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China's Financial System and Economy: A Review

Zhiguo He^{1,2} and Wei Wei³

¹Booth School of Business, University of Chicago, Chicago, Illinois, USA;
email: zhiguo.he@chicagobooth.edu

²National Bureau of Economic Research, Cambridge, Massachusetts, USA

³Becker Friedman Institute, University of Chicago, Chicago, Illinois, USA;
email: weiw20@uchicago.edu



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Keywords

economic reform, development, financial markets, implicit guarantee, fintech

Abstract

China's financial system has been integral to its spectacular economic growth over the past 40 years. We review the recent literature on China's financial system and its connections to the Chinese economy based on the categories of Aggregate Financing to the Real Economy (AFRE), a broad measure of the nation's yearly flow of liquidity accounting for unique features of China's financial system. While early work on China's financial system emphasizes the state-owned enterprise reform, the recent literature explores other more market-based financing channels—including shadow banking—that grew rapidly after 2010 and have become important components of AFRE. These new financing channels not only are intertwined with each other, but also, and more importantly, are often ultimately tied back to the dominant banking sector in China. Understanding the mechanisms behind these channels and their intrinsic connections is crucial to alleviate capital allocation distortion and mitigate potential systemic financial risk in China.

1. INTRODUCTION

China's financial system, including its various markets and financial intermediaries, has been essential to China's spectacular economic growth over the past four decades (Song et al. 2011), and it will likely become even more important for mobilizing capital across society in the next stage of China's economic development. To oversimplify, China's financial system—built around a colossal banking sector, an attention-grabbing stock market, a fast-growing bond market, and an increasingly complex and multifaceted shadow banking sector—is large yet underdeveloped. However, as Allen et al. (2005, 2019b) emphasize, interesting and deep heterogeneities underpin China's financial markets; thoroughly understanding its development has important implications for the broader literatures on law, institutions, finance, and growth.

By reviewing recent academic articles on China's financial system, this article aims to provide a comprehensive survey that explores its connections to China's impressive growth. Most papers reviewed here were published in leading academic journals, though some still circulate as working papers; most are up-to-date.¹ We aim to summarize intellectual reflections on recent developments in China's financial system, which in the past two decades has undergone, and is still undergoing, dramatic and structural changes.

Unlike many excellent review articles on similar topics (Allen et al. 2017, 2019a; Song & Xiong 2018), we organize this article around the concept of Aggregate Financing to the Real Economy (AFRE) [社会融资规模]. By accounting for unique features of China's financial system, AFRE is a broad measure of the nation's yearly flow of liquidity, described by officials as “indicating total funds the real economy obtained from the financial system over a certain period of time” (Elliott & Yan 2013, p. 9). Including bank credits, equity and bond issuances, and various shadow banking items like trust loans, AFRE is perhaps the most closely monitored and analyzed statistic released by China's central bank for macroeconomic management today. Although few academic works have studied this concept in the Western academic community (as it does not directly compare to other countries' reported figures), following the AFRE is natural when organizing the existing literature on China's financial system.

Section 2 provides a detailed explanation of AFRE's composition, highlighting the motivation behind the Chinese central bank's move to introduce AFRE: Given rapid developments in China's financial system over the past two decades, especially since the 2009 stimulus program/plan, traditional credit measures like bank loans increasingly fail to reflect the extent of financing to the real economy. This point is a recurring theme of this review.

In Section 3, we cover the stock market. Although cumulative equity issuance only accounted for 3% of AFRE by 2022,² the stock market's development, that is, the launch of exchanges in both Shanghai and Shenzhen in the early 1990s, marked a milestone event in the history of state-owned enterprise (SOE) reform. During that period, many Chinese SOEs conducted share issuance privatizations. We emphasize that China's privatization program during the 1990s, essentially a step toward broader SOE reforms, differs fundamentally from Western-style privatizations; Beijing, never using the terms “privatization” or “partial privatization,” introduced private investors to SOEs but never intended to transfer state control. More directly, ultimate privatization was never the goal of SOE reform, even for the significant 2005–2007 stock-split share reform, which converted all nontradable shares to tradable shares.

¹Among all papers reviewed here, 88% were written after 2005 and 67% after 2015.

²This is partly due to the accounting method of AFRE, which excludes capital gains. We discuss this point in Sections 2 and 3.

Beijing hoped these reform efforts could subject SOEs to market discipline, as in a well-functioning financial market share prices reflect information on managerial decisions and firm performance. As we review in Section 3.1, the empirical evidence is mixed, which is largely expected given the nature of the share issuance privatization program, in addition to China's underdeveloped legal and regulatory environment, typified by frequent regulatory interventions on IPO approvals (Section 3.2), and poor corporate governance practices (Section 3.3). Finally, we cover other channels whereby China's stock market supports its real economy, including the market feedback effect, stock market–banking system interactions (e.g., share pledging), and the opening-up of China's capital markets.

Section 4, which starts with a brief overview of Chinese banking reform history, reviews the literature on the banking and shadow banking sectors in China; these two AFRE categories together accounted for about 67% of AFRE by 2022. We combine these two lines of literature because shadow banking in China, unlike in other developed countries, can always be traced back to the country's mammoth banking system; as Amstad & He (2019, p. 126) observe, "Chinese shadow banking is literally just the 'shadow' of commercial banks." The other unique feature of Chinese shadow banking is the pervasive implicit guarantee, highlighted by Zhu (2016) and Allen et al. (2023). Most articles reviewed in this section reflect these two features.

The last important AFRE category is the bond market, accounting for about 9% of AFRE by 2022. China has taken enormous strides to develop its bond markets, an integral step in financial reforms (Amstad & He 2019). Our review focuses on two points: Uniquely in China, two well-developed but segmented bond markets coexist; and corporate bonds defaults have risen since 2014, generating increased attention. We highlight intrinsic connections between the corporate bond market and the (shadow) banking system.

Finally, Section 6 covers fintech development in China. Fintech, which played an important role when the shadow banking sector reached its last peak around 2017, is partially included in AFRE but not accounted for distinctly. As Section 6 explains, the remarkable growth of fintech in China is likely driven by both underdeveloped traditional banking (Chen 2016) and regulators' unusually friendly approach toward the burgeoning fintech industry in the early 2010s (Allen et al. 2019a). The section covers a wide range of fintech topics, including fintech lending driven by big data technology, broad economic implications of fintech disruptions, and the rise and fall of the peer-to-peer (P2P) industry.

We emphasize that this review article does not aim to cover the complete literature on China's financial system. Political risk and corruption are two particular areas receiving significant attention but are not specifically covered here (see Lin et al. 2016, Liu et al. 2017, Piotroski et al. 2022). We also have not covered the interaction between local government incentives and financial markets (Xiong 2018) as well as China's real estate market [see Song & Xiong's (2018) and Liu & Xiong's (2019) excellent reviews].

2. AGGREGATE FINANCING TO THE REAL ECONOMY

AFRE, also known as Total Social Financing, was introduced by the People's Bank of China (PBC, China's central bank) in 2011 to reflect the magnitude of financial support from the entire financial system to the real economy. This section explains PBC's underlying motivation and the detailed structure of the AFRE measure, around which we organize the existing literature on China's financial system.

In this review, we mention important literature on each category. However, we do not elaborate on financial instruments that have not been studied sufficiently (e.g., government bonds, acceptance bills, asset-backed securities, and finance leases), notwithstanding their increasing contributions to the Chinese economy.

2.1. What Is Aggregate Financing to the Real Economy?

As a broad credit measure, AFRE accounts for unique features of China's financial system. Without a clear international counterpart, this indicator is now closely monitored and analyzed for macroeconomic management and is also widely followed by the private sector and members of the general public interested in the Chinese economy.

AFRE refers to the total amount of financing that the real economy can access via the financial sector during a given period. As a flow measure, AFRE was first released on a quarterly basis in 2011, while AFRE level data—defined as outstanding stock of funding provided by the domestic financial system at the reference period's end—have been available since February 2015.³ The data on AFRE can be directly downloaded from the PBC website (under the Statistical Releases Section⁴) and are also available from Wind Information.⁵ The real economy refers to nonfinancial corporations and households; the financial system refers to the entire domestic financial system, covering financial institutions (commercial banks, financial leasing firms, etc.), security markets (bond and stock markets), and other intermediary markets (e.g., banks' off-balance sheet items). More specifically, AFRE includes the following four categories.

2.1.1. Category 1: bank loans in RMB and in foreign currencies. Category 1 includes loans made by banking institutions, mainly comprised of short-, medium-, and long-term loans and bill financing, which are on the balance sheet of the formal banking system. Bill financing [票据融资] is the PBC term for acceptance bills⁶ exchanged to banks often at a discount from their face value. Bank loans also include finance leases from financial leasing firms, which are classified as banking institutions in China (Chang et al. 2022). The level data show that, by 2022, outstanding bank loans accounted for 62.25% of AFRE.

2.1.2. Category 2: banks' off-balance-sheet items. Category 2 includes trust loans, entrust loans, and undiscounted bankers' acceptances, which are closely connected to shadow banking activities in China. Trust loans (1.09% of AFRE) are loans made by trust companies on behalf of individuals and institutions, while entrusted loans (3.27% of AFRE) are firm-to-firm loans for which trustees—either trust companies or commercial banks—serve as passive facilitators, given regulations prohibiting nonfinancial firms from making loans. For trust loans, trust companies can decide on fund usage per prespecified guidelines, whereas for entrusted loans trustees must follow the lender's request. These two types of loans could go to various sectors, including real estate and local governments with restricted access to formal bank credit. Finally, undiscounted bankers' acceptances (0.77% of AFRE) are off-balance-sheet guarantees by banks on behalf of depositors, providing relatively weak support to the real economy (An & Yu 2018).

2.1.3. Category 3: market-based direct financing. Category 3 covers net corporate bond issuance and equity financing in China's domestic markets by nonfinancial enterprises, often called market-based direct financing as opposed to indirect financing (categories 1 and 2). Cumulative

³Throughout this review, we adopt the AFRE level data from the end of 2022 to reflect the current composition of China's financial system.

⁴The aggregate financing reports are available at <http://www.pbc.gov.cn/en/3688247/3688978/3709140/index.html>.

