: Bank's Shadow and Traditional Shadow Banking

by Guofeng Sun

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November 2019

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Keywords: Banks' Shadow, Traditional Shadow Banking,
Credit Money Creation, Bank Accounting, Regulation

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Guofeng Sun[†]

The People's Bank of China

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Abstract

Banks' shadow, or money creation by banks beyond traditional loans, plays an important role in China's money-creation process, posing a number of challenges to monetary policy operations and financial risk management. This paper analyzes the money-creation mechanisms of China's shadow banking sector in detail, provides accurate measurements, investigates its effects on financial risk, and surveys recent regulation. To strengthen supervision, China's regulators should closely track the evolution of various shadow banking channels, both on- and off-balance sheet. Specific macroprudential regulation tools, such as asset reserves and risk reserves, should be applied separately to banks' shadow and traditional shadow banking.

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* All opinions expressed are personal and do not necessarily represent the views of the Bank for International Settlements (BIS) or The People's Bank of China. This paper was partly written while the author was visiting the BIS as part of the BIS Central Bank Research Fellowship (CBRF) Programme.

[†] The People's Bank of China. Address: No. 32, Chengfang Street, Xicheng District, Beijing, 100800, China. Email: sguofeng@pbc.gov.cn.

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Banks' shadow, or money creation by banks beyond traditional loans, plays an important role in China's money-creation process, posing a number of challenges to monetary policy operations and financial risk management. This paper analyzes the money-creation mechanisms of China's shadow banking sector in detail, provides accurate measurements, investigates its effects on financial risk, and surveys recent regulation. To strengthen supervision, China's regulators should closely track the evolution of various shadow banking channels, both on- and off-balance sheet. Specific macro-prudential regulation tools, such as asset reserves and risk reserves, should be applied separately to banks' shadow and traditional shadow banking.

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1 Introduction

In recent years, China's shadow banking system has become an integral part of the financial system. Unlike the case in advanced economies, China's shadow banking is dominated by commercial banks due to the bank-dominated financial system. A key characteristic of China's shadow banking is that banks hide loans within alternative accounting categories. China's shadow banking system can be defined from the perspective of credit money creation while highlighting the differences between two categories of Chinese shadow banking: banks' shadow and traditional shadow banking. *Banks' shadow* is defined as banks' money creation through accounting treatments that generate liabilities from assets, whereas *traditional shadow banking* refers to credit creation by non-bank financial intermediaries through money transfer. Both provide funding under the general shadow banking system, but only banks' shadow creates a new supply of money, thus affecting an intermediate monetary policy objective of the People's Bank of China (PBC).

Shadow banking in China has drawn broad research attention. The key drivers of shadow banking are regulatory arbitrage from the provider side (Hachem and Song, 2016; Ehlers et al., 2018) and the existence of some form of implicit guarantee from the buyer side (Claessens and Ratnovski, 2014; Kane, 2014). Wealth management products (WMPs) are issued for regulatory arbitrage or window dressing by banks in China (Cai et al., 2015), and the loan-to-deposit ratio regulation has been tightened (Hachem and Song, 2016). Based on transaction-level entrusted loans data, Allen et al. (2015) argue that entrusted loans are essentially a market reaction to credit shortages.

Recent studies have focused on shadow banking as a unique feature of China's financial system. Dang et al. (2015) investigate the features of the Chinese shadow banking system from the perspective of a bank-centric and implicit guarantee, and highlight the asymmetrical perception of risks among shadow banking entities, banks, and investors. Sun and Jia (2015) investigate the mechanism of shadow banking tools in detail, and introduce a deduction method for estimating its scale more accurately. Wang et al. (2016) analyze how credit control and a dual-track approach to liberalizing interest rates have contributed to the rapid rise of Chinese shadow banking. Chen, Ren, and Zha (2018) examine the impact of shadow banks on the effectiveness of monetary policy by considering a specific form of shadow banking (entrusted loan). Ehlers et al. (2018) provide a stylized shadow banking map for China and note that commercial banks play a dominant role in the country's shadow banking system. Their structural map of shadow banking is helpful, but is still too complex to convey an accurate picture of the substance of this business.

This paper is the first to emphasize the money creation role of shadow banks in China, and how it influences financial risks and impinges on the effectiveness of monetary policy. While traditional shadow banking functions in China in much the same way as it does in advanced economies, banks' shadow consists essentially of loans that take the form of other types of asset, posing challenges to the effectiveness of monetary policy and financial regulation. First, banks' shadow impairs the ability of monetary policy to influence money creation and risk-taking, thereby raising financial stability risks. Second, it impairs the effectiveness of banking regulations aimed at lending, and leads to the accumulation of systemic risk.

Banks' shadow lengthens the social financing chain, and is accompanied by opaque and non-standard accounting practices, leading to severe information asymmetry and increasing the instability of banks' liquidity demand. Facing a structural shortage of liquidity, monetary authorities rely mainly on liquidity conditions in the banking system to control total social financing. However, the instability of banks' demand for liquidity induced by banks' shadow activities makes it harder for the monetary authorities to regulate the monetary environment through liquidity control. This is one reason China's money market interest rate fluctuated widely in June 2013.

This paper makes three contributions. First, it analyzes the detailed money creation mechanisms of China's shadow banking tools, focusing mainly on banks' shadow instead of traditional shadow banking. Second, it introduces a so-called deduction method to provide an accurate measurement of China's shadow banking, and analyzes the evolution of its susceptible components based on the balance sheet information of 311 banks. It also empirically investigates the impact of shadow banking on financial risk at both the macro and micro levels. Third, it summarizes the regulations on shadow banking implemented by Chinese regulators, discusses related issues, and sets out the policy implications.

Using bank balance sheets, the deduction method for measuring the scale of China's shadow banking system shows that banks' shadow constitutes a large share of banks' credit money creation and exerts a significant influence on financial risk. It is necessary to clearly delineate the boundary of banks' asset expansion in creating credit money and to separately design macro-prudential policy tools for banks' shadow and

traditional shadow banking. A resulting policy implication indicates that regulators should apply different restrictions to banks' shadow and traditional shadow banking and focus on the balance sheet items that banks may use to hide their shadow banking operations.

The shadow banking system in developed markets is usually market-based, operating in parallel to banks. It is organized around securitization and wholesale funding. The mechanism is financial engineering that securitizes loans, leases, and mortgages into tradable instruments. Funding is raised through capital markets using special purpose entities (SPEs) such as commercial paper and repossession (repo) agreements. Shadow banking also provides financing to companies via finance companies, hedge funds, money market mutual funds, and investment banks. Typical products include asset-backed commercial paper, asset-backed securities, collateralized debt obligations, and repo. In these cases, savers hold money market balances instead of bank deposits.

Regulatory arbitrage is believed to be a key driver for the emergence of shadow banking worldwide. The case of China is similar but more complex, given China's unique banking regulations, such as regulated deposit and lending rates in addition to certain lending restrictions. Credit tightening in 2010 stimulated the rapid growth of the Chinese shadow banking system. The central government has restricted debt accumulation and investment in real estate by local governments, and curbed the loans of commercial banks, with the aim of controlling the money supply to check inflation and prevent an asset bubble. Yet, the demand for credit remains enormous.

On the *demand side*, credit tightening has made it difficult for local government financing vehicles (LGFVs) to obtain bank loans. However, many have already invested heavily in long-term projects. Motivated by the incentive of quickly increasing regional GDP, local governments are willing to borrow funds from banks, even at higher interest rates. On the *supply side*, banks (and non-bank financial institutions) have strong incentives to provide credit. First, through the shadow banking channels, banks lend to LGFVs at higher interest rates than they typically charge state-owned enterprises (SOEs). Second, there is a low credit risk with implicit guarantees by local governments, which are ultimately backed by the central government. Third, operating costs are lower. Fourth, banks can avoid the credit policies and bank lending guidance from the central government. Shadow banking is the main funding source for LGFVs, which governments are believed to implicitly guarantee.

This paper proposes policy implications for both the traditional and shadow banking systems. First, appropriate regulation should be applied to the traditional banking system. It is generally believed that shadow banking in China is driven mainly by stringent regulations on traditional banks. Thus, to avoid an accumulation of shadow banking risk, regulators should avoid applying overly strict traditional policies to traditional banks.

Second, regulatory authorities should balance the pros and cons of the shadow banking system. Ghosh et al. (2013) and Schwarcz (2013) present both the pros (in filling the funding gaps of the real economy and enhancing market effectiveness) and cons (in increasing leverage, exaggerating procyclicality, and facilitating the

propagation of systemic risk) of China's shadow banking system. Regulators may need to take measures to protect "shadow funds."

In terms of how to regulate shadow banking more effectively, guidance on general regulation and specific regulatory measures are critical. Current suggestions for regulation guidance include macroprudential and countercyclical regulation in the Basel III framework, functional regulation as proposed by Pozsar et al. (2010) and Wang (2012), and category-based regulation as proposed by Ba (2013).

2 Banks' shadow and traditional shadow banking

2.1 Definition of China's shadow banking system: banks' shadow and traditional shadow banking

Shadow banking in China has much in common with that of other countries, such as credit creation and regulatory arbitrage, but some of its features are products of China's financial and regulatory system. Thus, it is necessary to define China's shadow banking system more accurately as the basis for further research. Considering the different credit creation mechanisms (credit money and non-money mechanisms),¹ I classify Chinese shadow banking into two categories: banks' shadow and traditional shadow banking.

This paper distinguishes banks' shadow from traditional shadow banking (mainly non-bank financial institutions) from the perspective of credit money creation by banks. Sun (1996, 2001, 2019) created a Loan Create Deposit theory (LCD) with four types of market participant: central bank, banks, non-bank financial institutions, and non-financial sectors (enterprise and household). Only banks have the money-creation function. Banks increase customer deposits and create credit money while expanding assets through loans, foreign exchange purchases, and corporate bond purchases. This process is constrained by restrictions on cash, clearing, and the required reserves at the central bank and is also subject to the PBC and CBIRC's restrictions on capital² and credit policy. Banks' asset expansion capacity and operating profit are limited by regulations, such as through the risk-weighting of loans, capital consumption, and restrictions on providing liquidity to certain fields (e.g., excess capacity industry, local government financing vehicles, and real estate). Therefore, to reduce capital consumption³ and avoid credit restrictions, banks have an incentive to seek alternative

¹ Hsu et al. (2013) adopt a similar classification. They divide financial institutions into monetary financial institutions (MFIs) and non-MFIs according to whether credit money is created. MFIs include financial entities that create money (and credit at the same time), such as commercial banks and money market funds (which must be discussed). Non-MFIs include financial entities that do not create money (but create credit), such as investment funds, financial instrument companies, pension funds, hedge funds, securities companies, loan companies, and other financial subsidiaries.

² Capital constraint refers to the general constraint of bank capital on asset expansion, such as capital adequacy regulation, provision requirement, and the dynamic adjustment mechanism of the differential reserve.

³ According to regulations, the risk weight of commercial bank claims on other commercial banks is 25%. The risk weight is 20% for claims that have an original period of no longer than three months, which is a much lower weight than the general loan risk weight of 100%.

asset allocation channels to move certain assets from loan items to less capital-consuming and less-regulated assets (e.g., interbank lending, interbank payment, and trust entitlement) and other off-balance sheet assets. Meanwhile, banks create equal amounts of deposits on the liability side to meet the financing needs of non-financial enterprises. These assets and off-balance sheet lending are essentially loans, with the same mechanism of credit money creation as loans. Alternatively, when banks increase their holdings of certain asset types, an equal amount of deposits is added on the liability side, with such deposits constituting newly created credit money.⁴

Banks' shadow refers to bank⁵ activities that provide funding for enterprises through the creation of credit money, but which circumvent regulatory restrictions and constraints on lending by adopting non-standard accounting measures. Specifically, banks' shadow includes 1) assets channeled by other banks, such as the dual buyout of credit assets, the reverse repo of bills, interbank payment, purchases, and re-sales; and 2) activities channeled by non-bank financial institutions, such as the transfer of trust beneficial interests, credit-linked total return swaps, the oriented asset management plans of security brokers, and specific asset management fund plans.⁶ Banks' shadow is identical to bank lending in the sense that it expands assets and creates money to fulfill the funding needs of the real economy. However, it differs from bank loans in the sense that it is not listed as a loan in balance sheet items. Banks' shadow is channeled mainly through third-party financial institutions. Therefore, it exists in terms of interbank assets (on the asset side of the bank balance sheet), investment assets, or off-balance sheet items (e.g., off-balance sheet interbank assets that correspond to off-balance sheet WMPs).

Traditional shadow banking pertains to credit creation activities undertaken by non-bank financial institutions. It transfers money out of the banking system to provide funding for enterprises. As its credit creation mechanisms are analogous to those in advanced economies (e.g., money market funds and asset securitization), this category of Chinese shadow banking is called traditional shadow banking. Traditional shadow banking is conducted mainly by non-bank financial institutions' (e.g., trust companies, securities companies, finance companies, financial leasing companies, and microcredit companies⁷), which transfer funds that are directed to real economy borrowers (not a channel for banks) through trust loans,⁸ asset management plans, equipment leasing,

⁴Deposits created by banks' shadow are sometimes manifested as the interbank deposits of non-bank financial institutions and then transferred to enterprise deposits through entrusted loans. The interbank deposits of non-bank financial institutions are counted in M2. Thus, they are also part of credit money.

⁵ In this paper, banks refer to deposit-type financial institutions and non-bank financial institutions refer to non-depository financial institutions.

⁶ Banks rarely have their own shadow banking businesses, instead using third-party financial institutions as their channels.

⁷ Microcredit companies are not currently classified as financial institutions, but they have similar credit intermediation functions and also relatively complete statistic systems. Thus, they are included in our shadow banking analysis.