⁵Wind Information Co. (Wind, 万得) (at <https://www.wind.com.cn/Default.html>) consolidates various data sources and offers access to China's financial and macroeconomic data, which have been used by Chen et al. (2018, 2020b) and Allen et al. (2019c). For more details about Wind, readers are referred to Amstad & He (2019).

⁶Acceptance bills, which include bankers' acceptances and commercial acceptances, are short-term debt instruments issued by nonfinancial enterprises and guaranteed by commercial banks or nonbank institutions.

corporate bond financing and equity financing accounted for 9.01% and 3.09% of AFRE, respectively. Corporate bond financing covers the fixed-income securities issued by nonfinancial firms.⁷ Equity financing includes initial public offerings (IPOs) and seasoned equity offerings by nonfinancial firms on the Shanghai and Shenzhen Stock Exchanges. In its level measure, AFRE counts the cumulative book equity issuance, which excludes capital gains. So far, AFRE only covers equity financing in public markets, leaving private equity financing unaccounted for due to data limitations.

2.1.4. Category 4: other forms of financing. Category 4 includes other forms of recent development in AFRE. The largest component of this category is government bonds (17.49% of AFRE), including Treasury and municipal bonds. Treasury bonds are issued by the Ministry of Finance (MOF) and backed by the Chinese central government, functioning as a key PBC tool for implementing monetary policy through open market operations (Fan et al. 2012, Sun 2020, Hu et al. 2021). Municipal bonds, which were introduced during the 2014 fiscal reform to rein in the ever-growing local government debt problem, are directly issued by the local governments. They take two forms, “special purpose” and “general purpose,” corresponding to “revenue” and “general obligation” municipal bonds in the United States (Lam & Wang 2018, Chen et al. 2020b, He 2020, Liu et al. 2021a).

The second largest component includes asset-backed securities (ABSs) issued by deposit-taking institutions (0.58% of AFRE) and loan write-offs (2.13% of AFRE), introduced as part of AFRE in July 2018. Loan write-offs reduce new bank loans on the book of the banking system, but the actual loans are extended to the real economy; therefore loan write-offs should be added back to AFRE. Other funding sources in Category 4 (including microlending, investment real estate, etc.) accounted for 0.33% of AFRE. Fintech loans made by microlending companies are essentially microlending loans and therefore are counted in AFRE.⁸

2.2. Why Aggregate Financing to the Real Economy?

For a long time, bank loans represented the most important funding source for the Chinese economy. In the past two decades, however, rapid development has diversified the channels of financing for the real sector, so traditional bank credit measures have become less useful for reflecting the scope of financing to the real sector. This trend challenges the appropriateness of bank loans for representing aggregate funding, especially after the 2009 stimulus plan.

Figure 1 illustrates this point, by showing that bank credit—as a part of AFRE—over GDP jumped from 97% in 2008 to 118% in 2009 but has remained stable since. However, using the AFRE measure, the AFRE/GDP ratio has continued to climb, rising from 119% in 2008 to 170% in 2012; the ratio reached 284% in 2022. Crucially, rapid growth in nonbank financing has caused concerns over financial stability from top policy makers in Beijing.

There are several important caveats for the AFRE measure. First, as emphasized by Zhu et al. (2013), the AFRE concept covers much broader financing sources than on-balance-sheet bank loans and does not distinguish how much the various components support the economy.⁹ The

⁷For detailed institutional information for various corporate bond instruments, readers are referred to Amstad & He (2019).

⁸The two lucrative fintech lending businesses, Huabei (“just spend it,” which functions like a virtual credit card) and Jiebei (“just borrow it,” which functions like a short-term consumer loan provider), are operated by two Ant Financial microlending subsidiaries.

⁹For instance, similar to a letter of credit, an undiscounted bankers’ acceptance is merely a type of commitment that banks provide and hence represents weak support to real sectors: It is not a loan unless the banks need

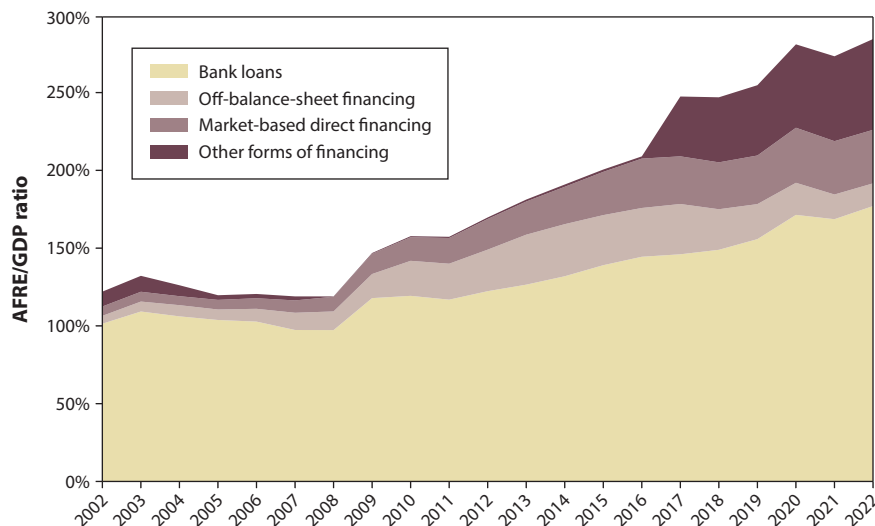


Figure 1

Aggregate Financing to the Real Economy (AFRE). The figure shows the ratio of AFRE level data over GDP from 2002 to 2022, decomposed into four categories: bank loans, off-balance-sheet financing, market-based direct financing, and other forms of financing.

second point is more relevant to researchers. Although closely related, AFRE is a separate concept from shadow banking in China, which mainly consists of trust and entrusted loans, wealth management products (WMPs), and underground lending (say, P2P platforms). AFRE is defined based on the asset side of banks' and financial institutions' balance sheets, focusing on supporting real economic activities. By contrast, shadow banking focuses on various nonbank financial businesses; some components could overlap given its often vague definition—like WMPs, which could be funding sources (i.e., liability), implying that simply adding trust loans to WMPs will overstate the size of shadow banking.

3. STOCK MARKET

The inception of China's stock market in 1990, including the two domestic stock markets (in Shanghai and Shenzhen), is the most significant event for China's financial system in the 1990s. By the end of 2022, there were 5,079 listed firms on China's stock market; its total market capitalization reached RMB 79.01 trillion, second only to that of the United States.

Despite developing rapidly, the stock market's contribution to AFRE—only 3.09% by 2022—is surprisingly small (in contrast, corporate bonds contribute 9.01%). As discussed in Section 3.4, this is partly because the accounting method of AFRE excludes capital gains and partly due to frequent regulatory interventions in IPO approvals. The latter reflects the unpleasant fact that China's stock market is less efficient than its Western peers'. Brunnermeier et al. (2022) provide a theoretical framework to rationalize the different approaches taken by China and the West to managing their financial systems given the disparate economic conditions and institutional backgrounds.

After reviewing early articles from the angle of SOE privatization, we cover IPOs in Section 3.2, highlighting problematic IPO and delisting processes in China. The inefficiency of China's stock

to pay or transfer to other banks in the secondary market, nor it is a shadow loan until the acceptance holder obtains liquidity via underground lending (say, pledging it on P2P platforms).

market is also reflected in ineffective corporate governance, discussed in Section 3.3. We conclude this section by discussing other important channels whereby China's stock markets connect to the real economy.

3.1. Stock Market and Privatization

To promote market forces, in the 1980s Beijing launched a series of programs that decentralized the managerial decision rights of SOEs from the government to the firms. SOEs were partially privatized by issuing some minority shares to individual investors, who could trade on the newly established stock exchanges in Shanghai and Shenzhen. Per the literature, we call these share issuance privatizations (SIPs).

We emphasize, however, that China's privatization program differs fundamentally from other countries', say, in Eastern Europe. The top Chinese authorities never used the terms "privatization" or "partial privatization," which, by explicitly acknowledging private ownership, would entail an ultimate goal of full privatization. This has never been the intention. Instead, Beijing officially calls this program "share ownership reform" [股份制改造], only introducing private investors to SOEs but not transferring control from the state to private investors. Besides the obvious reason that SIPs permit raising capital (Jiang et al. 2009), the main motivation behind SIPs was to subject the corresponding SOEs to market discipline, as share prices reflect information on managerial decisions and firm performance. As put by Wang et al. (2004, p. 470), "China's share issue corporatization aims to transform an SOE into a modern-form corporation that features both state and nonstate institutional shareholders in addition to small individual shareholders." Nevertheless, our article still uses "privatization" to be consistent with the literature.

Although the SIP program became an important measure taken by Beijing in the 1990s to reform SOEs, many scholars, including Xu & Wang (1997), question its effectiveness, arguing that it amounts to purely cosmetic changes. We will thoroughly review this point shortly.

Our SIP program review relates to another literature on how SOE reform affected the performance of Chinese SOEs in early years, with mixed evidence. On the positive side, Groves et al. (1994) show that introducing certain elementary incentives brought about a significant increase in productivity for Chinese SOEs. Lin et al. (1998), though they concur with Jefferson & Rawski (1994) who praise China's partial and gradual reform agenda, argue that the reform was far from successful due to SOEs' policy burdens and resulting soft budget constraints. More recently, He et al. (2022a) study government-led incentive systems by examining a staggered reform in the SOE performance evaluation policy, and they shed light on the challenges faced by economic reforms in China. Finally, although the SIP program was a milestone for SOE reform, many other privatization methods were widely used. Gan et al. (2018) report that the most popular method of privatization between the late 1990s and mid-2000s was direct sales to insiders and/or outside private owners, accounting for about 69% of all privatization programs; public offering—the SIP program—made up only 1%.

3.1.1. The impact of the share issuance privatization program on firm performance. In an early study, Sun & Tong (2003) track 634 SOEs that went through the SIP program from 1994 to 1998. By comparing performance three years before and after privatization, the authors find encouraging signs of improvement in total output measures like earnings and sales, but not in per-unit output measures like return on sales; the second negative impact was confirmed by Wang et al. (2004). Sun & Tong (2003) conclude that China's privatization has achieved some success, though limited in comparison to other countries' privatization programs.

Like many scholars, Sun & Tong (2003) blame partial privatization for the disappointing outcome, as state ownership is negatively related to firm performance after SIPs. An important caveat,

though, is legal entity ownership—essentially, shareholding of other SOEs. In the context of Chinese corporate ownership structure, legal entities [法人股] are typically business agencies or enterprises with significant resources to use. The positive association between performance and legal entity ownership documented by Sun & Tong (2003) is consistent with Xu & Wang's (1997) argument that legal entities—typically large blockholders that serve the same role as institutional investors in developed economies—can be more effective at monitoring.

Many papers followed the study by Sun & Tong (2003). Jiang et al. (2009) highlight that China's SIP program is a primary offering process, wherein the SOE-turned listed company issues new shares directly to private investors and keeps the offering proceeds, rather than a secondary offering process as in other countries (see Bolton & Roland 1992 for central and eastern European countries), wherein the government (which sells its equity stake in an SOE) receives the offering proceeds. The chosen privatization method, involving no sales of government stake, is consistent with the notion mentioned in Section 3.1 that SIPs allow the Chinese government to raise capital for SOEs without any intention of ultimate privatization. More importantly, Jiang et al. (2009) argue that since primary offerings cause a commensurate increase in firms' assets, the size-related measures (i.e., total output like sales) used by Sun & Tong (2003) and Wang et al. (2004) cannot capture efficiency improvement and hence are inappropriate in the Chinese context.

Revisiting Sun & Tong's (2003) research question, Jiang et al. (2009) demonstrate a positive impact of SIPs on Chinese SOEs from 1999 to 2002, three years after Sun & Tong's (2003) sample period. The authors attribute it to the improved institutional environment in the Chinese stock market since 1999.

Methodology-wise, Jiang et al. (2009) use a matching sample method by identifying matched SOEs that were in the same industry and had similar characteristics but had not gone through the SIP process; this partially addresses the selection bias of Sun & Tong (2003). Jiang et al. (2009) show that SIP firms continued to experience negative post-SIP profitability changes, and this "difference" result is consistent with the findings of Sun & Tong (2003). However, the performance decline of these SIP firms was significantly less pronounced than that of matched non-SIP SOEs, and this "difference-in-differences" result suggests a positive SIP treatment effect during the 1999–2002 period. The same difference-in-differences approach is used by Fang et al. (2017) to show that corporate innovation increases after SOE privatizations.

Huyghebaert et al. (2014) examine the post-listing financing decisions of 221 Chinese SOEs from 1994 to 1999 and ask whether stock market quotations alone can discipline them. Although offering an overall negative answer, the authors point to the stock market's positive role by documenting that SOEs with increasing accounts receivable—i.e., trade credit—are more likely to take out bank loans and to issue new shares. Arguably, these listed SOEs used their better access to external finance to ease their trading partners' financial constraints, potentially resulting in more efficient capital allocation. In this regard, Huyghebaert et al.'s (2014) paper is connected to the work of Cull et al. (2009), who study how Chinese firms with privileged access to bank loans redistribute their loans to their trading partners—presumably without such access—via trade credit (see Section 4.2.1).

Ownership structure and firm performance is another active research topic. Unlike Sun & Tong (2003), Wang (2005) finds that neither state ownership nor concentration of ownership is associated with negative post-listing operating performance, while legal entity ownership affects performance nonlinearly. Wei et al. (2005) give a nice description of the six different categories of shares (state, legal entity, foreign, insider, employee, and individual A-shares) and show that state and legal entity shares are significantly negatively related to Tobin's Q , while foreign shares are positively related to it, suggesting that agency conflicts in Chinese listed SOEs are exacerbated (alleviated) by state (foreign) ownership.

3.1.2. Split-share structure reform and its implications. Here we review the literature on China's split-share structure reform, largely enacted between 2005 and 2007.

3.1.2.1. Background of split-share structure reform. The SIP program beginning in the 1990s left behind an awkward legacy problem: the split-share structure. The split-share structure involves two classes (tradable and nontradable) of domestic A-shares with otherwise identical rights coexisting in a listed firm. All shares that existed before SIPs, owned by the state, legal entities, and natural persons, could not be traded on the exchanges and therefore were called nontradable shares. Only new shares issued in SIPs or seasoned equity offerings and those derived from tradable shares in rights offerings and stock splits were tradable.

The split-share structure's legacy hindered how China's financial markets functioned, as the interests of tradable and nontradable shareholders diverged naturally given different pricing mechanisms. Even worse, Liao et al. (2014) report that the median of nontradable shares, as a fraction of total shares outstanding, was 61.85% before the reform, implying that concerns about the split-share structure are especially acute because controlling shareholders typically held nontradable shares, which lack the capital gains benefits. Controlling shareholders would push listed firms to relentlessly raise money through seasoned offerings, only to exploit minority shareholders either through related-party transactions (Jian & Wong 2010) or, even more bluntly, by asking listed firms to make personal loans to controlling shareholders (Jiang et al. 2010). Simply put, neither control dilution nor adverse market reactions concerned controlling shareholders, who had absolute control but did not benefit from capital gains.

In 2005, Beijing launched the split-share structure reform, or simply share reform, aiming to convert all nontradable shares into legitimate tradable shares by paying tradable shareholders certain negotiated considerations. The consideration package was market driven without government-imposed pricing schedules; often it was sweetened with some legally binding promises from controlling nontradable shareholders on future dividend payouts and/or asset injections. The proposals then circulated for tradable shareholder feedback and negotiation. By 2010, 98.58% of listed firms had completed the reform; nontradable shares were history.¹⁰

3.1.2.2. Share reform: Does it only matter for SOEs? Although most papers view the share reform as part of SOE privatization, the deep economic issue of nontradable shares is also relevant to non-SOEs. Liao et al. (2014) report that about 40% of listed firms are non-SOEs; more importantly, the fractions of nontradable shares of SOEs and non-SOEs are remarkably similar (60.15% and 62.51%, respectively). As discussed in Section 3.3, this echoes the argument of Jiang & Kim (2020, p. 733), who observe that "the dominant agency problem in China is the horizontal agency conflict between controlling and minority shareholders arising from concentrated ownership structure," regardless of whether the controlling shareholders are government agencies (for SOEs) or founders (for non-SOEs).

3.1.2.3. The impact of share reform. Based on 633 SOEs and 399 non-SOEs completing share reform from 2005 to 2007, Liao et al. (2014) study the effect of privatization (Megginson et al. 1994, Megginson & Netter 2001) by exploiting the fact that the reform was carried out on both SOEs and non-SOEs. For non-SOEs, the reform dismantled the split-share structure only, while for SOEs the reform additionally removed legal barriers to in-depth privatization. Liao et al. (2014) find significant improvement in total output measures (e.g., output, profit, employment)

¹⁰As of 2022, only one listed firm, Giti Tire Corporation (600182.SH), has not completed the share reform.

for both groups after the reform, and much more so for SOEs. On per-unit efficiency measures (e.g., return on equity) and corporate governance measures (e.g., related-party transactions), both SOEs and non-SOEs performed much better after the reform, with insignificant between-group differences.

Looking specifically at the privatization effect, Liao et al. (2014, p. 500) conclude that share reform did have this effect, which “quickly boosted SOE output, profits, and employment, but did not change their operating efficiency and corporate governance.” However, their empirical results are also consistent with the interpretation that a successful share reform improved firms’ efficiency and governance. First, the additional total output boost in SOEs can be driven by state shareholders having more resources for asset injections as part of the consideration package. Second, by removing nontradable shares, controlling shareholders’ incentives were better aligned with minority shareholders’, leading to a significant improvement in firms’ per-unit measures regardless of state ownership.¹¹

This alternative view echoes Beijing’s long-standing position that the ultimate goal of SOE reform is not full privatization. In fact, after share reform allowing controlling shareholders to sell, as of October 2011 state shareholders had sold only 2.95% of their now-tradable shares to public investors (Liao et al. 2014).¹² Today, although the split-share structure no longer exists, controlling shareholders’ shares remain illiquid for various reasons, including insider trading regulations (Lian et al. 2022), maintaining control rights, and implicit trading restrictions.

Taking the angle of corporate governance and cash holdings, Chen et al. (2012) study the distinct impacts of share reform on SOEs and on non-SOEs, which are subject to different agency conflicts. The SOEs’ agency conflict is shaped by the controlling government agency’s objective function, typically involving nonpecuniary considerations; the government agency itself is often subject to its own internal control system (Lin et al. 1998). Non-SOEs’ controlling shareholders would not have social welfare objectives but may view their listed firms’ cash as a means to satisfy their own needs. Corroborating this perspective, Chen et al. (2012) report that cash holding reduction in response to the share reform is larger in non-SOEs.

Through which economic channel do pre-share reform agency conflicts operate, free cash-flows or financial constraints? Chen et al. (2012) show that after the share reform, non-SOEs increased dividend payouts but not capital investment, indicating the free cash-flow channel, whereas SOEs increased capital investment and short-term borrowings, suggesting the financial constraint channel. These findings suggest that the ability of corporate insiders to make personal use of corporate cash was more constrained in SOEs, a perspective consistent with the findings of Lin et al. (2022), who study the impact of the State Capital Operation Program initiated in 2007.

3.1.2.4. Compensation amid the share reform. As explained, the share reform involves a market mechanism wherein nontradable shareholders offer negotiated compensation—typically additional shares—to tradable shareholders. Li et al. (2011) report that average compensation from nontradable shareholders is a 30% increase in the number of shares held by tradable shareholders. They further show that compensation size is positively associated with nontradable shareholders’ gain from risk sharing.

¹¹The difference between total output measures and per-unit efficiency measures is consistent with the primary and secondary offering difference highlighted in Section 3.1.1 following Jiang et al. (2009).

¹²Potentially, market participants anticipated further privatization when the share reform was implemented around 2005 to 2007; Tan et al. (2020) show that the potential partial privatization prospects had a positive effect on corporate innovation.

Highlighting ownership structure, Firth et al. (2010) show that the compensation ratio decreases with the tradable-share ownership of mutual funds, suggesting that mutual funds bow to political pressure to facilitate the reform.¹³ A broader takeaway is that minority shareholders cannot count on institutional investors in China to monitor effectively (Jiang & Kim 2020).