⁸ Banks also have a smaller scale of traditional shadow banking, such as the entrusted loan business between two companies. The current balance of entrusted loans is quite high. However, entrusted loans are lent mainly between non-bank financial institutions and enterprises and

mortgages, and credit loans. In this process, non-bank financial institutions act as credit intermediaries. The amount of credit increases, but the quantity of money is unchanged, as credit is created by adjusting the distribution of money (i.e., money is transferred from investors to financiers).

The unique features of shadow banking in China stem from the bank-dominant financial system and its regulatory constraints. First, shadow banking in China generates more shadow due to the binding capital adequacy requirements of commercial banks. And the additional credit is allocated to industries to which the government restricts the supply of credit from banks. Secondly, although the leverage ratio is not binding on commercial banks in China, shadow banking practices also influence commercial banks' leverage. Note the reclassification of loans as other items does not influence banks' leverage ratio. Yet, by initiating new loans under the guise of other accounting categories, banks' shadow expands the balance sheet and then reduces the risk weights of those assets. As a result, the leverage ratio is first increased and then reduced.

A similar pattern applies to the shadow banking activities that are moved off banks' balance sheets, such as entrusted loans.⁹ According to the preceding definition, China's shadow banking system differs fundamentally from shadow banking in advanced economies (e.g., Europe and America) in terms of its background, mechanisms, and risk profile. The main funding source of shadow banking in advanced economies is mutual funds, with underlying assets such as sub-prime loans and other illiquid financial claims and products such as asset securitization and repo. In advanced economies, shadow banking pertains mainly to the traditional shadow banking that transfers credit money. By contrast, China's shadow banking system pertains mainly to banks' shadow, with credit money created through the expansion of liabilities with loan-like assets at its core.

2.2 Money creation mechanism of banks' shadow

Banks' shadow entails banking activities that provide money for real sectors through asset expansion (which is inherently identical to bank loans) and related credit money creation (asset expansion simultaneously creates deposits), but which circumvent regulatory restrictions—such as credit allocation constraints—by hiding loans as alternative balance-sheet items. Banks' shadow is channeled mainly through third-party financial institutions, including other banks and non-bank financial institutions.

Analyzing the composition of bank assets facilitates our understanding of the operational mode and business types of banks' shadow. Banks' shadow can be decomposed into “interbank” and “investment” channels according to asset type. Considering the different counterparties, the interbank channel consists of “interbank” channels (the counterparties are commercial banks engaged in business such as interbank payment and reverse repo) and “non-bank” channels (the counterparties are non-bank financial institutions engaged in business such as lending to non-bank financial institutions). Investment channels refer to activities such as converting loan

between cash collection businesses within enterprise groups. Entrusted loans between two enterprises are quite few.

⁹ I thank an anonymous referee for pointing out this pattern.

assets into investment assets, such as bank-trust cooperation, bank-security corporations, broker-dealer channels, fund subsidiary channels, notes, and trust beneficial interests. I now turn to a detailed analysis of these three shadow banking credit-money-creation modes.

Via the interbank channel, banks provide loan-like financing to corporations and create the same amount of money, but circumvent capital adequacy requirements and credit allocation restrictions by cooperating with another bank and recording the assets as interbank assets. The top three commonly used operating modes include the reverse repo of bankers' acceptance notes, interbank payment, and the reverse repo of trust beneficial interests.¹⁰ Consider interbank payment. Bank A acts as an agent of Bank B in providing financing to Corporation Q, where Bank B commits to paying back the principal and interest to Bank A at a later date. The related accounting practices are shown in **Table 1**. Bank A records the interbank funding as interbank lending and matches it with an equal amount of deposits from Corporation Q on the liability side. This practice simultaneously increases the money supply and credit provision by the same amount. Alternatively, banks provide credit to corporations by creating money. Meanwhile, the balance sheet of Bank B does not change, as its commitment to repaying the principal and interest is recorded off-balance sheet. In this case, Bank A is a "channel institution" for concealing assets. Bank B is the lending risk-taker, and makes the principal and interest payment on a specified date. Similar accounting practices apply to both the reverse repo of bank acceptance notes and the reverse repo of trust beneficial interests. There is one essential difference among the three commonly used operating models. In the case of reverse repo of trust beneficial interests, loans to corporations are actually moved off-balance sheet and instead are shown on the balance sheet of newly created SPV of trust loans. In the case of a reverse repo of banker's acceptance notes, as well interbank payments, loans to corporations are simply relabeled as interbank lending due to accounting malpractice, and there is no off-balance sheet entity to hold these loans. As demonstrated, the interbank channel is not fundamentally different from traditional lending.

Table 1: Money creation mechanism of the interbank channel (unit: RMB)

Without interbank corporation			
Bank B			
Loans to Corporate Q	+100	Deposit of Corporate Q	+100
With interbank corporation			
Bank A			
Interbank Lending	+100	Deposit of Corporate Q	+100

¹⁰ In the first half of 2011, considering that some rural credit cooperatives were exercising non-standard accounting practices to hide discount loans as "reverse repo financial assets," the China Banking Regulatory Commission (CBRC) introduced related accounting requirements.

(Table 1 continues)

Bank B

No Change	No Change
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With non-bank channels, banks provide funding to non-bank financial institutions (asset side) in the forms of interbank borrowing and lending, bank deposits, or reverse repo; they add the same amount of money to the liability side as the deposits of other financial institutions,¹¹ which are further converted into corporate deposits through entrusted loans. The related accounting practices are shown in **Table 2**. In Table 2, loans to corporations are moved off the balance sheets of commercial banks, and onto the balance sheets of non-bank financial institutions in the form of entrusted loans.

Table 2: Money creation mechanism of non-bank channels (unit: RMB)

Without non-bank corporation

Bank B

Loans to Corporate Q	+100	Deposit of Corporate Q	+100
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With non-bank corporation

Step 1

Bank B

Lending to Non-bank Financial Institutions	+100	Deposit of Non-bank Financial Institutions	+100
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Non-bank Financial Institutions

Deposits at Bank B	+100	Interbank Borrowing	+100
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Step 2

Bank B

Lending to Non-bank Financial Institutions	+100	Deposit of Corporate Q	+100
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Non-bank Financial Institutions

Entrusted Loan ---- Corporate Q	+100	Interbank Borrowing	+100
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¹¹ From October 2011, the PBC has included the deposits of non-depository financial institutions at commercial banks in the money supply, which is also credit money. Thus, this type of banks' shadow creates credit money, in the same way as other banks' shadow businesses and traditional businesses, such as loans.

Via investment channels, banks provide loan-like financing to non-financial corporations and create the same amount of money, but avoid restrictions on credit allocation by operating between financial institutions and moving assets from loan items to investment assets. Commonly used modes include bank-trust cooperation, bank-security cooperation, bank-insurance cooperation, and bank-fund cooperation. Such modes enable banks to hide loan-type assets as investment assets and to list them as on-balance sheet items, such as “financial assets available for sale”¹² and “receivable investments.”¹³ Consider bank-trust cooperation. Table 3 illustrates its accounting practice. Corporation Q applies for funding from Bank B, but Bank B is prohibited from lending due to credit allocation restrictions. To circumvent this restriction, Bank B uses the shadow banking channel through Trust Company T. Specifically, Trust Company T sets up a trust fund (SPV) to invest in Corporation Q. Then, Bank B buys the trust beneficial interests. For accounting purposes, Bank B lists the trust beneficial interests as “amounts due” or “financial accounts available for sale” and simultaneously increases the on-balance sheet deposits from Corporation Q to fulfill its own financing needs. In this case, Trust Company T and the Trust SPV acts as a channel for Bank B to circumvent regulatory restrictions and does not affect the money creation process. Loans to corporations are moved off-balance sheet of Bank B and onto the balance sheet of Trust SPV. Note that “Bank” in all of the tables in this paper refers to the whole banking system, except in the case of the interbank channel. In this sense, although the non-bank financial institutions and Corporation Q have accounts at different banks, the related accounting practices can still be displayed on the same balance sheet.

Table 3: Money creation mechanism of bank-trust cooperation (unit: RMB)

Without bank-trust corporation

Bank B			
Loans to Corporate Q	+100	Deposit of Corporate Q	+100

With bank-trust corporation

Step 1

Bank B			
Trust Beneficial Interests	+100	Deposit of Trust SPV	+100

Trust SPV			
Deposits at Bank B	+100	Trust Beneficial Interests	+100

¹² Financial assets available for sale usually include bonds, notes, trusts, and other beneficial rights. Commercial banks tend to hide loans as “notes” and “trusts and other beneficial rights.”

¹³ A receivable investment is a type of bank investment business, referring to non-derivative financial assets that are not quoted in the active market but that have fixed or determined payoffs. Commercial banks tend to hide loans under corresponding secondary items.

(Table 3 continues)

Step 2

Bank B

Trust Beneficial Interests	+100	Deposit of Corporate Q	+100
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Trust SPV			
Trust Loan	+100	Trust Beneficial Interests	+100
---- Corporate Q			

Regardless of the different modes and various participating institutions involved, the original providers of funding are banks and the ultimate borrowers are mostly financing entities that have difficulty obtaining loans directly from banks. The complicated transaction structure is designed to establish an indirect link between banks and entities that are unable to obtain financing from banks. In essence, banks' shadow is actually a bank credit business.

2.3 Money creation channels of banks' shadow in China

The main balance- and off-balance-sheet items (i.e., shadow banking related) of state banks in China are shown in **Figure 1**. Banks' shadow, which creates the money supply, includes the following on- and off-balance-sheet items: interbank payment, lending to non-banking financial institutions, investment, entrusted loans, and trust loans by bank-trust cooperation.

Figure 1: Banks' shadow: the balance sheet of banks

	Assets	Liabilities and Capital
Balance Sheet	Loans to big firms Interbank loans Reserves Interbank payment Lending to nonbanking financial institutions Investment	Deposit Central Bank lending Bank capital
Off-Balance Sheet	Entrusted loans Trust loans	Wealth management products (WMPs)

As an interbank channel, interbank payment enables state banks to provide loans to SOEs through small banks. Specifically, state banks make loans to SOEs, but small banks pay the funds; state banks hold the claim on small banks by interbank payment. The credit risk weight of interbank payment is 25%, much less than 100% of the loans. With lending to non-banking financial institutions, state banks lend to non-banking financial institutions, which then lend entrusted loans to SOEs, LGFVs, and real estate developers. The risk weight for lending to financial institutions is lower than that for SOEs.

As an investment channel, investment enables state banks to purchase financial products issued by non-banking financial institutions, including trust companies,

security firms, insurance companies, financial companies, and mutual funds (subsidiary companies). Investments can be hidden in balance sheet items such as receivable investments (trust beneficial interests, commercial paper, and bond) and financial assets available for sale. Again, this channel has a lower risk weight than loans.

Trust loans by bank-trust cooperation are also an important channel of banks' shadow. An estimated 70% of trust funds are sourced from banks, and trust funds are used to make loans through bank-trust cooperation. The PBC has tightened related regulations in recent years. Banks are required to bring all bank-trust cooperation WMPs back onto balance sheets; furthermore, capital requirements for trusts have increased.

Entrusted loans are by definition loans made between non-financial firms through banks as a service agent. In practice, entrusted loans can refer to lending within a corporate group, or banks' conversion of loans to entrusted loans. The rise of entrusted loans as a main channel of banks' shadow in China is driven mainly by interest rate arbitrage, which is a unique aspect of China's shadow banking sector. On the one hand, big SOEs have easy access to cheap credit, but lack good investment opportunities; on the other hand, it is difficult for small enterprises to borrow, but they have good investment opportunities that are likely to generate high yields. Moreover, banks avoid risk capital for their loans.

2.4 Credit creation mechanism of traditional shadow banking

Traditional shadow banking refers to the activities of non-bank financial institutions, such as trust, securities, fund, finance, leasing, and microfinance companies that create credit through money transferring to meet social financing needs. As shown in **Table 4**, without acting as a channel of banks' shadow, Trust Company T raises idle funds from Resident R by issuing financial products. It transfers funds to Corporation Q in the form of loans. For accounting purposes, the trust company adds the trust funds of R to the liability side and the cash thus raised to the asset side. However, granting trust loans with such funds leads to a reduction in deposit funds on the asset side and an increase in the trust loan assets.

This process of credit creation (intermediary) is illustrated based on banks' balance sheets as both a reduction in the deposit of Resident R and an increase in the deposits of Corporation Q. Therefore, the credit creation of non-financial institutions (e.g., trust and securities companies) is done via money transfer, which neither creates deposits to increase money nor shifts deposits out of the banking system. The credit creation (intermediary) behavior of non-bank financial institutions does not affect the total amount of money created by banks.

Non-bank financial institutions and private finance cannot create money, but can only create credit through money transfers, indicated by transferring cash or bank deposits from Resident R to Corporation Q. In this process, no money is created, but the total amount of credit in the society is increased, which implies that it is a money transfer type of credit.