3.2. Initial Public Offerings

In the SIP program, IPOs and privatization are two sides of the same coin. Qian et al.'s (2022) great survey covers many important aspects of the IPO market in China—the policy evolution, IPO pricing, bidding and allocation practices, and aftermarket trading—from 1990 to 2018. Besides extremely severe IPO underpricing, Qian et al. (2022) present another interesting empirical fact: During aftermarket trading, IPO institutional bidders, whether or not they received an allocation, rarely buy the stock on the open market; those who receive allocations sell during the first week they are allowed to. This implies that Chinese investors—including institutional ones—pay little attention to firm fundamentals given their ultrashort investment horizons.

Several papers explore the connections between IPO underpricing and long-run underperformance from the perspective of political economy. Chen et al. (2015) find that SOEs underprice their IPOs more than non-SOEs, and SOEs controlled by the central government underprice even more compared to their local government peers. Fan et al. (2007) find that politically connected IPO firms underperform other IPO firms in the long run. Piotroski & Zhang (2014) argue that IPOs—often considered a barometer for economic growth—can be politically motivated; indeed, local IPO volume increases before an impending provincial-level political promotion event but underperforms in the long run.

Finally, the lengthy IPO approval process and regulatory-driven suspensions are unique features in China's IPO markets. A firm seeking to conduct its IPO must navigate an elaborate process administered by the China Securities Regulatory Commission (CSRC); regulators have on multiple occasions suspended all IPO activities.¹⁴ In normal, non-suspension times, firms may need two to three years to obtain IPO approval. Because firms cannot time the IPO market given the multi-year time frame from application to listing, market-wide IPO suspensions come largely as a surprise for IPO-seeking firms. Exploiting suspension-induced delay as a plausibly exogenous shock, Cong & Howell (2021) show that IPO delay has a long-lasting negative effect on corporate innovation, while the negative effect on tangible investment is only temporary. Tight IPO regulations fuel a high demand for reverse mergers, leading to a significant “shell” value of underperforming public firms and a near-zero delisting rate (Lee et al. 2022).

3.3. Corporate Governance

China's corporate governance problem is rooted in its concentrated ownership structure, featuring severe conflicts of interest between controlling shareholders and minority shareholders. In a thorough and insightful review paper, Jiang & Kim (2020) highlight several distinct features of controlling shareholders in China. First, there are two types of controlling shareholders, the state and the family; the latter maximizes profit while the former also carries political responsibilities.¹⁵ Second, controlling shareholders, not CEOs or chairs of the board, are the primary decision makers.

¹³In a related paper Zhang & Zhang (2022) show that the compensation ratio is negatively associated with the firm's abnormal perk expense.

¹⁴This is the so-called approval-based system, contrasted with the registration-based system in the United States. In 2019, a pilot registration system was introduced for the Science and Technology Innovation Board (STAR Market); the registration system has been applied nationwide except for the Main Board Market.

¹⁵Consistent with this view, Chen et al. (2012) find different reactions from firms with different controlling shareholders (Section 3.1.2).

3.3.1. Controlling shareholders and related-party transactions. Before 2006, a common practice whereby controlling shareholders expropriated minority shareholders consisted in intercorporate loans, a form of related-party transactions. Typically reported as “other receivables,” these intercorporate loans averaged about 8% of total assets and were rarely repaid (Jiang et al. 2010).

Gul et al. (2010) argue that when large shareholders in China own more than 50% of the firm, their significant cash-flow rights make expropriation costly; indeed, intercorporate loans are more severe when controlling shareholders have fewer shares, as shown by Jiang et al. (2010). This point not only echoes the agency conflict between controlling and minority shareholders as a major drawback of the split-share structure (Section 3.1.2) but also suggests a benefit for controlling shareholders once they have sufficient cash-flow rights. This hypothesis is confirmed by Jiang et al. (2017): In China, listed firms with a controlling shareholder who owns less than 50% of the firm have the worst performance.

Controlling shareholders may also benefit minority shareholders when they conduct related-party transactions on favorable terms to listed firms, including buying firms’ assets at high prices, lending at favorable interest rates, or propping up earnings. However, Peng et al. (2011) show that propping only temporarily benefits minority shareholders, and in some cases cash is eventually transferred back to the controlling shareholder.

3.3.2. Boards of directors. The controlling shareholders also nominate and appoint a board of directors, rendering the monitoring role of the board largely ineffective (Jiang & Kim 2015). Nevertheless, some directors still conduct partially effective monitoring; Jiang et al. (2016) show that independent directors’ dissent improves corporate governance by conveying value-relevant information to the market. However, according to Jiang et al. (2016), only 6% of highly reputed independent directors dissent even once; most dissents occur during the directors’ last terms, when they are less beholden to controlling shareholders.

Giannetti et al. (2015) study directors having experience with superior corporate governance practices from abroad. Starting in the late 1990s, many provinces have implemented policies to attract skilled emigrants to return to China. Giannetti et al. (2015) show that directors with foreign experience facilitate the adoption of strong corporate governance practices.

3.4. The Real Role of China’s Stock Market

The literature on China’s stock markets is much wider than the one on its financial market reform. The topics we review here typically fall in the mainstream finance literature; they have been chosen not only for their significance but also for their close connection to the real economy.

As we have mentioned, China’s stock market, despite its rapid development in the last three decades, contributes negligibly (3%) to the AFRE. This is partly due to AFRE’s accounting method, which measures the cumulative contribution of the stock market’s financing support to the real economy but excludes capital gains. By total market capitalization, China’s stock market accounted for 22.95% of AFRE.¹⁶

China’s stock market supports its real economy by at least three other channels. First, stock prices formed in a well-functioning market provide valuable information to the economy

¹⁶Of course, China—as an emerging economy with a bank-dominated financial system—still lags behind the United States in terms of stock market capitalization. In 2022, the total market capitalization to GDP was 159% for the United States but only 65% for China (92% if we include the Hong Kong Stock Exchange alongside the two exchanges in Shanghai and Shenzhen).

(Section 3.4.1). Second, share pledging allows listed firms' shareholders to use their shares as collateral to obtain credit (Section 3.4.2). Finally, the Chinese economy's internationalization continues to accelerate as the capital markets further open up (Section 3.4.3).

3.4.1. Price informativeness. In an influential paper, Morck et al. (2000) run a capital asset pricing model (CAPM)-style regression for each individual stock and use the resulting R^2 as an inverse measure of firm-specific information content in stock prices. The greater the R^2 , the higher the synchronicity across all stocks, and hence the less the price informativeness. Morck et al. (2000) document that emerging markets typically have a higher synchronicity and note that China is an example with especially high synchronicity. Consistent with Morck et al. (2000), Gul et al. (2010) show that stock price synchronicity in China is positively related to whether the largest shareholder is government related. Finally, Carpenter et al. (2021) measure stock price informativeness as the predicted variation in a cross-sectional regression of future earnings on past market valuations. Surprisingly, the authors find that stock prices in China are as informative about future profits as they are in the United States, especially after the financial reforms in the first decade of the twenty-first century.

3.4.2. Share pledging. Share pledging, wherein shareholders obtain loans with their shares of listed companies as collateral, is a unique financing vehicle at the intersection of the stock market and banking system. It is a significant component of China's financial system; at the market's peak in 2017, more than 95% of A-share listed firms had at least one shareholder pledged, with the total value of pledged shares amounting to RMB 6.15 trillion (>10% of total market capitalization).

Most studies show that share pledging destroys firm value, since pledging shareholders who face margin calls are likely to alter their decisions¹⁷—e.g., cutting corporate innovation (Pang & Wang 2020) or conducting related-party transactions (Li et al. 2020b). The exception is described by Guo et al. (2022), who document a positive shareholder wealth effect on listed firms.

One widely held belief in this literature is that share pledging funds circle back to the listed firms (e.g., Pang & Wang 2020, Meng et al. 2022). He et al. (2022b) clarify that pledging shareholders have discretion over pledging funds, which could be personal consumption, financial investments, etc. Based on He et al.'s (2022b) survey, a majority of shareholders (67.3%) used pledging funds outside the listed firms.

By linking firm registration data with share pledging data, He et al. (2022b) offer a more positive perspective on share pledging, arguing that shareholders' pledging transactions are related to their entrepreneurial activities. Utilizing a policy shock favoring share pledging by natural person shareholders (over legal entity shareholders), He et al. (2022b) show that natural person shareholders increased entrepreneurial activities significantly in response to the policy shock.

3.4.3. The opening up of China's capital markets. Although its capital account remains tightly controlled, China has adopted several innovative schemes in its stock market to ease foreign access restrictions, including the B-share market, the Qualified Foreign Institutional Investor (QFII) scheme, and the Stock Connect program. Ma et al. (2021) provide more institutional details on the opening-up process of China's stock market.

¹⁷Relatedly, margin trading, wherein investors take a leveraged position in eligible stocks by borrowing from their brokerage firms, became available in China's stock market in 2010. Margin trading became popular during the 2014–2015 Chinese stock market boom and subsequent crash, based on which Bian et al. (2021) and Hansman et al. (2022) study margin trading and its implications on stock prices.

Among these initiatives, the Stock Connect program is a milestone, which enables foreign investors and qualified investors from mainland China to directly trade eligible shares listed on each other's markets via their own exchanges, without adapting to the operational practices on the other side. In November 2014, the Shanghai–Hong Kong Stock Connect was launched; Shenzhen followed suit in December 2016. He et al. (2023b) analyze how cross-border investors in the Stock Connect respond to macro-related shocks, highlighting the importance of profiling heterogeneous cross-border participants over market integration. Chen et al. (2020a) document a strong predictability of foreign flows (Northbound trading) on mainland stock returns; however, He et al. (2023a) demonstrate that this informativeness is partly driven by mainland insiders who evade the see-through surveillance by round-tripping via the Stock Connect.

The Stock Connect quickly surpassed QFII as the main access route for foreign investors, and its success directly prompted the opening up of other securities, including the Bond Connect launched in 2017. Analyzing the opening-up process of China's bond market, Clayton et al. (2022) characterize how China is internationalizing its currency by controlling the entry access of different types of foreign investors into its domestic market, beginning with more stable investors and allowing in flightier ones only later. They rationalize this strategy as building credibility as an international currency issuer while reducing the risk of capital flight.

3.4.4. Risk, returns, and factors. Finally, we briefly mention the extensive literature on the risk–return relation in China's stock market. Hu et al. (2021) report that from 1993 to 2020, the Chinese stock market yielded an average annual return of 13%, with a volatility of 43%. In contrast, the US stock market during the same period delivered an average annual return of 10% and volatility of 19%, suggesting that China's stock market underperforms (once risk adjusted; see also Allen et al. 2021).

Considering cross-sections, many papers have studied the standard US-based factors [say, Fama & French's (1993) three factors]; Hu et al. (2021) offer a comprehensive review of this literature. We highlight that a few papers take into account the China-specific institutional settings. As we discussed in Section 3.2, underperforming listed companies (which tend to be small) have a significant shell value because of the reverse mergers analyzed by Lee et al. (2022). Liu et al. (2019b) therefore construct size factors in China differently from the classic Fama–French model by excluding the smallest 30% of firms, which could be valued significantly as potential shells.

4. BANKS AND SHADOW BANKING

As has been observed by many leading scholars (Allen et al. 2017, 2019a), China's financial system is dominated by a large banking system compared with other economies. In this section we first offer a brief overview of Chinese banking reform history, drawing heavily from two books written by former top banking officials in China (Liu 2009, Jiang & Zhan 2019). We then review two key topics for understanding how the Chinese banking system functions: how bank credit affects China's economic growth, and shadow banking.

4.1. A Brief History of Banking Reform in China

Before 1978, China had a mono-bank system in which the PBC operated simultaneously as the central bank and the sole commercial bank. In 1978, the state embarked on a major economic reform program that unfolded in a gradual and evolutionary fashion.

4.1.1. The first stage: 1978–1993. In the first stage, the banking system was expanded and diversified. The government split off PBC's commercial banking function into four newly

established or reestablished state-owned specialized banks, also known as the Big Four: the Agricultural Bank of China (ABC), the Bank of China (BOC), China Construction Bank (CCB), and the Industrial and Commercial Bank of China (ICBC). It then formally promulgated that the PBC would function as China's central bank. Beijing also gradually introduced competition into the banking system by allowing the entry of new financial institutions, including credit cooperatives, postal savings institutions, and joint-stock banks. However, the banking sector still operated on a credit plan system controlled by the PBC,¹⁸ and the Big Four dominated the lending market, functioning mainly as policy lending conduits.

4.1.2. The second stage: 1993–2003. In 1993, the State Council issued the “Decision on Financial System Reform,”¹⁹ a prelude to the second stage featuring the commercialization of the banking system. Three policy banks were established in 1994 to take over policy lending deals from the Big Four; the China Development Bank (CDB) is the largest one.²⁰ In 1995, the Big Four were officially named state-owned commercial banks by the Commercial Bank Law. Rural credit cooperatives left the ABC's administrative control; urban credit cooperatives were transformed into city commercial banks.

In 1998, the PBC abolished the credit plan system and gradually established an indirect management framework for credit relying on quantity-based instruments such as open market operations, the reserve requirement ratio (RRR), and central bank lending.²¹ Meanwhile, the PBC required banks to improve their asset liability management. An important rule of asset liability management, which Beijing removed in 2015, was the 75% loan-to-deposit cap: Banks were prohibited from lending more than 75% of the value of their deposits. Although the PBC could still intervene, banks gained more independence to manage their credit allocation and pursue commercial objectives. However, the separation between policy-lending and commercial-lending functions was far from complete. With the SOE reform ongoing, the Big Four shouldered a growing burden to extend loans to loss-making SOEs, resulting in a high proportion of nonperforming loans (NPLs).

Under the “Grasp the Large, Let Go of the Small” [抓大放小] strategy in the late 1990s (Hsieh & Song 2015), the Big Four's loan quality severely deteriorated. In 1998, the MOF issued RMB 270 billion of special Treasury bonds to recapitalize the Big Four, and four newly created state-owned asset management companies (AMCs) acquired nearly RMB 1.4 trillion of NPLs at book value from the Big Four. Meanwhile, China's accession to the World Trade Organization (WTO) in 2001 yielded a timetable for integrating China into the global economy. Specifically, the banking sector was committed to opening up to foreign competition within five years, heavily pressuring domestic banks.

4.1.3. The third stage: 2003–present. The third stage started in 2003 and focused on share ownership reform. In October 2003, Beijing officially approved the state-owned commercial banks' share ownership reform plan. Besides the Big Four, the Bank of Communications (BOCOM), which the China Banking Regulatory Commission (CBRC)²² officially classified as a state-owned commercial bank in 2007, was also included, turning the Big Four into the Big Five.

¹⁸The credit plan system is a mandatory quota system under which the PBC sets the lower limit on new loans and their allocation to specific sectors on an annual basis.

¹⁹The full text (in Chinese) is available at <http://www.reformdata.org/1993/1225/23288.shtml>.

²⁰The other two are the Export-Import Bank of China and the Agricultural Development Bank of China.

²¹The PBC could indirectly intervene in credit allocation via those policy instruments. For example, the PBC implemented targeted easing through lowering the RRRs only if banks lent to small and medium enterprises and rural sectors.

²²The CBRC was merged with the China Insurance Regulatory Commission, becoming the China Banking and Insurance Regulatory Commission (CBIRC) in 2018.

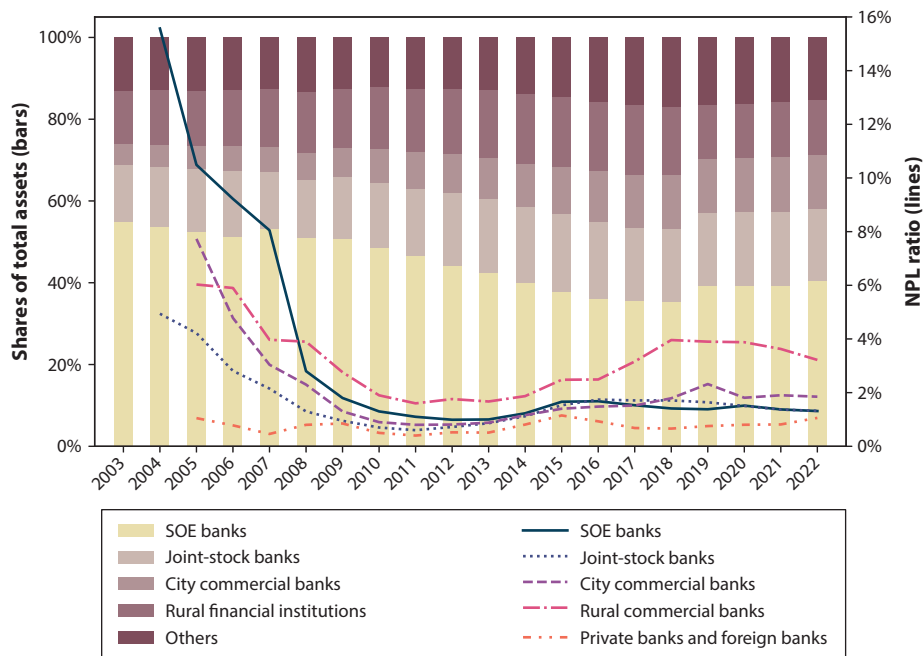


Figure 2

Evolution of banking sector composition and NPL ratio. The figure shows the composition of the banking sector in terms of total assets and NPL ratio from 2003 to 2022. “Others” include policy banks and nonbank financial institutions. Abbreviations: NPL, nonperforming loan; SOE, state-owned enterprise.

The share ownership reform involves three steps: recapitalization, the disposal of NPLs through AMCs, and the introduction of foreign strategic investors. In December 2003, Central Huijin Investment Company was established as a wholly state-owned company, authorized by the State Council to exercise rights and obligations as a shareholder in state-owned financial institutions. From 2003 to 2008, Central Huijin injected capital totaling USD 79 billion funded from foreign exchange reserves into the Big Four, and RMB 3 billion capital funded from PBC relending to BOCOM. Meanwhile, after the Big Five transferred a combined RMB 2 trillion of NPLs to their respective AMCs (about 11% of total book assets), as evident from the NPL ratio evolution in **Figure 2**, several international financial institutions, including Goldman Sachs, joined as strategic investors in the restructured state-owned banks. From 2005 to 2010, the Big Five launched successful IPOs on both the Shanghai Stock Exchange and the Hong Kong Stock Exchange. The Postal Savings Bank of China (PSBC) was founded in 2007 on the basis of China’s postal savings system and went public in Hong Kong (in 2016) and Shanghai (in 2019). The CBRC classified PSBC as a state-owned commercial bank in 2018, initiating the Big Six era.

State-owned banks were not the only entities to undergo drastic changes. In December 2006, foreign banks were allowed to open local subsidiaries without any geographical or customer restrictions. In April 2009, the CBRC relaxed geographical restrictions for joint-stock banks, substantially promoting their expansion (Gao et al. 2021b), though city commercial banks and rural financial institutions were classified as regional banks under strict geographical restrictions (Zhang et al. 2012). In 2014, Beijing started opening its banking sector to private investors; some private commercial banks operate as online banks and have substantially advanced the development of fintech, as discussed in Section 6.1. **Figure 2**, depicting the evolution of China’s banking sector,

shows that the relative proportion of state-owned commercial banks by total assets decreased from 54.93% in 2003 to 40.41% in 2022.

As China's real sector activities are less responsive to interest rate changes than those of other advanced economies, the PBC does not directly target short-term market rates, but the situation has been evolving in recent years. Embarking on interest rate liberalization reforms in the late 1970s, China made significant progress in the 2010s. The PBC scrapped bank lending rates and deposit rate ceilings in 2013 and 2015, respectively. In 2019, the PBC introduced the market-driven loan prime rate (LPR) as the benchmark lending rate and reformed how participating banks submit quotations. In 2015, the PBC launched an official deposit insurance scheme that covered more than 99% of depositors up to RMB 500,000 each, paving the way for banks to compete without putting depositors at risk. Replacing the implicit guarantee (Section 4.3.1) with an explicit guarantee, this was an important step for interest rate liberalization, studied by Liu et al. (2021d) and Buchak et al. (2021). As for the quantity-based instruments, since 2013 the PBC has introduced various liquidity facilities and tweaked them frequently. In contrast with traditional instruments managing aggregate economic variables, those liquidity facilities are mainly structural policy instruments. They often fund specific policy targets such as urban redevelopment projects (also called shantytown renovation), small and medium enterprises, and rural sectors via policy banks and large commercial banks in order to promote inclusive economic growth. For more details on China's monetary policy framework and its transmission mechanisms, readers are referred to Huang et al. (2019) and Wang (2019).