Table 4: Credit creation mechanism of non-bank financial institutions (unit: RMB)**Origination of Trust SPV**

Trust SPV			
Deposits at Commercial Bank	+100	Trust Fund ---- Resident R	+100
Commercial Bank			
Reserve at Central Bank	+100	Deposit of Resident R	0
		Deposit of Trust SPV	+100

Investment of trust funds in trust loans

Trust SPV			
Trust Loan ---- Corporate Q	+100	Trust Fund ---- Resident R	+100
Commercial Bank			
Reserve at Central Bank	+100	Deposit of Resident R	0
		Deposit of Trust SPV	0
		Deposit of Corporate Q	+100

Traditional shadow banking has six channels. 1) Trust loans (without bank-trust cooperation). 2) Undiscounted bankers' acceptance (BA). BA includes certificates issued by banks that promise unconditionally to make a future payment, generally backed by a deposit from the party desiring the BA to be issued. Only undiscounted BAs belong to shadow banking, while discounted BAs are classified as loans. 3) Microfinance companies, which became legal in 2008 to aid small and medium-sized enterprise financing and are usually privately owned. These companies have been growing rapidly in recent years due to their high profit margins. Generally, the lending rate of microcredit companies can be four times the benchmark lending rate. Microfinance companies are subject to strict regulations: their debt amount is limited and is set based on the size of capital. They are not allowed to absorb deposits or to borrow from the interbank market. 4) Pawn shops, which are mostly self-financed and small-scale (RMB 101 billion). 5) Private lending, which was estimated at around RMB 5 trillion in 2016 (China Household Finance Survey, CHFS). Private lending is not subject to any supervision. Spillover risk from private lending is limited because low interest loans are usually relationship lending, and the scale of high interest loans is small. 6) P2P lending platforms, which use online credit platforms to facilitate credit information gathering. P2P lending is relatively small in size but has grown rapidly in recent years. P2P lending is frequently vulnerable to fraud and default.

2.5 Wealth management products: correcting some misunderstandings

Some narratives about Chinese WMPs are misleading and lead to inaccurate estimations of the scale of shadow banking. One prevalent view is that Bank B raises

funds by issuing WMPs and investing in the financial assets of Corporation Q (e.g., trust loans or asset management plans managed by trust companies, asset management companies, or security companies as trustees). In such a way, funding is moved from WMP investors to enterprises. However, this view is misleading if addressed from the perspective of credit money creation.

As demonstrated in Figure 1, WMPs are “quasi-deposits” and lie on the liabilities side of the balance sheet. Banks tend to move certain loans (such as loans to local government financing platforms) off-balance sheet as entrusted loans and move the corresponding deposits off-balance sheet as WMPs.

Assume that banks are formed by granting loans to residents. Residents R1 and R2 use their bank deposits, D1 and D2, to buy guaranteed and non-guaranteed bank WMPs, respectively. The related on-balance sheet accounting practices are shown in **Table 5**. That is, for Resident R1, who buys guaranteed WMPs, bank deposit D1 changes from savings deposits to structured deposits¹⁴ (still on-balance sheet). For Resident R2, who buys non-guaranteed WMPs, bank deposit D2 is moved off-balance sheet, as banks are not responsible for the repayment risk. An equal amount of asset-side trust beneficial interests is also simultaneously moved off-balance sheet.

Table 5: Credit creation mechanism of banks’ WMP (Unit: RMB)

Without WMPs			
Commercial Bank			
Loans of Resident R1	+100	Deposit D1 of Resident R1	+100
Loans of Resident R2	+100	Deposit D2 of Resident R2	+100
XX Assets	+100	Deposit of Corporate Q	+100
With WMPs			
Principal Guaranteed WMPs			
Commercial Bank			
Loans of Resident R1	+100	Structured Deposits	+100
Non-Guaranteed WMPs			
Commercial Bank			
Loans of Resident R2	+100	Deposit of Corporate Q	+100

Note: “XX Assets” is moved off balance sheet.

As illustrated previously, the purchase of WMPs leads only to changes in deposit accounts, shifting deposits off-balance sheet rather than transferring them to the deposit accounts of Corporation Q. In this sense, WMPs are not fundraising channels for buying

¹⁴ Since 2013, the PBC has stipulated that all financial institutions must incorporate on-balance sheet WMPs in structured deposit statistics.

assets or supporting the projects of Corporation Q. In fact, the funding for Corporation Q is raised from credit money creation through non-standard lending practices that add trust beneficial interests on the asset side, but not from deposits D1 and D2. While deposit D2 is moved off-balance sheet for balancing purposes, an equal amount of XX assets (mainly bonds and non-standard assets) are also moved off-balance sheet. These assets are the origins of creating the deposits of Corporation Q and meeting its financing needs. In other words, the banks create the deposits of Corporation Q by expanding XX assets (one mode of shadow banking) to meet the funding needs of the real economy. Meanwhile, if Resident R2 invests in non-guaranteed WMPs, then banks artificially match XX assets with an equal amount of saving deposits that are used to purchase non-guaranteed WMPs. This is why there is no natural link between XX assets and WMP funds (referring to the intuitive interpretation of the raised WMP funds used to purchase assets). WMPs essentially constitute a manner of attracting deposits with the backdrop of unfinished interest rate liberalization. They create neither money nor credit and provide no funding for corporations. Instead, XX assets create credit and meet the funding needs of corporations. This is why double-counting exists in some studies measuring the scale of shadow banking, which considers both XX assets and WMPs. Non-guaranteed WMPs enable banks to release capital (by moving XX assets off-balance sheet) and reserves (by transferring deposit D2 into WMPs and then moving it off-balance sheet) and to provide more space for banks' asset expansion (which requires more capital) and credit money creation (which requires more reserves). Yet, WMPs neither create credit (or money) nor serve as credit intermediaries. Thus, they are not included in the definition of shadow banking in this paper.

Yields of WMPs are generally higher than deposit rates. For example, in June 2017, the average yield of a WMP was 4.66% (annualized), while the official RMB benchmark deposit rate was 1.5%. WMP returns can be higher because WMPs are not 1) subject to reserve requirements or 2) covered by deposit insurance. Banks can keep the margin profit by selling WMPs, given that the banks' shadow assets also have a higher interest rate. The underlying assets of WMP include bank loans and investments.

WMPs present three risks. First, pooled underlying assets and related information asymmetry make it difficult to identify the underlying assets. Second, the credit risk of end-borrowers (e.g., enterprises) can be disguised as an interbank loan. Third, possible investor panic may trigger systemic risk, as depositors view WMPs as bank deposits and expect banks to absorb all the risks of default.

3 Measuring China's shadow banking

3.1 Issues in measuring Chinese shadow banking

One strand of the literature uses the aggregation approach to measure the scale of shadow banking, that is, directly sum up the products or subcategories of shadow banking. This creates two issues. First, the different definitions or classifications of shadow banking lead to significant differences in measurement results. For example, Yan et al. (2014) define six measures of Chinese shadow banking according to regulation intensity. The broadest measure of shadow banking is RMB 67.03 trillion, whereas the narrow measure is only RMB 10.3 trillion. Liu (2013) estimates the size of "other debts than formal credit lending" at approximately RMB 25 trillion, of which the

scale of shadow banking is approximately RMB 10 trillion. Gao et al. (2013) focus on banks' off-balance sheet financing and make an estimation based on the indicators of total social financing, which they find to range from RMB 7.1 trillion to RMB 21.9 trillion.

Second, the aggregation approach cannot avoid double-counting or omission. The approach is applicable to off-balance sheet securitization (a major component of U.S. shadow banking) rather than to China. For example, the overlapping of shadow banking subcategories may induce double-counting, and the different accounting practices of different institutions, such as identical items listed under different accounting items, may result in omission.

In this sense, the liability side approach introduced by Harutyunyan et al. (2015) provides a solution. This approach is more suitable for capturing on-balance sheet asset securitization, which is the main form of shadow banking (such as guaranteed securities and covered bonds) in European countries. The measurement results are replicable across time and countries, and the approach provides a tool for historical and international shadow banking comparison. Yet, no such research has been conducted on Chinese shadow banking.

Credit money creation is a key difference in shadow banking between advanced economies and China. In advanced economies, shadow banking is essentially money. Thus, it must be analyzed from the angles of the participating entities, activities, and innovations in the market. However, in China, concerns about shadow banking pertain mainly to its role in supporting the real economy and generating financial risks. Few studies have analyzed the mechanisms of shadow banking and its measurement from the perspective of credit money creation. I fill this gap by providing a thorough analysis of the money creation mechanisms of Chinese shadow banking and by measuring its scale accordingly. Our key tools include credit money creation theory,¹⁵ bank balance sheets, and banks' accounting tactics in handling shadow banking items.

3.2 Measuring banks' shadow with the deduction approach

This paper measures banks' shadow using the deduction approach introduced by Sun and Jia (2015). Given the basic accounting principle that total debits must equal total credits for each transaction, the asset expansion of banks' shadow must equal the deposit size created in the subsequent phases. Sun and Jia (2015) measure banks' shadow from the banks' liability side by deducing all "non-shadow assets" (including traditional assets such as loans, foreign exchanges, and corporate bonds) from the possible liabilities.

Figure 2 shows not only the evolution of banks' shadow in China, but also the effect of regulation on the response of banks in switching between the various channels for banks' shadow. According to the timeline of the global financial crisis and related

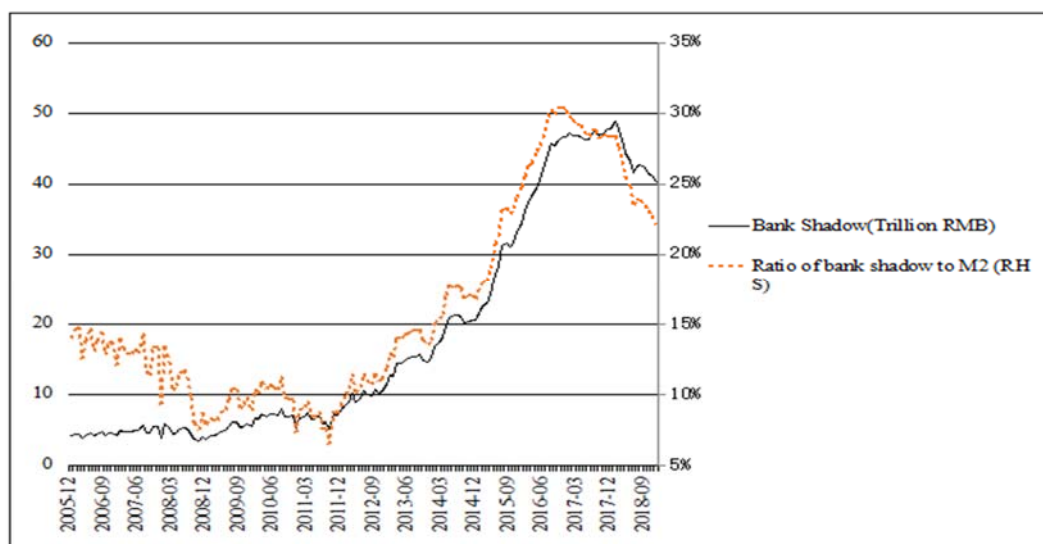
¹⁵According to the credit-money-creation theory, banks' behavior in loan granting and deposit creation is money-creation behavior. Furthermore, no money circulation or money-generating behavior occurs while banks use deposits to grant loans that are deposited back into the banks. Sun (1996, 2001, 2004) analyzes this idea.

regulations, the evolution of banks' shadow and its share in money creation can be divided into four stages.

During the first stage (January 2006 to October 2008), the scale of banks' shadow was quite stable, but its share in money creation decreased sharply. Before the sub-prime crisis, the gap between banks' deposit liabilities and traditional assets (mainly loans and foreign exchanges) was positive, with a scale of approximately RMB 5 trillion to RMB 7 trillion. However, this is irrelevant to banks' shadow, due mainly to the reform of state-owned banks before 2004, when banks bought the bonds of asset management companies, massively wrote off non-performing loans, and were injected with capital from states' foreign exchange reserves. From 2006 onward, the gap remained stable and the share of banks' shadow in money creation decreased dramatically year by year, indicating that the main credit money creation channels were traditional bank loans and foreign exchange channels.

During the second stage (October 2008 to October 2011), the scale of banks' shadow and its share in money creation were both stable. The Chinese government's RMB 4 trillion investment plan stimulated bank's asset expansion. As bank balance sheets expanded rapidly, the gap between their deposit liabilities and traditional assets increased from RMB 3.48 trillion at the beginning of this period to RMB 7.20 trillion in October 2011. Nevertheless, as the amount of credit money created by banks was also quite large, the share of the gap in total money creation increased moderately, from 7.54% to 8.81%. This implies that, during this stage, the role of banks' shadow asset channel in banks' credit expansion did not change fundamentally. Furthermore, the main channels were still traditional loans and foreign exchange channels.

Figure 2: Size of banks' shadow in China (Unit: Trillion RMB)



During the third stage (October 2011 to January 2017), both the scale of banks' shadow and its share in money creation increased. In the second quarter of 2010, the monetary authorities began to implement prudent monetary policies, introduced macro-prudential policies characterized by capital constraints to strengthen regulation, and applied specific credit regulations to sectors with excess capacity (e.g., real estate). To

circumvent the preceding regulations and capital restrictions, banks converted loan assets to banks' shadow through tools such as investment and interbank businesses, to meet the financing needs of real estate developers and local government financing platforms. As shown in Figure 2, from October 2011, the scale of banks' shadow continued to increase, hitting a record high of RMB 47.86 trillion in January 2017; the corresponding share in money creation also increased to 30.37%.

Note that during this period, both the scale of banks' shadow and its share in money creation fluctuated. For example, the shrinkage in banks' shadow during June and December 2014 was caused mainly by reductions in banks' shadow business channeled through other banks, influenced by the "Notice about regulating interbank business of financial institutions" jointly issued by the PBC, CBRC, China Securities Regulatory Commission, China Insurance Regulatory Commission, and State Administration of Foreign Exchange. By the end of December 2014, banks' shadow had fallen from RMB 21.31 trillion to 20.55 trillion, and the corresponding share from 17.62% to 16.73%.

During the fourth stage (from January 2017), the scale of banks' shadow stabilized while the share of money that it created began to decrease, due mainly to stricter regulations and other factors, such as slowing economic growth and the increase in credit risk. China has tightened financial regulations since January 2017, when off-balance sheet products, such as trust and entrusted loans, were included in the Macro-prudential Policy Assessment (MPA) and local governments were prohibited from continuously expanding their debt. Nevertheless, the scale of banks' shadow is still quite high and may surge again once external environmental changes or banks continue to carry out financial innovation aimed at circumventing regulations.

3.3 Measuring traditional shadow banking

Traditional shadow banking involves credit creation activities undertaken by non-bank financial institutions, and it transfers money outside the banking system to provide funding for enterprises. Its credit creation mechanisms are similar to those seen in advanced economies. Without acting as a channel for banks, non-bank financial institutions invest the funds they raise in real sectors via trust loans (without bank-trust cooperation), asset management plans, equipment leasing, mortgages, credit loans, etc. In this process, credit increases but the money supply remains unchanged; money is simply transferred between different entities.

To measure the scale of traditional shadow banking, four components need to be considered: the balance of microfinance company loans, financial companies' claims on non-financial companies and residents, the balance of finance lease contracts, and the balance of trust assets (excluding bank-trust cooperation). The data sources include the PBC, China Leasing Union, and China Trustee Association.

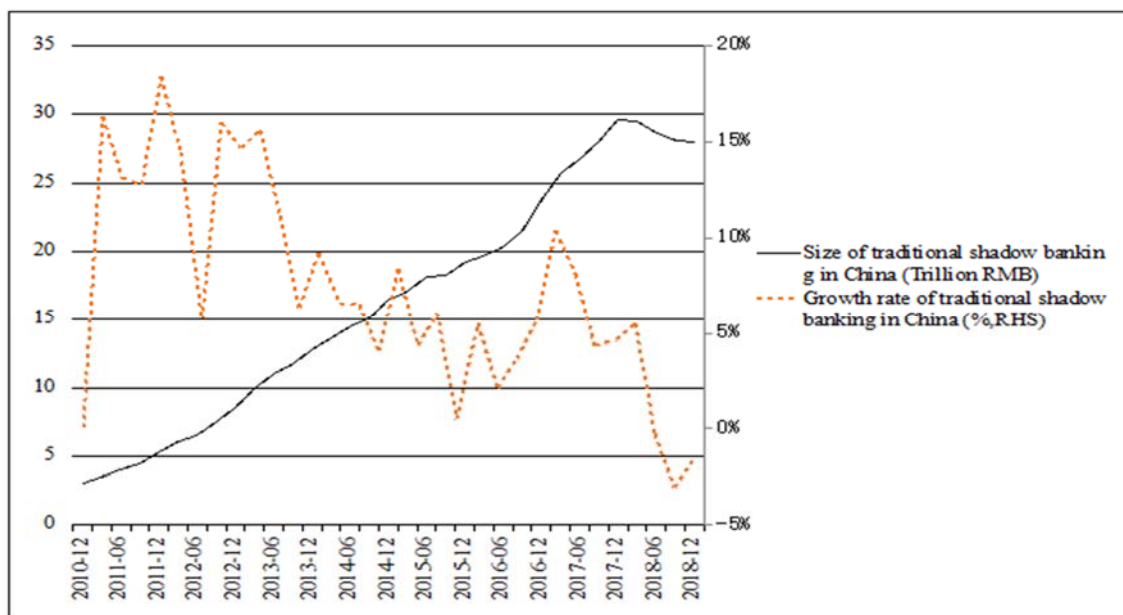
Compared with banks' shadow, China's traditional shadow banking is relatively small (**Figure 3**). Before 2010, traditional shadow banking developed very slowly, with a scale of less than RMB 2 trillion, taking less than 2% of the total credit money created by banks, as non-bank financial institutions contributed less to meeting social financing needs. Since 2010, the scale of traditional shadow banking has grown, and the share of banks' credit creation has also increased. In September 2017, the scale of traditional shadow banking reached RMB 28.32 trillion, whereas non-bank financial institutions

enhanced their efficiency in using the existing money stock, playing an important role in credit creation and meeting social financing demands.

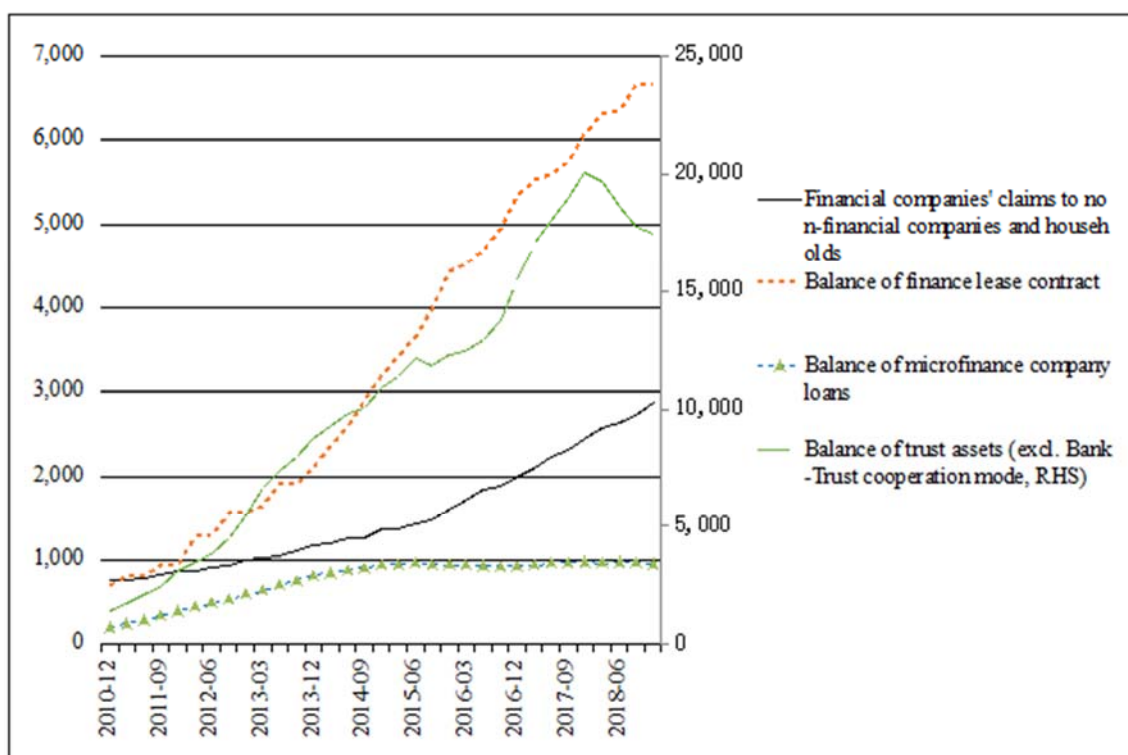
Among the channels of traditional shadow banking, trust assets take the largest share, and their contraction led to a sharp drop in the scale of traditional shadow banking in 2015. This contraction of trust assets was due to the stricter regulation (e.g., capital requirements) imposed on trust companies by the regulators.

Figure 3: Measuring traditional shadow banking in China

Panel A: Size and growth of traditional shadow banking in China



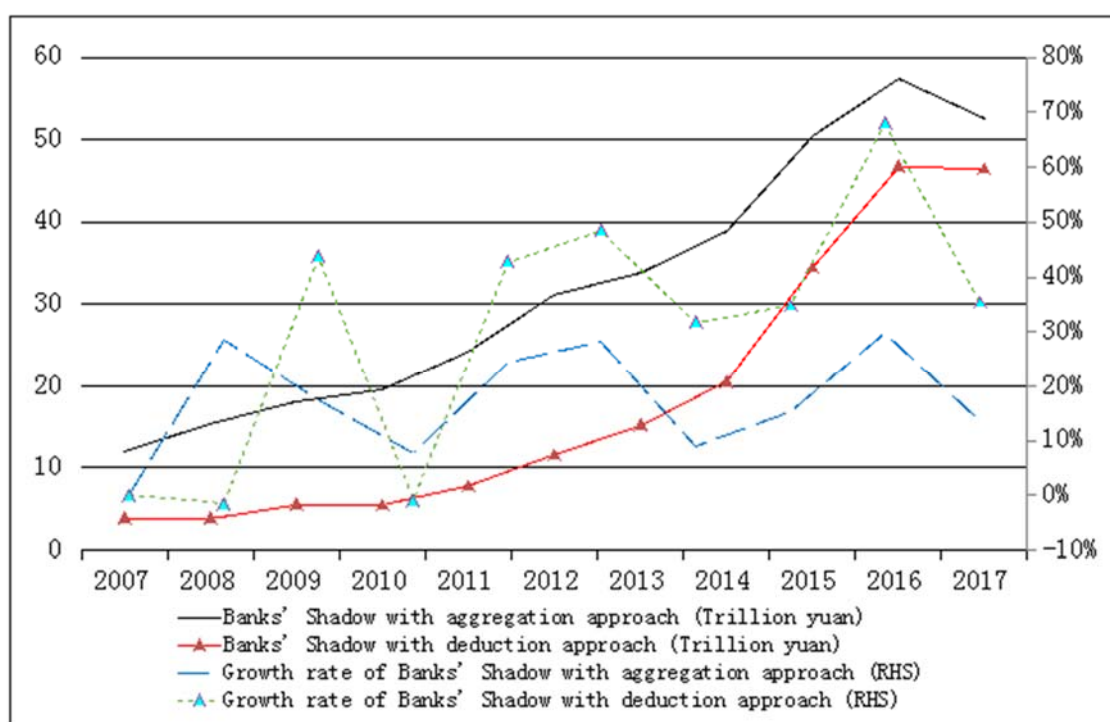
Panel B: Components of traditional shadow banking in China (Unit: RMB billions)



3.4 A Comparison of the deduction and aggregation approaches

Accurate measurement of China's shadow banking and all of its channels are fundamental for banking supervision and regulation. It is important, therefore, to avoid double-counting. As discussed previously, bank-trust cooperation-related bank assets overlap with trust loans. Double-counting occurs when trust loans and WMPs are summed, as trust loans are on the asset side while WMPs are on the liability side. Moreover, double-counting occurs when all shadow-banking-related accounting items are summed. **Figure 4** displays the significant difference between the deduction and aggregation approaches in measuring China's shadow banking. The aggregation approach seems to overestimate the scale of shadow banking and is unable to eliminate non-shadow banking from banks' balance sheet items. Although the aggregation approach yields inaccurate estimations, it sheds light on the structural evolution of banks' shadow components.

Figure 4: Measuring China's banks' shadow: a comparison of the deduction and aggregation approaches

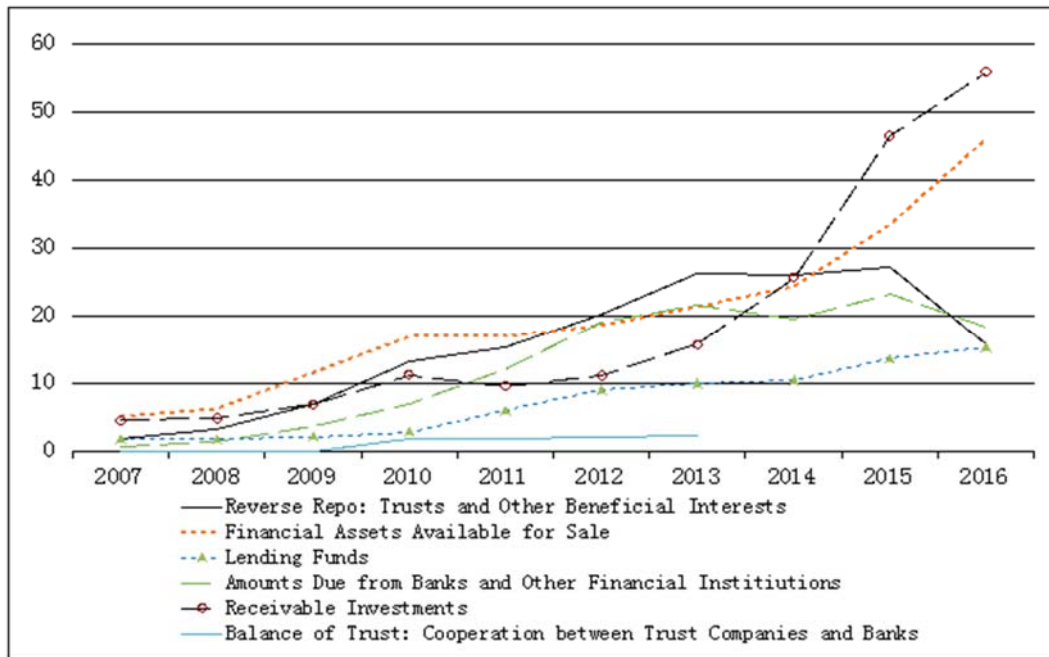


Note: The aggregation approach uses balance-sheet data of 39 listed banks, capturing an estimated 67% of the total banks' shadow.