Regarding liquidity regulation, the CBRC tightened enforcement of the 75% loan-to-deposit cap after 2008. Hachem & Song (2021), discussed in Section 4.2.1, argue that in the presence of interbank market power, a regulatory tightening of liquidity rules can trigger unintended credit booms funded by shadow banking. They echo Chen et al. (2018), who show that shadow banking hampers the effectiveness of monetary policy in China. Although the 75% cap for loan-to-deposit ratios was removed in 2015, banking regulators are still monitoring banks' loan-to-deposit ratio as a liquidity indicator. Moreover, the CBRC adopted the Basel III risk-based capital regulations and liquidity risk monitoring tools in 2012 and brought them into force in 2013 (Basel Comm. Bank. Superv. 2013, 2017).

4.2. Bank Loans and Real Economy

In this section we review the literature on how China's banking system affects the real economy.

4.2.1. Bank incentives and capital allocations. Using a sample of Chinese SOEs from 1980 to 1994, Cull & Xu (2003) provide perhaps the first evidence that bank finance was positively linked to both profitability and reform efforts (e.g., giving SOE managers discretion to set wages). Firth et al. (2009) also confirm this positive relationship with non-SOE firms covered in the 2003 World Bank survey. But are Chinese state-owned banks properly incentivized to allocate their funds to stronger firms? Cull & Xu (2003) argue that the banking reform launched in 1978 improved bank employees' incentives to evaluate credit risk. Based on an interview with a branch-level executive, the authors reported that the compensation package of bank employees was linked to loan-portfolio quality. Supervised by high-level offices, bank branches—though often subject to credit plans specifying the total amount of loans to various sectors—had discretion to determine which firms would receive loans based on factors such as profitability.²³

²³Cull & Xu (2003) emphasize that local governments have limited influence over bank decisions, since the local branches report to branches further up in the hierarchy of the affiliated bank.

Of course, the financial system could work even without credit allocation to better firms. For instance, Cull et al. (2009) document that firms with privileged access to bank loans redistribute their loans to trading partners—who presumably lack such access—via trade credit. Cull et al. (2009) highlight the difference between SOEs and non-SOEs; based on a sample of firms from 1998 to 2003, the authors show that poorly performing SOEs were more likely to extend trade credit, while non-SOEs' profitability was positively correlated with trade credit.

Bailey et al. (2011) paint a different picture than Cull & Xu (2003). Bank loans could serve as a positive signal for borrowers' quality or could be made for policy goals. Indeed, based on loan announcements for all listed companies from 1999 to 2004, Bailey et al. (2011) document significant declines in borrowers' stock prices around loan announcements. The negative effect is stronger for firms with more frequent related-party transactions, suggesting that state-owned banks do not serve as monitors as they do in developed countries.

The two leading papers reviewed above present a puzzle for the finance–growth nexus literature, which has shown that financial development is an important factor in promoting economic growth.²⁴ On the one hand, as Allen et al. (2005) argue, China seems to be a counterexample to the finance–growth nexus hypothesis; on the other hand, Ayyagari et al. (2010) document a positive correlation between bank loans and economic growth in China. We return to this topic in Section 4.2.3.

Finally, we review two theoretical pieces regarding how the Chinese banking system reform affects capital allocation. Liu et al. (2021d) focus on interest rate liberalization; their general equilibrium model features both an inefficient SOE sector and an efficient non-SOE sector. Although interest rate liberalization improves capital allocations within each sector, it exacerbates misallocations across sectors—in general equilibrium, a higher deposit rate encourages more savings flowing disproportionately to less-efficient SOEs. Taking a different angle at funding competition in the interbank market, Hachem & Song (2021) construct a model in which, somewhat surprisingly, liquidity regulation can trigger unintended credit booms in the presence of interbank market power. After liquidity tightening, smaller price-taking banks respond with more aggressive shadow banking activities, causing a funding reallocation away from the big price-setting bank and, potentially, a credit boom. Both papers demonstrate that regulatory actions often lead to unintended yet profound consequences, especially given the Chinese financial markets' unique institutional features.

4.2.2. The 2009 stimulus program/plan and its impact. Right after the global 2007–2008 financial crisis hit the export-driven Chinese economy, the State Council announced the RMB 4 trillion fiscal plan in November 2008. Most of the massive 2009 stimulus package was implemented through China's local governments, which finance infrastructure investment by bank loans through off-balance-sheet local government financing vehicles (LGFVs) (Deng et al. 2015, Bai et al. 2016, Zilibotti 2017).

Although the 1994 tax sharing reform prohibited local governments from borrowing or running deficits, to circumvent these restrictions, in 2009 local governments were allowed to borrow heavily via LGFVs to fund stimulus spending. In a typical arrangement, a local government transfers ownership of a plot of land to an LGFV, which then borrows from banks using the land as

²⁴Based on the provincial-level data from 1999 to 2007, Lin et al. (2015) show that industrial growth is positively associated with the fraction of non-Big Four banks, pointing to the Big Four as the root cause of the Chinese banking sector's inefficiency.

collateral. Bai et al. (2016) estimate that about 90% of local government investment was financed via bank loans in 2009, consistent with the sudden dramatic increase in 2009 of newly issued bank loans recorded in the AFRE data (**Figure 1**).

This one-time massive on-balance-sheet credit expansion has had long-lasting and unintended consequences; it not only planted the seeds for the shadow banking surge several years later (Chen et al. 2020b) but also caused capital misallocation, as emphasized by Bai et al. (2016). Along this line, by matching the comprehensive loan-level data set (a topic discussed in Section 4.2.5) with firm-level data on manufacturing firms, Cong et al. (2019) document that the 2009 stimulus plan disproportionately favored SOEs, reversing the pre-2008 process of capital reallocation toward non-SOEs. The authors argue that implicit government guarantees for state-connected firms become more prominent during recessions and can explain this reversal. Huang et al. (2020b) show that during the stimulus period, local public debt crowded out non-SOE investment by tightening funding constraints while leaving SOE investment unaffected. Both papers are consistent with the narrative according to which the state has advanced and the private sector has retreated since the 2009 stimulus program, as advocated by McGregor (2012) and Song & Xiong (2018), though others have challenged this view by looking at the private sector's shares in the economy (Lardy 2014, Kroeber 2020).

4.2.3. Formal versus informal finance. Conventional wisdom (see, e.g., LaPorta et al. 1998) suggests that well-developed financial institutions play a critical role in economic growth. In an influential paper, Allen et al. (2005, p. 57) argue that China presents a counterexample to the law and finance literature, as “neither its legal nor financial system is well developed, yet it has one of the fastest growing economies.” The authors examined three real sectors during the past four decades: the listed sector (covered in Section 3), the (nonlisted) SOE sector, and the private sector, including all other firms with private and local government ownership. Consistent with the law–finance–growth nexus theory (LaPorta et al. 1998), Allen et al. (2005) find slow growth in the first two sectors due to poor legal protections and weak financial markets. However, the astonishing growth of the third sector, which has received credits from nonbank and nonmarket sources, challenges this classic theory. Allen et al. (2005) argue that there exist effective, alternative financing channels and corporate governance mechanisms to support China's growth.

This view is challenged by Ayyagari et al. (2010), who study a comprehensive firm-level data set from the 2003 World Bank Investment Climate Survey. Ayyagari et al. (2010) show that bank financing is associated with faster growth, and that all firms, irrespective of size, benefit from access to formal financing. The authors hence conclude that reputation- and relationship-based informal financing are likely limited and unlikely to substitute for formal mechanisms.

What drives the divergence between Allen et al. (2005) and Ayyagari et al. (2010)? Allen et al. (2019b), as a response to Ayyagari et al. (2010), provide an answer. Even though the 2003 survey constructed by the World Bank covers many financing sources, the largest financing component for Chinese firms is “others.” Allen et al. (2005) classify unidentified “others” as informal financing, while Ayyagari et al. (2010) consider it internal financing, which largely reconciles the seemingly contradictory results (Allen et al. 2019b).²⁵

²⁵Allen et al. (2019b) further separate two kinds of informal financing according to the mechanism for dealing with information asymmetry and enforcement: constructive informal financing, such as trade credits with information advantages, and underground financing, such as loan sharks with little information technology but coercion when borrowers default. They especially warn that ignoring heterogeneities in nonbank lending might have contributed to the underacknowledgment of the role of informal financing in China.

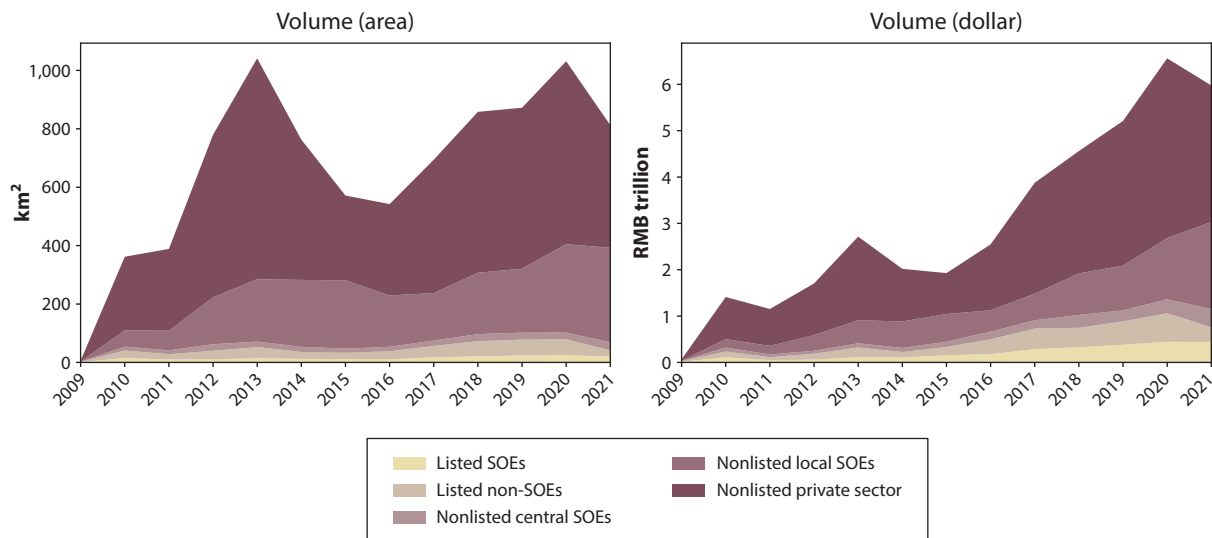


Figure 3

Residential land transaction volume. The figure shows the composition of China’s residential land transaction volume in terms of area and dollar amount by different types of buyers from 2009 to 2021. We classify buyers into listed SOEs, listed non-SOEs, nonlisted central SOEs, nonlisted local SOEs, and the nonlisted private sector (including private firms and natural persons). Abbreviation: SOE, state-owned enterprise.