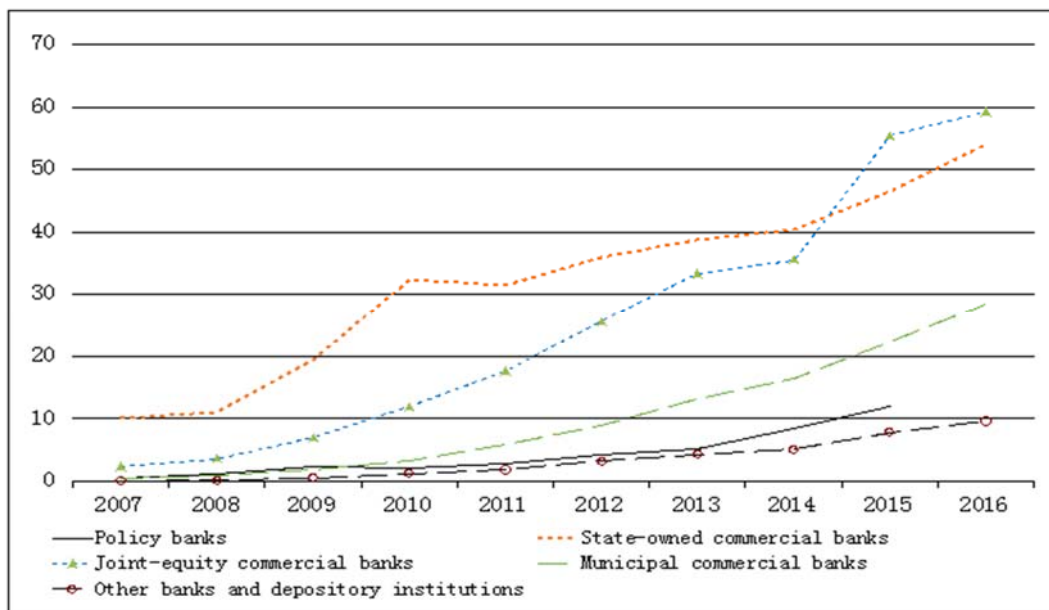
As demonstrated in **Figure 5**, the shrinkage of banks' shadow during June and December 2014 was caused mainly by the decline in the interbank channel, such as interbank payments and reverse repos (Panel A), due to the stricter regulations Chinese financial market regulators placed on interbank business. After January 2015, banks' shadow channels switched from the interbank channel to investment channels, such as financial assets available for sale and receivable investments, contributing to the growth of China's shadow banking.

Figure 5: Constituents of shadow banking: banks' balance sheet items

Panel A: Components of banks' shadow banking business



Panel B: Shadow banking involvement by bank type



Note: Although there are only 26 listed banks in China, the balance sheet items of 311 banks were downloaded from the CSMAR database. “Balance of Trust: Cooperation between Trust Companies and Banks” is taken from the China Trustee Association.

According to the preceding analysis, I find that the banking sector still dominates credit creation, leading to the tremendous scale of banks' shadow and the high share of credit money creation and significantly affecting macroeconomic regulation and

financial risk management. Thus, related regulations must be investigated from the macro perspective.

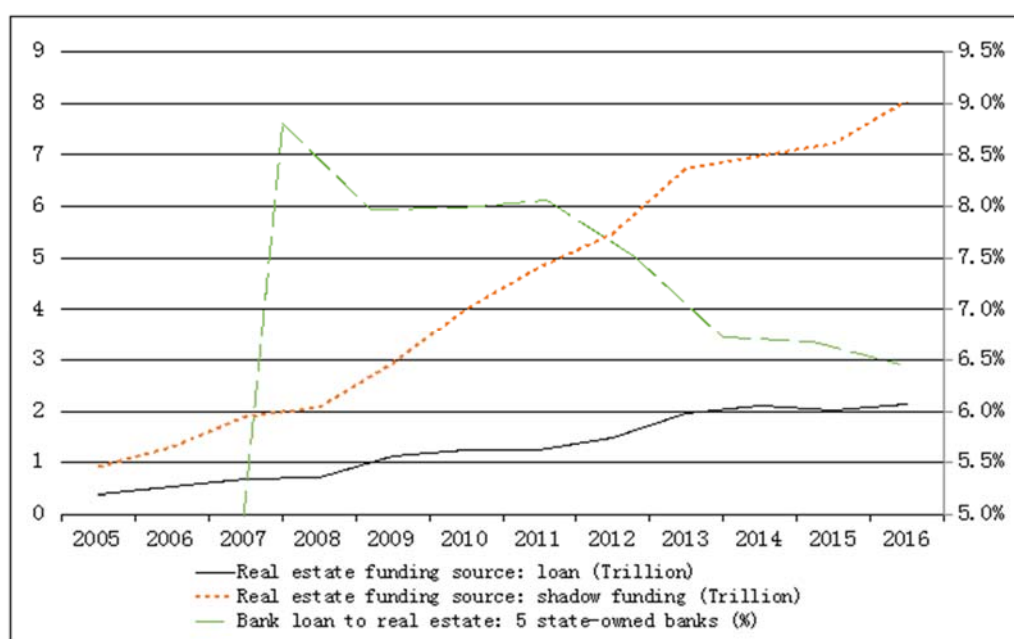
4 Shadow banking credit and financial risk

4.1 Fund uses of Chinese shadow banking

Funding from China's shadow banking flows mainly into three types of borrower: LGFVs, enterprises with excess capacity, and real estate developers. Take the channels of banks' shadow as examples. State banks may lend to non-banking financial institutions, which then lend as entrusted loans to LGFVs, enterprises with overcapacity, and real estate developers.

Trust companies are the main conduits for shadow fund flows. In China, the trust company license allows participation in money market business, capital market business, and alternative investments. Trust companies can lend to restricted or high-risk industries (e.g., real estate, LGFVs) and are subject to less scrutiny, as they only act on behalf of their beneficiaries. As displayed in **Figure 6**, shadow funding takes a larger share of the real estate funding source than bank loans.¹⁶

Figure 6: Real estate funding sources: bank lending vs shadow funds



Note: The real estate funding source from shadow funding is calculated as the self-funded part plus other funding minus deposit and prepayment.

4.2 Shadow banking and money creation

Differences between banks' shadow and traditional shadow banking reflect the relationship between credit and money. Traditional shadow banking increases credit, but does not increase money due to its money transferring mechanism. Banks' shadow

¹⁶ Data from the real estate sector are more accessible than data from the LGFV and enterprises with excess capacity.

creates both credit and money, and thus its newly created credit and money expansion are consistent. Hence, the credit provided through *traditional shadow banking* is not counted in M2.

Credit and money have the following relationship. The scope of credit includes but is not limited to money; money is a special form of credit, which is generally acceptable to the government and the non-bank private sector.

With the credit tightening in 2010, the incremental money supply (proxied by the M2 growth rate) sharply declined and returned to its pre-crisis level or became even lower; the scale of bank loans consistently decreased and became quite stable afterward. On the contrary, non-bank financing increased, and its share of total social financing also significantly rose, indicating the growth of shadow banking outside the traditional banking system.

The main conclusions and policy implications from **Table 6** indicate that, although shadow banking creates additional money, its growth reduces the relevance of money quantity indicator M2, which requires a more discrete monetary policy than in the traditional financial system.

Table 6: Correlation of shadow banking and credit creation

	Traditional shadow banking (TSB)	Banks' shadow	M2 (adjusted)	Loan
TSB	1.000			
Banks' shadow	0.964	1.000		
M2 (adjusted)	0.995	0.977	1.000	
Loan	0.995	0.983	0.998	1.000

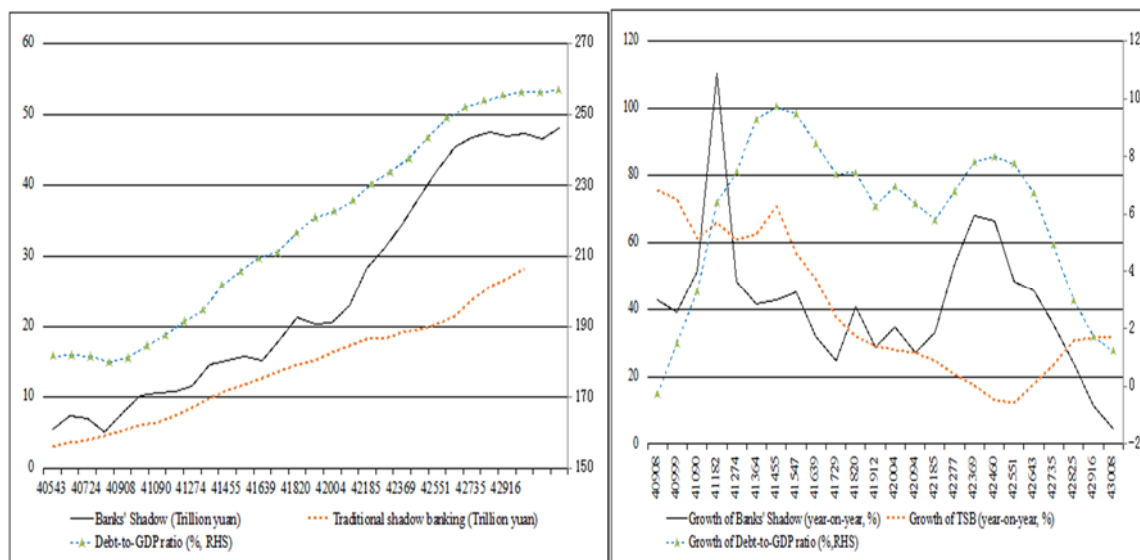
	TSB (MoM growth)	Banks' shadow (MoM growth)	M2 (adjusted) (MoM growth)	Loan (MoM growth)
TSB (MoM growth)	1.000			
Banks' shadow (MoM growth)	0.310	1.000		
M2 (adjusted) (MoM growth)	0.389	0.847	1.000	
Loan (MoM growth)	0.001	0.347	0.553	1.000

Note: Since October 2011, the PBC has incorporated the deposits of non-depository financial institutions at depository financial institutions into its money supply statistics. For consistency, I make the corresponding adjustments to the money supply data after October 2011. Data on the deposits of non-depository financial institutions at depository financial institutions are retrieved from the “Balance Sheet of Other Depository Corporations” published by the PBC.

4.3 Shadow banking growth causes higher macro financial risk

The debt-to-GDP ratio is usually deemed as an indicator of financial risk at the macro level. As shown in **Figure 7**, the scale and growth of banks' shadow is more in line with the debt-to-GDP ratio than traditional shadow banking.

Figure 7: Shadow banking and debt-to-GDP ratio: scale and growth



Source: Debt-to-GDP ratio is from Bank for International Settlements.

I implement a vector autoregression (VAR) model to test hypotheses concerning the causality link between credit risk and shadow banking and to further assess the extent to which shadow banking affect the macro finance risk. I use the Cholesky decomposition to identify orthogonal shocks in our variables and examine their effect on the remaining variables in the system while keeping the other shock constant. To analyze the response of one variable to an orthogonal shock in another variable, I focus on the impulse-response functions.

Table 7: Granger tests for the debt-to-GDP ratio and shadow banking

Equation	Excluded	chi ²	df	Prob> chi ²
Debt-to-GDP ratio	TSB	19.143	3	0.000
Debt-to-GDP ratio	Banks' shadow	13.189	3	0.004
Debt-to-GDP ratio	ALL	33.742	12	0.001
TSB	Debt-to-GDP ratio	3.135	3	0.371
TSB	Banks' shadow	25.222	3	0.000
TSB	ALL	70.913	12	0.000
Banks' shadow	Debt-to-GDP ratio	3.683	3	0.298
Banks' shadow	TSB	7.151	3	0.067
Banks' shadow	ALL	24.233	12	0.019

Note: Variables in the table are month-on-month growth rates. For the Granger test, VAR(3) model is selected according to information criteria, and macro variables (changes in GDP growth rate, changes in average loan rate) are also included in the VAR model.

According to **Table 7**, both banks' shadow and traditional shadow banking cause the debt-to-GDP ratio to rise, but not conversely. The growth of banks' shadow significantly drives that of traditional shadow banking, but the opposite link shows relatively lower significance.

4.4 Shadow banking and financial risk: evidence at the micro level

The contribution of the growth of shadow banking to financial risk is formally assessed for a set of 311 banks in China. A panel regression is run with bank risk as the dependent variable and different measures of shadow banking activity as the independent variables, while the control variables include other possible determinants of bank risk found in the literature. A general specification of a regression model is stated as follows:

$$BankRisk_{it} = \alpha_1 ShadowIndicator_t + \alpha_2 BankFactor_{it} + \alpha_3 MacroFactor_t + \epsilon_{it}$$

where α_i ($i = 1, \dots, 4$) are coefficients (or coefficient vectors) to be estimated, and ϵ_{it} is an error term for bank i at time t . The dependent variable, $BankRisk_{it}$, is proxied by the credit risk of banks. $ShadowIndicator_t$ is the growth of the shadow banking indicators measured in this paper (TSB, banks' shadow, total shadow banking, which are indicated by TSB, BS and ShadowBanking respectively)¹⁷. $BankFactor_{it}$ captures the possible determinants of credit risk at the bank level to control for fundamental differences between banks. $MacroFactor_t$ refers to the general macroeconomic condition (including real GDP growth and inflation) and monetary stance (measured by real interest rates). **Table 8** provides variable descriptions.

For the dependent variable, I select two proxies for banks' credit risk: the nonperforming loans to total loan ratio and the provision coverage ratio, which reflects banks' internal risk estimation and regulatory requirement. Regression results are shown in **Table 9**. The coefficient of *Credit Growth* is negative, coinciding with banks' practice in expanding the total loan amount to reduce the NPL ratio. The positive coefficient of *Capitalization* reflects banks' excess risk-taking.

Although banks' shadow increases banks' credit risk, its impact on internal risk estimation is not significant, meaning banks tend to ignore the risk caused by their shadow (hidden under certain balance sheet items). Moreover, banks' shadow significantly raises bank credit risk, while the impact of traditional shadow banking is also positive but not significant.

¹⁷ Bank-level shadow banking proxies (summation of shadow items on the balance sheet) may also be used, but may create endogeneity issues.

Table 8: Variable descriptions

Variables	Description	Sources
Dependent		
Credit risk	Nonperforming loans (NPLs) to total loan ratio	CSMAR
Internal risk estimation	Provision coverage ratio, proxy for internal risk estimation	
Bank-specific		
Credit growth	Credit growth rate	CSMAR
Provisions	Loan loss provisions to total loan ratio	
Profitability	Return on asset (ROA) ratio	
Capitalization	Total equity to total assets ratio	
Size	Natural logarithm of total assets	
Macroeconomic		
GDP growth	Growth rate of gross domestic product	China Statistics Bureau
Inflation	Inflation rate	
Monetary stance	Real interest rate	PBC

Table 9: Influence of shadow banking on bank credit risk

	NPL Ratio				Internal Risk Estimation			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Provisions	-0.00073 (0.0005)	-0.00074 (0.0005)	-0.00078 (0.0005)	-0.00078 (0.0005)	0.00083 (0.0042)	0.00081 (0.0042)	0.00096 (0.0043)	0.00098 (0.0043)
CreditGrowth	-0.774*** (0.247)	-0.731*** (0.248)	-0.554** (0.269)	-0.557** (0.269)	-0.673 (1.879)	-0.597 (1.889)	-1.826 (2.078)	-1.842 (2.078)
Capitalization	8.031*** (1.210)	8.190*** (1.212)	8.414*** (1.229)	8.435*** (1.229)	13.82 (9.062)	14.09 (9.091)	14.26 (9.377)	14.32 (9.375)
Size	-0.0960*** (0.0169)	-0.0950*** (0.0169)	-0.0989*** (0.0171)	-0.0988*** (0.0171)	-0.0512 (0.1330)	-0.0497 (0.1330)	-0.0349 (0.1370)	-0.0343 (0.1370)
GDPGrowth	-0.0354 (0.0419)	0.0769 (0.0770)	0.00436 (0.1160)	0.0253 (0.1280)	0.288 (0.3250)	0.509 (0.5980)	0.618 (0.9160)	0.575 (1.0130)
Inflation	-0.233*** (0.0427)	-0.173*** (0.0550)	-0.101 (0.0628)	-0.079 (0.0679)	0.657** (0.3300)	0.776* (0.4260)	0.715 (0.4950)	0.738 (0.5340)
RealIntRate	-0.293*** (0.0445)	-0.182** (0.0782)	-0.226*** (0.0718)	-0.145 (0.1160)	0.743** (0.3440)	0.963 (0.6060)	0.853 (0.5640)	0.94 (0.9080)
BS		0.0114* (0.0066)				0.0223 (0.0506)		
TSB			0.0267 (0.0174)				0.0545 (0.1360)	
ShadowBanking				0.0102 (0.0067)				0.0158 (0.0524)
Constant	5.401*** (0.555)	3.642*** (1.155)	4.109*** (1.381)	3.576** (1.708)	-3.104 (4.331)	-6.556 (8.946)	-7.272 (10.850)	-7.159 (13.410)
Observations	506	506	486	486	515	515	495	495
R-squared	0.32	0.324	0.337	0.337	0.03	0.031	0.032	0.031

The results are more obvious when I check across different bank types (**Table 10**). First, both banks' shadow and traditional shadow banking lead to increases in banks' credit risk (NPL ratio), but that risk is not reflected in banks' internal estimation. Second, the risk from shadow banking challenges municipal commercial banks more than other types of bank.

Table 10: Influence of banks' shadow and traditional shadow banking on bank credit risk

Panel A: Impact of banks' shadow

	NPL Ratio					Internal Risk Estimation				
	State-owned	Municipal	Joint	Rural	Foreign	State-owned	Municipal	Joint	Rural	Foreign
CreditGrowth	-0.0302	-0.211	-0.904***	0.907**	-0.513	0.323	-0.136	2.824	-0.741	-7.815
Capitalization	-1.735	5.088**	8.839**	-7.303***	-5.711	-28.68	-8.152	-44.82	8.462**	121.6
Size	-0.142	-0.0281	-0.0556	-0.246***	-0.292*	0.303	-0.247**	-1.091***	0.324***	1.738
Provisions	0.294***	-0.00044	0.446***	0.378***	0.731***	0.131	0.00123	-0.826	0.129**	-4.084
GDP_Growth	0.00873	0.216	-0.0004	0.308	2.587	-0.202	0.187	0.251	-0.362	4.198
Inflation	-0.286***	-0.0241	-0.256***	-0.307**	-1.02	0.356***	-0.241	1.151***	0.546***	7.827
RealIntRate	-0.401***	0.142	-0.241***	-0.234	0.151	0.418***	-0.275	1.243***	0.4	10.52
BS	0.0024	0.0317***	0.0020	0.0079	0.0704	-0.0093	-0.04	0.0628	-0.0042	0.597
Constant	7.096*	-1.384	2.801*	5.999*	-11.9	-6.188	11.17*	26.74**	-6.658	-147.2
Observations	34	177	84	125	25	34	175	84	124	42
R-squared	0.821	0.308	0.782	0.674	0.909	0.794	0.198	0.436	0.288	0.133

Panel B: Traditional shadow banking

	NPL Ratio					Internal Risk Estimation				
	State-owned	Municipal	Joint	Rural	Foreign	State-owned	Municipal	Joint	Rural	Foreign
CreditGrowth	-1.344	-0.251	-0.798*	0.899**	-0.505	3.124	0.0703	0.592	-0.739	-4.156
Capitalization	-5.385	5.640**	14.28***	-7.223***	-5.049	-26.31	-11.4	-52.66	8.505**	131.3
Size	-0.0736	-0.0293	-0.0806	-0.246***	-0.286*	0.193	-0.246**	-1.119**	0.324***	1.701
Provisions	0.285***	-0.00043	0.370***	0.378***	0.713***	0.124	0.00118	-1.012*	0.129**	-4.614
GDP_Growth	0.17	-0.079	0.0993	0.205	1.987	-0.369**	1.164**	-0.894	-0.302	30.28
Inflation	-0.193***	0.00526	-0.165***	-0.304**	-0.973	0.231**	-0.604**	0.342	0.568***	-3.295
RealIntRate	-0.279***	-0.137*	-0.149**	-0.314***	-0.407	0.337**	0.111	-0.353	0.458***	5.779
TSB	0.0417*	0.0332*	0.0362**	0.0033	0.0843	-0.0570*	-0.0049	-0.136	0.0029	3.104
Constant	2.933	2.14	1.52	7.216**	-5.041	-0.789	2.413	49.44***	-7.546*	-330
Observations	30	176	72	124	25	30	174	72	123	42
R-squared	0.824	0.317	0.816	0.674	0.908	0.834	0.237	0.437	0.273	0.158

5 Monetary policy challenges and regulation

5.1 Strict regulation of traditional banking gives rise to the shadow banking system

Strict regulation of traditional banking gives rise to the shadow banking system. The rapid growth of shadow banking in China was driven largely by the credit tightening policies introduced in 2010 and by China's unique banking regulation system. In the second quarter of 2010, Chinese monetary authorities began to implement a more prudent monetary policy, introduced macro-prudential policies characterized by capital constraints to strengthen regulation, and applied specific credit regulations to sectors with excess capacity (e.g., real estate). To circumvent regulations and meet financing needs in certain sectors, shadow banking activities rose sharply, posing threats to financial stability.

Conversely, shadow banking undermines the effect of monetary policy. The effectiveness of some regulatory policies and tools has been compromised or partially offset by the shadow banking system. For example, the Chinese government set credit restrictions—such as restrictions on loans from traditional banks and the equity ratio of developers—on the real estate sector to prevent housing bubbles, but shadow banking provides an alternative source of funding. A similar case holds for enterprises with excess capacity. Furthermore, capital adequacy requirements for banks have become less effective, as shadow banking activities have enabled banks to move some assets off-balance sheet, such as the above-mentioned entrusted and trust loans through bank-trust cooperation.

5.2 Risks stemming from the shadow banking system

The shadow banking system poses the following risks. First, it raises risk exposures. The debt liability of SOEs increases significantly, as illustrated by the rising corporate debt-to-GDP ratio; the total exposure to real estate sector increases, including direct investment exposure and exposure through collateral; and the risk exposure of local governments also increases due to LGFVs, which are an important source of credit.

Second, an unreliable supply of funds increases financial risk. Maturity mismatching and rollover risk are critical issues in the Chinese shadow banking system. Most funding from shadow banking is short term and must be rolled over constantly. Moreover, the capital structure in the shadow system exaggerates the issue. Long-term capital is sparse. Debt financing comprises the majority, while the amount of equity is small.

Third, the shadow banking system may induce large-scale loan defaults. Despite the lack of any explicit guarantee, Chinese investors typically expect banks or the government to cover any losses. Once this trust is shaken, investors may panic, causing a run on the shadow banking sector and also triggering systemic risks.

Fourth, the shadow banking system increases systemic risks. There are no real off-balance-sheet liabilities for banks. Compared with traditional banks, the shadow banking system is less transparent and less regulated, but carries a high liquidity risk. Shadow banking threatens the stability of the whole financial system.

5.3 Recent regulation of Chinese shadow banking

Financial regulators in China have been monitoring the evolution of shadow banking closely since 2009 or earlier. Appendix B provides a list of shadow banking related regulations that have been announced or implemented by the PBC, CBIRC, CBRC, CSRC, CIRC, and SAFE. The main regulator of Chinese shadow banking is CBIRC (also CBRC), which coincides with the reality that Chinese shadow banking centers on banks rather than on traditional shadow banking, which channels funds through other types of financial institution.

Financial regulators in China have reacted in a timely manner to new forms of shadow banking. In the early stage of Chinese shadow banking, banks-trust cooperation acted as the dominant channel of shadow banking fund flows. The CBRC quickly set restrictions on off-balance sheet assets formed by bank-trust cooperative wealth management business, capped the balance of bank-trust cooperative financing at 30% of total bank-trust cooperation business, and required banks to move off-balance sheet assets formed by bank-trust cooperative wealth management products back onto their balance sheets by the end of 2011.

Cash flows both into and out of banks' shadows have been closely monitored by regulators. New regulations and guidance have been released every year on WMPs, the main funding source. For example, in 2013, the CBRC set limits on WMPs that invest in non-standard credit, including entrusted loans, trust loans, bankers' acceptances, accounts receivables and beneficiaries. In addition, interbank refinancing, a main channel of shadow banking funding that emerged after the 2011 bank-trust restriction, has been tracked and strictly regulated. For example, in 2014, the PBC, CBRC, CSRC, CIRC and SAFE jointly issued a notice on regulating the interbank business, which covered interbank lending, interbank deposit, interbank borrowing, interbank agent payment, repo and reverse repo. In 2017, the CBRC included negotiable certificates of deposit (NCDs) as part of interbank lending and borrowing, and required banks to ensure that interbank liabilities restrictions continued to be observed. Specifically, interbank liabilities must not exceed one-third of total liabilities, and the total interbank lending balance (including NCDs) must not exceed 50% of banks' Tier 1 capital.

China has tightened its financial regulations since 2017. First, the MPA has been set up, and all off-balance sheet products, such as trust and entrusted loans, must be included within it. Second, restrictions on the scale of WMPs have been imposed. Banks are prohibited from providing principal or interest guarantees on WMPs and must set up separate accounts for each product. Third, the central government has prohibited local governments from continuously expanding their debt. Fourth, within the background of supply-side structural reform, funding support to enterprises with excess capacity and real estate companies is still restricted, with the restrictions now expanding from loans to other financial products. These regulations have slowed the growth of the shadow banking sector.

The financial policy mix of Chinese government in recent years has achieved the dual goals of defusing financial risk and maintaining strong financial support for the real economy. The new financial regulations on shadow banking, including the so-called New Regulations on Asset Management Businesses, are intended mainly to

mitigate the excessive financial risk posed by shadow banking activities. The defusing of this risk will ultimately be conducive to the long-term stable growth of the Chinese economy. In a notably short time frame, the strengthened financial regulations have put a strong brake on China's shadow banking system. Since 2017, due to much a lower growth rate in banks' shadow activities, and even a negative growth rate at times, the year-on-year growth rate of M2 and Aggregate Financing to the Real Economy (AFRE) has also slowed significantly. For example, the M2 and AFRE growth rates have decreased from 11.3% and 12.8% at end-2016 to 8.1% and 9.8% at end-2018 respectively. This represents the necessary but short-term pain.

In parallel, Chinese financial authorities have striven to maintain financial support to the real economy in the form of RMB loans and bond issuance. Loan growth since 2017 has been kept at around 13%, which is substantially higher than the GDP and the CPI growth rates combined. The growth rate for bonds outstanding actually rebounded in 2018, from 2.5% at end-2017 to 9.2% at end-2018. In addition, the PBC rolled out several new policy tools to increasing funding support to the agricultural sector, SMEs, and the private sector, such as the Targeted Reduction of Reserve Requirement (TRRR), Targeted Medium-term Lending Facility (TMLF), and other structural monetary policy initiatives. The overall monetary and financial condition for the real economy has been conducive to stable growth.

5.4 Suggestions for accounting regulation

Monetary authorities should implement different regulations for commercial banks and non-bank financial institutions. That is, they should implement "asset reserve" requirements for banks and "risk reserve" requirements for non-bank financial institutions. Different from the "deposit reserve" requirement, the asset reserve requirement is based on the risk characteristics of different bank assets. Banks are required to place deposits with the central bank in specified amounts. Based on the premise of standardized bank accounting, assets with different risk characteristics are listed under different asset entities. Asset reserves can curb not only asset risk, but also and more importantly money creation from the source (assets rather than liabilities), which can improve the efficiency of policy transmission. Different from banks, the operating mechanism of non-bank financial institutions is not loans generating deposits, but absorbing deposits and granting loans, similar to the banking business mode in the real money system. Therefore, referring to reserve requirements, the risk reserve requirement requires non-bank financial institutions to retain part of the deposits they absorb to cope with liquidity risk. The remaining deposits may be used to grant loans or for investment activities, such as buying bonds. Although the credit creation of non-bank financial institutions does not change the balance sheets of banking and monetary authorities, it affects the social balance sheet. Furthermore, the process of credit creation can lead to changes in the assets and liabilities of non-bank financial institutions, residents, and enterprises. The risk reserve requirement can bind the credit creation of traditional shadow banking to the balance sheet of monetary authorities and effectively restrain the credit creation of non-bank financial institutions. Equipped with the preceding two kinds of institutional arrangements, a generalized macro-prudential regulation framework can be erected. Combining this framework with other policies,

such as micro-prudential regulations, would form a comprehensive law and regulation system for shadow banking supervision.