4.2.4. A glimpse into China’s construction sector. We use the construction sector to illustrate the interaction among China’s financial system, real economy, and policy making. **Figure 3** shows the residential land transaction volume from 2009 to 2021.²⁶ Following Allen et al. (2005), we decompose the transactions into land purchased by listed SOEs, by listed non-SOEs, by nonlisted (central and local) SOEs, and by the private sector. The transaction volume rose sharply after the 2009 stimulus program/plan, with the private sector (mainly private property developers) and nonlisted local SOEs (mainly LGFVs) as major buyers. Beijing cut land supply during 2014–2016 to curb the rise of unsold houses, while it switched to increasing supply since 2017 due to the surge of housing prices. In August 2020, Beijing imposed strict restrictions on property developers’ borrowing by capping their assets-to-liabilities, debt-to-equity, and cash-to-short-term-debt ratios—known as the Three Red Lines [三条红线]. As a result, in 2021 the indebted and cash-strapped private developers were struck by this policy and pulled back from buying land, while local SOEs stepped in to fill the gap.

4.2.5. Recent banking research based on loan-level data. Haoyu Gao and Xiaoguang Yang, with access to an administrative loan-level data set,²⁷ have produced a series of interesting papers alongside various coauthors. Focusing on the informational role of interfirm ownership networks in bank lending, Gao et al. (2022c) show that banks’ internal loan ratings at issuance predict subsequent delinquent events more accurately when borrowers are connected to banks’ existing

²⁶These data are from the Ministry of Natural Resources, which posts transaction details of all land sales by the local governments in China. For more details, readers are referred to Chen & Kung (2019) and He et al. (2022c).

²⁷The data set includes all major bank loans that the CBRC compiled for monitoring use, covering over 80% of loan contracts granted by the 19 largest Chinese banks from October 2006 to June 2013.

customers via ownership networks. Gao et al. (2021b) study how the 2009 deregulation of bank entry altered China's local banking industrial organization and its economic consequences. Finally, Gao et al. (2021a) paint a politics–finance nexus picture by providing direct evidence that SOEs selectively avoid defaulting on loans extended by the largest policy bank, CDB, which has a higher political rank than the Big Five.

As explained in Section 4.1, the CDB, unlike other commercial banks having profit as a primary performance target, operates under the policy mandate to grant subsidized credit to SOEs in strategic industries. Ru (2018) shows that CDB loans to SOEs crowd out private investment in the same industry but crowd in private investment in downstream industries, not only shedding light on the important question of how government-directed credit affects the economy but also reconciling the ambivalence from prior studies, which rely only on aggregate data either in China (Banerjee et al. 2020) or in other countries (Gale 1991).

4.3. Shadow Banking

According to the PBC, shadow banking refers to “credit intermediation involving entities and activities outside the regular banking system that serves to provide liquidity and credit transformation and which could potentially be a source of systemic risk or regulatory arbitrage” (PBC 2013, p. 203). Shadow banking in China takes a multifaceted form and should be generally defined as markets and/or institutions operating partially outside the traditional banking sector, with lighter regulations.

We first explain commonalities and distinctive features of shadow banking in China when compared to other developed countries. We then review several articles specific to certain shadow banking products and discuss their connections to the real economy.

4.3.1. Shadow banking in China: What is different? China's shadow banking sector has two themes in common with shadow banking sectors worldwide, but also two unique features. First, as Chen et al. (2020b) argue, the upsurge of shadow banking is typically linked to rising financing demands from certain real sectors, typified by the popularity of state-chartered trust companies in late-nineteenth-century America associated with large-scale railroad construction. China is no exception: Zhu (2021) argues that shadow banking activities initiated by banks prior to 1996 helped direct credits to the more productive nonstate sector whose growth craved funding.

Shadow banking in China, like in the rest of the world, also features regulatory arbitrage. As highlighted by Hachem (2018), shadow banking is credit intermediation occurring outside the regulated sphere in response to stringent regulations; blatant regulatory arbitrage took place both when large US banks actively set up asset-backed commercial papers conduits before the 2007–2009 financial crisis (Acharya et al. 2013) and when Chinese non–Big Five banks made off-balance-sheet loans via trust companies after 2010 (Chen et al. 2020b).

Shadow banking in China is also quite unique. First, unlike in other developed countries, almost every aspect of shadow banking activities in China—made manifest by all the papers reviewed here—can be traced back to its mammoth banking system. As put by Amstad & He (2019, p. 126), “Chinese shadow banking is literally just the ‘shadow’ of commercial banks,” a view echoed by Ehlers et al. (2018) and Sun (2019). This stands in stark contrast to its US counterpart, where secularization and market-based instruments play a prominent role.

Another central feature of China's shadow banking sector is the prevalence of implicit guarantees whereby investors expect returns on risky investments. Unlike the fixed-income products offered in developed markets, bond-like investments in China, including trust products and WMPs, carry implicit guarantees from their issuers, underwriters, regulators, and even different levels of government. As Zhu (2016, p. 5) observes, “many investors believe that, as long as the

(issuers and) financial institutions are concerned with their reputations, as long as the regulators are concerned with career advancement, and as long as the Chinese government is concerned with social stability, they will take care of the risks that investors themselves should bear when investing in such products.” Although implicit guarantees are not necessarily unique to China, as the case of Fannie Mae and Freddie Mac in the United States illustrates, the scope of implicit guarantees—or investors’ perception of them—is rooted in soft budget problems (Kornai 1979, 1980) and is likely more severe in China.

4.3.2. Shadow banking activities. In this section we review the literature on several shadow banking products and their connections to the real sector.

4.3.2.1. Trust products. As the largest nonbank financial industry in China since 2012, trust companies are non-deposit-taking institutions—hence less regulated than traditional banks—that raise funds through the issuance of investment products to investors. Typically, these trust products are risky, but Chinese investors expect implicit guarantees, presumably provided by trust companies or their selling banks, as Section 4.3.1 notes. Allen et al. (2023) analyze a comprehensive data set of trust products from 2002 to 2015 and document that the pricing of trust products (i.e., the promised yield) depends on both the underlying investment risk and the implicit guarantee’s strength. For instance, yield spreads are lower if the trust firm is larger or controlled by an SOE, or if the Big Five sell the product. And following the first high-profile near-default of a trust product in 2014, which shocked perceptions of implicit guarantees, spreads increased but the effect was concentrated among products with lower-strength guarantees.

4.3.2.2. Entrusted loans. Unlike trust loans, entrusted loans are firm-to-firm loans that use traditional financial intermediaries as trustees (see Section 2.1.2 for more details). Allen et al. (2019c) manually collect transaction-level data on entrusted loans from listed firms, thanks to the disclosure requirement mandated by the CSRC; a similar data set is also used by Chen et al. (2018). Allen et al. (2019c) document two types of entrusted loans: affiliated loans, which are essentially pass-through loans between related parties at rates around the official bank loan rate (about 6% in the sample period), and nonaffiliated loans, which are done at arm’s length with the borrowing cost reflecting the market rate (about 14%). Unlike affiliated lenders who tend to have high profitability, lenders of nonaffiliated loans have low growth; they essentially use entrusted loans to act as intermediaries, pocketing an immediate interest rate differential of 8%. In short, entrusted loans involve firms with privileged access to cheap capital (say, large SOEs) channeling funds to less privileged firms (say, private small-medium enterprises), indicating inefficiency in China’s banking system.

4.3.2.3. Wealth management products. In 2009 the Big Five were instructed to extend loans to LGFVs (see Section 4.2.2). Using a proprietary data set that covers the largest 25 commercial banks, Acharya et al. (2021) study the role of WMPs from 2007 to 2014. They argue that one large state-owned bank, driven by its president’s personal preferences, was particularly willing to make stimulus-related loans, raising deposits aggressively to finance these loans. The authors then instrument deposit availability with banks’ exposure to competition from this large state-owned bank, and they show that their issuance of WMPs exposed them to future rollover risk (He & Xiong 2012).

Heightened rollover risk is further studied by Huang et al. (2020a), who show that banks perceived to be riskier strategically provide stronger implicit guarantees to their issued WMPs to build reputation and reduce rollover costs. For each WMP, Huang et al. (2020a) construct its shortfall, indicating whether this WMP’s realized return falls short of its highest target return the

issuer bank promised. By directly measuring (the absence of) implicit guarantees, Huang et al.'s (2020a) method is an important improvement over Allen et al.'s (2019c), which can only indirectly measure expected implicit guarantee.

4.3.3. Shadow banking, real economy, and policy implications. The intersection between shadow banking and the Chinese economy has received growing attention in the literature. We review two papers here; for a comprehensive review, readers may consult Hachem (2018).

Chen et al. (2018) provide an excellent overview on the institutional background of China's quantity-based monetary system, its commercial bank regulations, and the relationship between shadow and traditional banking. Using a data set on entrusted loans similar to Allen et al.'s (2019c), Chen et al. (2018) show that contractionary monetary policy from 2009 to 2015 stimulated shadow banking and encouraged banks to bring shadow banking products onto their balance sheets, hampering the effectiveness of monetary policy. This is consistent with the PBC's underlying motivation for introducing AFRE in 2011 (see Section 2.2).