6 Conclusion

This paper's in-depth analysis of China's shadow banking system highlights the critical role of banks' shadow in creating credit money and hiding the credit risk incurred by banks. The challenges posed to monetary policy regulation and financial risk management are also assessed. **First**, the paper clarifies the definition of shadow banking in China and decomposes it into banks' shadow and traditional shadow banking, analyzing the money creation mechanisms of shadow banking channels (interbank and investment channels) in detail. From the perspective of credit money creation, it also clarifies some misunderstandings about WMPs and their role in Chinese shadow banking. **Second**, this paper quantifies the scale of shadow banking in China (both banks' shadow and traditional shadow banking) using the deduction approach, comparing this with the aggregation approach commonly used in the literature and showing that the deduction approach can avoid miscalculation issues such as double-counting and overestimation. **Third**, this paper investigates the relationship between shadow banking credit and financial risk at both the macro and micro levels. Chinese shadow banking funds are used mainly for local government funding vehicles, enterprises with excess capacity, and real estate developers. Banks' shadow is closely related to the money creation indicator M2, while traditional shadow banking is less relevant, reducing the accuracy of M2 as a policy measure. At the micro level, this paper uses the balance sheet information of 311 banks (including listed and non-listed banks) over the past decade, finding that, although banks' shadow drives up banks' credit risk, banks have not adequately assessed that risk or taken the appropriate countermeasures. **Finally**, this paper discusses the monetary policy challenges posed by Chinese shadow banking and surveys the recent trend to tighten regulation. Regulators are urged to closely track the evolution of various shadow banking channels, both on- and off-balance sheet. To strengthen supervision, separate macro-prudential regulation tools are needed for banks' shadow and traditional shadow banking. In the future, the key to regulating China's shadow banking system will be to strengthen the regulatory mechanism centered on banks. Both banks' shadow and traditional shadow banking are intricately linked with the banking system, and they draw on banks as the main funding source. The regulatory authorities should seek to enhance their macro-prudential management of the banking system to preempt future excessive growth of financial risks.

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Appendix 1: Deduction method for measuring shadow banking

Consider all banks on a consolidated balance sheet. Assets can be divided into two parts: 1) non-shadow or traditional assets, such as loans (L), foreign exchanges (FE), and corporate bond investments (EB), and 2) shadow assets (SB), as shown in Appendix Table 1.

Appendix Table 1: Money Creation of Banks

Commercial Bank		
ASSETS	LIABILITIES	
Loans (L)	Deposits of residents and companies ($D_R + D_C$)	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px; text-align: center;"> Taxes payment, bonds purchase Insurance premium, monetary fund, securities margin Profit, stock </div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">Cash withdrawal</div> <div style="margin-bottom: 10px;">Cash in circulation (C)</div> <div>Off-balance sheet WMPs (FM)</div> </div> </div>
Foreign exchange (FE)	Deposits of government (D_G)	
Investment in corporate bonds (EB)	Deposits of other non-bank financial institutions (D_{NB})	
Shadow assets of bank (SB)	Capital (K)	

Assuming that both parts create liabilities as deposit D , I have the following:

$$NSB + SB = L + FE + EB + SB + D \quad (1)$$

Deposit D includes mainly the deposits of residents (D_R) and non-financial companies (D_C), cash in circulation (C), fiscal deposits (D_G), the deposits of other non-bank financial institutions (D_{NB}), and bank capital (K). First, cash in circulation (C) is the total circulation of the central bank-created cash deducted based on the cash held by banks. People hold cash for transaction purposes, which transfers part of the deposit money into cash money. As it is initially generated by the expansion of bank assets, this part of the deposits held by non-bank departments should be added to the right-hand side of equation (1).

Second, D_G denotes the fiscal deposits that come from the deposits of residents and enterprises through tax payments and bond purchases. D_G includes the fiscal deposits of banks (D_{GB}) and the central bank (D_{GC}). However, it must be deducted based on fiscal deposit increments that correspond to the treasury bond holdings of banks (TB_B) and the central bank (TB_C). Banks' government bond purchases do not belong to shadow banking, and the fiscal deposit this creates should not be reflected in D . Another component that should not be reflected in D is the treasury bond holdings of the central bank, as the central bank can only buy treasury bonds from a secondary market with main counterparties as banks; this part of the treasury bonds is purchased and held by banks but does not belong to shadow banking. Third, some resident deposits such as residents' investments in money market mutual funds, insurance fee payments, and securities margin raises deposited in the bank by fund companies, insurance companies, and securities companies are transferred to be deposits of other non-bank financial institutions (D_{NB}) and must be added back to D . Note that interbank deposits (D_B) are

not part of this, as they do not lead to increments in corporate deposits, whereas traditional loans, foreign exchange business, and the interbank channels discussed previously increase corporate deposits.

Fourth, the capital account K of the bank balance sheet comes from deposits, whereas K includes share capital, capital reserves, surplus reserves, and undistributed profits. As shown in **Appendix Table 2**, when bank Y issues stocks, the deposits of stock buyer B decrease and the share capital or capital reserves under the capital account increase by the same amount. Surplus reserves and undistributed profits come mainly from interest income, whereas undistributed profits are converted from deposits by corporation B. For example, the deposits of enterprise B on the liability side decrease by RMB 120, of which RMB 100 is used to repay the principal. This leads to an equal amount of reduction in loans of enterprise B. The remaining RMB 20 is used to pay interest, leading to an increase of RMB 20 in bank profits. The following table illustrates the accounting practice of this example.

Appendix Table 2: Credit money creation of banks' asset formation

Commercial Bank X			
Loan generates deposit			
Loans of Corporation B	+100	→	Deposit of Corporation B +100
Reserve	-20	← Corporation B moves 20 deposit from Bank X to Bank Y →	-20
Commercial Bank Y			
Reserve	+20	← Corporation B moves 20 deposit from Bank X to Bank Y →	Deposit of Corporation B +20
			-20
		Corporation B buys stock of Bank Y	↑
		Equity (Capital reserves)	+20

In summary, the right-hand side of equation (1) is expressed as follows:

$$D = D_R + D_C + C + D_G + D_{NB} + K \quad (2)$$

Importantly, although banks' off-balance-sheet WMPs (FM) are not part of our definition of shadow banking (with the credit creation function), they must be added back to banks' balance sheets for debtors' liabilities to measure the scale of shadow banking. As demonstrated in Table 4 on the asset side of banks' balance sheet, whereas the deposit $D2$ for buying off-balance-sheet WMPs is moved off-balance sheet, the loans of resident $R2$ that created the deposit still stay on-balance sheet, preventing it from being matched within the on-balance-sheet liability D . In this case, the scale of shadow banking is underestimated if the deduction method is adopted by subtracting non-shadow assets from liability D due to an over-deduction of $R2$. Therefore, the off-balance-sheet WMPs should return to the balance sheet to reflect the corresponding traditional banking business (e.g., granting loans to $R2$ and subsequently creating deposit $D2$) on both banks' asset-side D and liability-side non-shadow assets. In this way, the measurement of shadow banking is accurate. Substituting equation (2) into

equation (1) and accounting for off-balance-sheet WMPs,¹⁸ the scale of banks' shadow¹⁹ is expressed as follows:

$$\begin{aligned} SB &= (D_R + D_C + C + D_{NB}) + D_G + K + FM - (L + FE + EB) \\ &= M_2 + (D_{GB} + D_{GC} - TB_B - TB_C) + K + FM - (L + FE + EB) \end{aligned} \quad (3)$$

For measurement purposes, the money supply is $M_2 \approx D_R + D_C + C + D_{NB}$ and the net deposit of the government is $D_G = (D_{GB} + D_{GC} - TB_B - TB_C)$, where D_{GB} and D_{GC} are the fiscal deposit balance of banks and the central bank, respectively, and TB_B and TB_C are the treasury bond holdings of banks and the central bank, respectively. To convert foreign exchange (FE) back to local currency, the exchange rate of foreign exchange purchase (e_{t-p}) is adopted, rather than the spot exchange rate (e_t). As the left-hand side of equation (1) is actually the bank deposit, the equation holds only when FE on the right-hand side is in increments of RMB deposits that correspond to foreign exchange.

¹⁸ Currently, no public data reflect banks' WMP classifications. According to the 2013 Annual Report on China's Banking Wealth Management Market, off-balance sheet WMPs (with floating interest payments, but principals not guaranteed) accounted for 63.80% of the entire wealth management market until December 31, 2013. Given this statistic, I roughly estimate off-balance sheet WMPs as 60% of the total scale of WMPs.

¹⁹ The data sources include the PBC, the CBRC, China Central Depository & Clearing Co., Ltd., and the China Wealth Website.

Appendix 2: China's bank's shadow (2005Q4-2019Q1)
(Unit: Trillion RMB)

Date	M2	D_G	K	FM	(L+FE+EB)	Bank's Shadow
2005-12	30.07	-1.21	1.06		25.70	4.22
2006-03	31.24	-1.02	1.09		27.39	3.91
2006-06	32.65	-0.80	1.20		28.79	4.26
2006-09	33.57	-0.65	1.22		29.84	4.30
2006-12	35.08	-1.13	1.31		31.02	4.24
2007-03	37.21	-0.87	1.57	0.34	33.47	4.79
2007-06	39.09	-0.48	1.61	0.34	35.50	5.05
2007-09	40.77	-0.98	1.64	0.34	37.16	4.61
2007-12	41.75	-2.22	1.84	0.34	37.82	3.89
2008-03	43.62	-1.70	1.85	1.08	40.37	4.49
2008-06	45.92	-1.25	1.87	1.08	42.20	5.42
2008-09	46.16	-1.26	1.89	1.08	44.14	3.74
2008-12	48.40	-2.30	2.18	1.08	45.53	3.83
2009-03	54.13	-2.45	2.18	1.08	50.53	4.42
2009-06	58.30	-1.97	2.20	1.08	54.00	5.61
2009-09	59.96	-1.83	2.25	1.08	56.07	5.38
2009-12	62.53	-2.48	2.31	1.08	57.95	5.51
2010-03	66.72	-2.21	2.33	1.79	61.30	7.33
2010-06	68.81	-1.70	2.38	1.79	63.98	7.30
2010-09	70.71	-1.70	2.52	1.79	66.36	6.95
2010-12	73.88	-2.72	2.65	1.79	70.14	5.45
2011-03	76.99	-2.29	2.68	2.93	72.93	7.38
2011-06	79.01	-1.91	2.73	2.93	75.77	6.99
2011-09	79.47	-1.89	2.78	2.93	78.13	5.15
2011-12	85.16	-3.16	2.86	2.93	80.01	7.79
2012-03	89.56	-3.12	2.90	3.83	82.91	10.26
2012-06	92.50	-2.89	2.96	3.83	85.79	10.61
2012-09	94.37	-3.00	3.01	4.29	87.83	10.84
2012-12	97.41	-3.93	3.07	4.53	89.52	11.56
2013-03	103.59	-3.86	3.06	5.23	93.49	14.53
2013-06	105.44	-3.25	3.10	5.79	95.94	15.14
2013-09	107.74	-2.93	3.17	6.33	98.56	15.74
2013-12	110.65	-3.97	3.25	6.51	101.22	15.24
2014-03	116.07	-3.84	3.29	7.64	105.03	18.12
2014-06	120.96	-3.46	3.34	8.50	108.03	21.31
2014-09	120.21	-3.21	3.39	9.83	109.96	20.25
2014-12	122.84	-3.99	3.64	10.09	112.03	20.55
2015-03	127.53	-4.09	3.77	11.90	116.11	23.01
2015-06	133.34	-3.63	3.89	13.74	118.99	28.34
2015-09	135.98	-3.70	4.07	15.93	121.15	31.14
2015-12	139.23	-4.56	4.30	17.43	121.88	34.52
2016-03	144.62	-4.33	4.40	18.81	125.23	38.28
2016-06	149.05	-3.86	4.43	20.18	127.70	42.10
2016-09	151.64	-4.32	4.53	22.78	129.34	45.29
2016-12	155.01	-5.32	4.69	23.11	130.74	46.75
2017-03	160.79	-5.42	4.76	22.22	134.13	48.21
2017-06	163.95	-5.08	4.82	21.63	137.59	47.73
2017-09	166.37	-4.98	4.93	22.36	140.60	48.09
2017-12	169.02	-5.66	5.18	22.17	142.87	47.85

Date	<i>M2</i>	<i>D_G</i>	<i>K</i>	<i>FM</i>	<i>(L+FE+EB)</i>	<i>Bank's Shadow</i>
2018-03	173.99	-5.55	5.19	22.80	147.83	48.60
2018-06	177.02	-5.25	5.28	21.00	152.20	45.85
2018-09	180.17	-4.86	5.34	22.18	156.17	46.64
2018-12	182.67	-6.41	5.42	22.04	159.18	44.54
2019-03	188.94	-6.18	5.48	22.04	165.26	45.02

Data Sources: The PBC, CBRC, CBIRC, China Bond, Shanghai Clearing House, Wind database

Notes: 1. ***M2*** values before Oct. 2011 are adjusted by adding deposits of non-depository financial institutions in commercial banks, consistent with the statistics coverage modification of ***M2*** in October 2011 by the PBC.

2. Without high-frequency data for banks' off-balance-sheet WMPs, ***FM*** values are calculated by multiplying the total WMPs scale with the ratio of off-balance-sheet WMPs. Data sources include the CBRC or the CBIRC (*Annual Report on China's Banking Wealth Management Market*) and Wind database. I interpolate irregular total WMPs scale data to monthly frequency (from 2007 to 2013) by repeating the next non-missing value. For the ratio of off-balance-sheet WMPs, I refer to that of WMPs with floating interest and unguaranteed principle. According to official releases, off-balance-sheet WMPs accounts for 63.80% of all WMPs at the end of 2013, and it becomes 67.17%, 74.17%, 76.79%, 79.56% respectively at the end of 2014, 2015, 2016-06 and 2016-12. The ratio starts to decline afterward, becomes 76.22%、75.05%、74.54% in 2017-06, 2017-12 and 2018. For missing values in 2018-03 and 2018-09, FM is filled with the average value of last and next observations. The missing value in 2019-03 is set equal to 2018-12.

Appendix 3: China's traditional shadow banking (2010Q4-2018Q4)

(Unit: Trillion RMB)

Date	Financial Companies' Claims on Non-Financial Companies and Households	Balance of Finance Lease Contract	Balance of Microfinance Company Loans	Balance of Trust Assets (Excl. Bank-Trust Cooperation Mode)	Traditional Shadow Banking
2010-12	0.76	0.70	0.20	1.38	3.04
2011-03	0.75	0.80	0.24	1.74	3.53
2011-06	0.78	0.80	0.29	2.13	4.00
2011-09	0.82	0.93	0.34	2.42	4.51
2011-12	0.87	0.93	0.39	3.14	5.33
2012-03	0.87	1.28	0.44	3.51	6.10
2012-06	0.91	1.28	0.49	3.77	6.45
2012-09	0.92	1.55	0.53	4.48	7.49
2012-12	1.00	1.55	0.59	5.44	8.58
2013-03	1.01	1.65	0.64	6.62	9.92
2013-06	1.05	1.90	0.70	7.37	11.02
2013-09	1.11	1.90	0.75	7.96	11.73
2013-12	1.16	2.10	0.82	8.72	12.80
2014-03	1.20	2.35	0.84	9.26	13.65
2014-06	1.25	2.60	0.88	9.81	14.54
2014-09	1.27	2.90	0.91	10.05	15.12
2014-12	1.36	3.20	0.94	10.88	16.38
2015-03	1.37	3.42	0.95	11.37	17.10
2015-06	1.43	3.66	0.96	12.08	18.13
2015-09	1.48	3.98	0.95	11.82	18.23
2015-12	1.61	4.44	0.94	12.24	19.23
2016-03	1.71	4.52	0.94	12.45	19.63
2016-06	1.83	4.68	0.94	12.90	20.35
2016-09	1.88	4.95	0.93	13.74	21.50
2016-12	2.00	5.33	0.93	15.47	23.72
2017-03	2.09	5.54	0.94	17.09	25.66
2017-06	2.24	5.60	0.96	17.98	26.77
2017-09	2.32	5.75	0.97	18.97	28.01
2017-12	2.44	6.06	0.98	20.08	29.56
2018-03	2.57	6.30	0.96	19.64	29.48
2018-06	2.65	6.35	0.98	18.60	28.57
2018-09	2.72	6.65	0.97	17.78	28.12
2018-12	2.88	6.65	0.96	17.45	27.93

Data Sources: The PBC, China Leasing Union, China Trustee Association

Appendix 4: List of regulations upon Chinese shadow banking

Date	Content	Regulator	Targets
Dec. 2009	Prohibiting the "investment funded by bank-trust cooperative financial products in credit assets or commercial papers issued by the issuing banks". Trust companies are forbidden to transform their function of asset management to the transferee or banks issued wealth management products, in the business of bank credit assets, bills, and trust loans.	CBRC	Banks-Trust
Aug. 2010	The CBRC instructs banks to move off-balance sheet assets formed by bank-trust cooperative wealth management business back onto the balance sheet and to hold a provision coverage ratio of 150%. The CBRC also caps the balance of financing-related bank-trust cooperative wealth management products at 30% of total bank-trust cooperation business.	CBRC	Banks-Trust
Jan. 2011	Trust companies' financing-related bank-trust cooperative wealth management products outstanding is required to be reduced by 25% quarterly. Banks are also required to move off-balance sheet assets formed by bank-trust cooperative wealth management products back onto the balance sheet by the end of 2011.	CBRC	Banks-Trust
June 2011	The CBRC curbs bill-related reverse repo business and suspends unregulated bill-related business.	CBRC	Reverse repo, Bills
Sep. 2011	Commercial banks are required to improve their disclosure of information on WMPs and strengthen their management operations.	CBRC	WMPs
Aug. 2012	The CBRC orders banks to move interbank refinancing business onto the balance sheet and a further check on the authenticity of trade deals to rectify interbank refinancing based on fake trades.	CBRC	Interbank Business
March 2013	The CBRC sets limits on WMPs used to fund non-standard credit i.e. trust loans, bankers' acceptances, entrusted loans, accounts receivables and beneficiaries, the lower of 4% of total assets and 35% of total WMPs.	CBRC	WMPs
Apr. 2014	The CBRC strengthens the supervision of trust companies and bans non-standard capital pool operations that involve covering the pay-outs of maturing WMPs with the proceeds of new WMP sales.	CBRC	Trust
May 2014	The PBC, CBRC, CSRC, CIRC and SAFE jointly issue notice on regulating the interbank business of financial institutions to further regulate the interbank transactions. The notice defined and regulated the interbank financing business, i.e. interbank lending, interbank deposit, interbank borrowing, interbank agent payment, repo and reverse repo.	PBC, CBRC, CSRS, CIRC, SAFE	Interbank Business
Dec. 2014	The CBRC announces a draft plan to encourage banks to invest funds raised through WMPs directly, rather than engaging the services of trust and security companies in order to reduce risky lending in the shadow banking market. Among other things, banks are to be encouraged to set up their own investment accounts for funds raised from WMPs. The funds are allowed to invest in preferred stock and ABS, but banned from investing in stocks traded in the secondary market or related funds.	CBRC	WMPs
Jan. 2015	The CBRC releases a proposal to tighten regulation on entrusted loans, prohibiting such funds from investing in financial assets such as WMPs, bonds, equity, futures and derivatives.	CBRC	Entrusted loan
Apr. 2015	The CSRC bans securities firms from using "umbrella trusts" (considered high-leverage) for margin trading in the stock market, as well as over-the-counter stock financing.	CSRC	Trust

Date	Content	Regulator	Targets
March 2016	The CBRC issues a directive to strengthen risk management practices of trust companies, including by lowering the leverage of structured products, forbidding non-standard debt pools, increasing provision coverage. For structured-financing products, the guidance placed a clear line of 1:1 for leverage ratio, the maximum is 2:1. Real estate, LGFV (local government funding vehicle) and over-capacity industries were regarded as a key area to control risk.	CBRC	Trust
Apr. 2016	The CBRC issues a notice on regulating banking institutions' transferring beneficiary right of credit assets. Hiding non-performing assets by transferring beneficiary right will be prohibited; banking institutions should not undertake explicit/implicit reverse purchasing liabilities; the beneficiary right of non-performing assets cannot be transferred to individual investors.	CBRC	Banks
May 2016	The CIRC issues a notice on the Clean-up of Channel Business for Insurance Asset Management Companies. Channel business for insurance asset management companies will be prohibited. Self-check and clean-up will be finished by 31 July.	CIRC	Insurance AMC
June 2016	The CIRC issues a circular on the Strengthening of Portfolio Products Issued by Insurance Asset Management Companies. The insurance AMCs will be prohibited from issuing assets pooled products and nested product; setting sub-account; transferring the products to trustees in the form of external investment advisers. The new rules also set limits on leverage for structured products issued by insurance AMCs	CIRC	Insurance AMC
July 2016	The CBRC releases a draft for comments to further supervise WMPs fund flow. The SPVs of WMPs must not invest in non-standard debt issued by trusts unless permitted by CBRC; WMPs' investment to equity market will also be strictly restricted.	CBRC	WMPs
July 2016	The CSRC sets up interim Provisions on the Regulation of the Private Asset Management Business of Securities and Futures companies. Restricting channel business, reducing leverage, prohibiting yield commitment will lead to the end of rapid expansion of the asset management business of security companies.	CSRC	Securities and Future companies
Oct. 2016	The State Council formally issues detailed measures (initially drafted in April 2016) on regulating the e-finance industry, including P2P lending, crowd-funding, third-party payment transactions. Limits are imposed on property developers and agents from engaging in property-related finance business through these platforms. Issuance of property down-payment loans is strictly prohibited for these institutions.	The State Council	E-finance
Nov. 2016	The CBRC publishes a consultation paper, with the aim of tightening regulations for commercial banks' off-balance-sheet activities.	CBRC	Off-balance sheet financing
Jan. 2017	From Q1 2017 onwards, the PBC will include off-balance-sheet WMPs in the calculation of "broad credit", which is an indicator the PBC use to evaluate the credit exposure of individual banks under its MPA framework.	PBC	WMPs
March 2017	A document issued by the CBRC was circulated to banks, to clean up irregularities in the sector and intensify the crackdown on financial speculation that exploits systemic loopholes. The guidelines ordered banks to "self-inspections" or "top-down inspection" into financial arbitrage activities.	CBRC	Banks
March 2017	The CBRC has circulated a notice to govern the banking activities in violation of law, regulations and rules. The regulator required banks' self-examinations and top-down inspection of violations and potential risks by 12 June.	CBRC	Banks

Date	Content	Regulator	Targets
Apr. 2017	The CBRC issued a guideline on reducing systemic financial risks. The document identified 10 major risks facing the banking system with an emphasis on credit risk, liquidity risk, risk of bond market volatility, risk of property market crash, local government bond default risk, risk of cross-selling of financial products and risk of WMPs, etc. Lenders are required to step up risk control efforts.	CBRC	Banks
Apr. 2017	The CBRC circulated a notice to crack down on improper banking practices in innovation, transactions, incentives, charges/fees. The regulator ordered banks' self-examinations on issues including mechanism, rules, procedures, personnel, businesses by 15 July.	CBRC	Banks
Apr. 2017	The CBRC issued a notice to lenders requiring banks to report the amount of negotiable certificates of deposit (NCDs) as part of interbank lending and borrowing; requiring banks to ensure the ratios still hold when NCDs are included in outstanding interbank lending and borrowing. The CBRC will check on whether interbank liabilities have exceeded one-third of total liabilities by including NCDs into the calculation of interbank liabilities balance, and whether total interbank lending balance (including NCDs) has reached over 50% of banks' tier-1 capital.	CBRC	NCD
May 2017	The CBRC instructed trust companies to rein in funding to real estate sector, intensifying a campaign to curb risks in both the property market and the shadow-finance industry. Trusts are one of the few financing channels that are still viable for property firms, and the CBRC's requirements may further restrict this channel.	CBRC	Trust
Aug. 2017	The PBC said that it would start to include NCDs (tenors within one-year, issued by banks with assets of more than CNY500bn) in its quarterly MPA from Q1 2018.	PBC	NCD
Aug. 2017	The CBRC tightened trust industry oversight, including opening only one trust beneficial account for each trust product, and clarifying the liabilities and rights of all participating parties to better protect investors.	CBRC	Trust
Nov. 2017	The PBC and other regulators jointly unveiled a proposal to tighten supervision of asset-management products (draft). Financial institutions should offer yields based on the net asset value of the products they issue, to reflect the risks and return of the underlying assets, instead of offering a guaranteed principal repayment or rate of return. The draft rules set a grace period until June 2019.	PBC, CBRC, CSRS, CIRC, SAFE	Asset management products
Dec. 2017	CBRC issued a notice on regulating bank-trust operations, in order to further standardize bank-trust cooperation and better control financing chain and regulatory arbitrage. It also bans trust fund from investing in real estate sector, stock market and other restricted industries.	CBRC	Banks-Trust
Jan. 2018	The CBRC released strict supervision on entrusted loans in commercial banks. The new rules include strengthening risk management, supervision, and disclosures on the source and intended use of the fund. The CBRC forbids the use of entrusted loans for investment.	CBRC	Entrusted loan
Jan. 2018	CIRC revised rules to tighten regulation over the use of insurance funds, effective on 1 April, in order to better serve the real economy. Firms commissioned to manage insurance funds should not reassign the funds, and measures to reduce leverage should be strengthened. Overseas investment of insurance funds must follow the rules of the CIRC.	CIRC	Insurance companies

Date	Content	Regulator	Targets
Apr. 2018	PBC and other three regulators jointly unveiled new rules on regulating the asset management businesses of financial institutions, unifying regulatory standards for the fast-growing asset management industry. The new rules cover strict standards for investment in non-standard assets, standards of asset management product leverage, rules on removal of multi-tier nesting, restrictions on conduit operations, as well as strict controls on implicit guarantees. The transition period for the new regulations has been extended to the end of 2020.	PBC, CBIRC, CSRS, SAFE	Asset management products
July 2018	PBC and other regulators issued additional clarification on New Regulation on Asset Management Businesses, to further clarify policy stance for financial market entities.	PBC, CBIRC, CSRS	Asset management products

Note: The CBIRC was created via the merger of the China Banking Regulatory Commission (CBRC) and the China Insurance Regulatory Commission (CIRC) in early 2018, announced by the State Council in March 2018.

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