Chen et al. (2020b) argue that the accelerated growth of China's shadow banking after 2012 is tightly linked to its 2009 stimulus plan reviewed in Section 4.2.2. Although the dawn of shadow banking in China around 2008 can be attributed to other factors (Hachem & Song 2021), only after 2012 did its growth begin accelerating: WMPs grew by a total of RMB 3.5 trillion during the three-year period from 2008 to 2011 but increased by RMB 2.5 and 3.1 trillion in the single years 2012 and 2013, respectively; a similar pattern holds for trust and entrusted loans. Chen et al. (2020b) focus on municipal corporate bonds (MCB) [城投债], bonds issued by LGFVs to support infrastructure investment (Section 4.2.2). Adopting an instrumental variable motivated by the literature on local governors' career incentives (Zhou 2004, Xiong 2018), the authors use cross-sectional variation to show that MCBs rose quickly around 2014 as a way to refinance stimulus-era loans, and they provide aggregate evidence that WMPs have been investing heavily in MCBs to support local government infrastructure investment. We return to this paper in Section 5.2, covering Chinese bond markets.

5. BOND MARKET

Over the past 20 years, China has taken enormous strides to develop its bond markets, as an integral step in implementing financial reforms. This section covers two major topics regarding the Chinese bond market: the coexistence of two segmented bond markets, and corporate bonds. Readers who are interested in the historical background and institutional details are referred to Amstad & He (2019) and Hu & Wang (2022).²⁸ Two additional articles are worth mentioning here: Huang & Zhu (2009) provide a detailed account of the Chinese bond market's history since 1911, including the post-1978 reform era and the early development stage between 1990 and the early 2000s; Mo & Subrahmanyam (2020) focus on 2010 to 2019, arguing that government policies and foreign investors have significantly impacted the liquidity of Chinese bond markets.

5.1. Segmented Markets

As Amstad & He (2019) explain, there are two distinct and largely segmented markets in today's Chinese bond markets: the quote-driven, over-the-counter, "wholesale" interbank market; and

²⁸Hu & Wang (2022, section 2) provide an excellent review of the literature on Chinese Treasury bonds and their pricing, while Amstad & He (2019, section 5) cover the literature on credit rating agencies and bond ratings in China.

the order-driven, centralized, “retail” exchange market. The exchange bond market resides within the Shanghai and Shenzhen Stock Exchanges; its participants include nonbank financial institutions, corporate investors, and retail investors (mainly high-net-worth individuals). In contrast, the interbank market was established by the PBC in June 1997; by January 2023 it hosted 3,965 financial institutions, including commercial banks, urban and rural credit cooperatives, and nonbank financial institutions (e.g., mutual funds, insurance companies, securities firms).

The exchange market has aggressively competed with the interbank market, resulting in dual-listed bonds. Due to the market segmentation documented by Chen et al. (2022), dual-listed bonds could show different prices despite the same fundamentals. Liu et al. (2019a) show that dual-listed bonds with stronger retail demand are traded at significantly higher prices on the exchange market than those traded by institutional investors on the interbank market.

Taking advantage of an institutional feature wherein the two markets adopt different rules for repurchase agreement (repo) transactions, Chen et al. (2022) identify the value of asset pledgeability, a challenging task given the endogeneity of asset pledgeability itself. They use a policy shock in December 2014 that rendered a class of AA+ and AA bonds ineligible for repo on the exchange market to study the value of pledgeability in bond pricing.

5.2. Corporate Bonds

Like the banking system and stock market, the corporate bond market plays a prominent role in China’s financial system by channeling household savings toward the real sector. At the end of 2022, the outstanding corporate bond balance in AFRE was RMB 31.01 trillion, comparing quite favorably to RMB 10.64 trillion in the stock market yet significantly behind RMB 214.27 trillion in bank loans.

5.2.1. Municipal corporate bonds. Several papers study MCBs, a type of corporate bond issued by LGFVs that carry out infrastructure investment on behalf of local governments (Section 4.3.3). Related to the implicit guarantees discussion in Section 4.3.1, MCBs are a perfect example of how planning and the market mix in the contemporary Chinese economy: They are implicitly backed by local government (hence “municipal”), but legally speaking they are issued by LGFV entities just like other regular corporations (hence “corporate”). In this vein, both Ang et al. (2019) and Liu et al. (2021b) show that MCB’s credit spreads depend not only on the financial conditions of the issuing LGFVs but also on the fiscal conditions of their backing municipalities.

As reviewed in Section 4.3.3, Chen et al. (2020b) connect the dramatic 2012–2015 growth of MCBs to the 2009 stimulus plan and provide further evidence that WMPs invest heavily in MCBs. Considering that WMPs offered households an attractive savings vehicle with market-based interest rates (see, e.g., Buchak et al. 2021), Chen et al. (2020b) take a positive view of the stimulus hangover effect: As an unintended (but good) consequence, the 2009 stimulus plan served as a catalyst for the development of China’s corporate bond markets three to five years later.

5.2.2. Default of corporate bonds. Another rapidly growing literature concerns rising corporate default in China. Li & Ponticelli (2022) study the recent progress of bankruptcy resolution in China, based on a case-level data set from 2011 to 2020. They compare bankruptcy cases handled by specialized versus traditional civil courts and argue that court specialization increases efficiency via the selection of better-trained judges and greater judicial independence from local politicians.

Based on the same structural framework of credit risk modeling (Merton 1974), Geng & Pan (2021) study long-term corporate bonds and find that credit spreads in China become informative only after the first corporate bond default in 2014. Focusing on short-term bonds, Huang et al.

(2023) take the framework of He & Xiong (2012) and show that liquidity is much more important than default risk for explaining variation in the spreads of short-term commercial papers.

As emphasized in Section 4.3.1, corporate bonds in China may carry implicit government guarantees, especially when issued by SOEs. As Geng & Pan (2021) show, amid a wave of default events after 2018, non-SOE issuers experienced a much larger increase in credit spreads relative to SOEs. However, the implicit guarantee is not “guaranteed,” and the opposite was true during the first large SOE default in 2015 (Jin et al. 2022).

5.2.3. Corporate bond issuances. Several recent papers focus on corporate bond issuance. Ding et al. (2022) discover robust overpricing in China’s primary interbank market; driven by rebates and self-purchases by underwriters, issuance overpricing stands in sharp contrast to issuance underpricing in developed financial markets (Ritter & Welch 2002, Cai et al. 2007).

Expanding the scope to offshore corporate bond markets, Huang et al. (2021b) show that offshore USD-denominated Chinese corporate bond issuance is driven by the wedge between domestic and foreign interest rates. From a different angle, Flannery et al. (2022) show that the issuance of two USD-denominated sovereign bonds by the Chinese government in 2017 helped reduce yield spreads, bid-ask spreads, and the volatility of offshore USD-denominated Chinese corporate bonds.

6. FINTECHS

Globally, the financial industry has undergone a radical transformation wherein incumbent banks face increasing competition from the rising fintech sector. The rapid development and astonishing growth in China’s fintech sector are particularly remarkable, so we cover this topic separately, although fintech is only partially included in AFRE and not counted distinctly.²⁹

As Chen (2016) mention, due to underdeveloped traditional banking, and especially small/medium enterprises’ and consumers’ lack of credit access, the large unfulfilled demand facilitates the entry of fintech firms. But perhaps more importantly, regulators took an unusually friendly approach to the burgeoning fintech industry in the early 2010s. For instance, privately owned companies faced no stifling restrictions to entering financial service industries (Allen et al. 2019a).

Ant Financial provides a good case study of success, and many papers reviewed here use data from Ant Financial and its parent company Alibaba. Its business model rests on enabling direct interactions among mass users on digital platforms, with a large stock of user data as an essential byproduct. Ant Financial uses these data as an input to offer a range of services that exploit network effects, generating further user activity and facilitating further financial inclusion (Luohan Acad. 2019). However, fintech’s development in China is not without potential concerns.

6.1. Fintech Lending and Big Data

Fintech lenders, beyond automated services, have revolutionized the collection and use of credit information. Ant Financial’s and Alibaba’s success in the past decade drives a burgeoning literature on fintech lending in China. Using data from Ant Financial, Hau et al. (2019) show that big data technology helps fintech promote inclusive financing, in that fintech firms have advantages in making loans to vendors who either have low credit scores or had been excluded from bank credit. Hau et al. (2019) extend this result and argue financial inclusion matters most for underdeveloped and largely segmented credit markets in emerging markets.

²⁹AFRE covers fintech lending by online banks (in the bank loan category) and microlending companies (in the “other” category), but it leaves peer-to-peer lending uncounted due to data limitations (Section 2).

Hau et al. (2021) analyze automated credit lines by Ant Financial to vendors on Alibaba's online retail platform (Taobao). Using a discontinuity in the credit decision algorithm, Hau et al. (2021) show that a vendor's credit approval boosts its sales and transaction growth. Interestingly, Hau et al. (2021) report that proximity to Big Five bank branches correlates positively with the take-up of fintech credit, suggesting that Big Five banks worsen credit frictions for small entrepreneurs through the redirection of local savings to the state sector, consistent with the argument that the traditional banking system in China harms financial inclusion.

Screening borrowers is only one of many critical steps wherein fintech lenders utilize big data technology. Using a large sample of personal loans from a fintech lender in China, Dai et al. (2020) show that information acquired by the lender through borrowers' digital footprints can significantly increase repayment likelihood on delinquent loans. Digital footprints serve as a new type of collateral and can enhance financial inclusion by facilitating delinquent loan collection.

Pushing further this idea that data may serve as a new type of collateral for fintech lending businesses, Gambacorta et al. (2023) compare the lending practices of Ant-backed MYbank, a private depository institution providing online banking services (Section 4.1.3), to those of traditional banks typically relying on physical collateral.³⁰ The authors show that fintech loans do not correlate with local business conditions and house prices but react strongly to changes in firm characteristics, like transaction volumes and network scores (important inputs of firms' credit ratings developed by Ant Financial). In sharp contrast, bank credit is positively correlated with local house prices, consistent with the classic collateral channel à la Kiyotaki & Moore (1997). By showing that fintech credit is less reliant on traditional collateral, this paper delineates potential transmission mechanisms of an effective monetary policy in China.

6.2. Financial Disruption and Economic Implications

By challenging incumbent financial institutions with new business models, the rising fintech sector could potentially disrupt the traditional financial system, with profound implications for both macro- and micro-economic policies in China.

Buchak et al. (2021) argue that the fintech sector is an important economic force driving interest rate liberalization in China. Using data from Ant Financial, Buchak et al. (2021) study fintech's role in ending "financial repression" in China via the introduction of a money market fund with deposit-like features. Cities and banks whose depositor bases are more exposed to fintech see greater deposit outflows and respond to fintech competition by offering competing products with market interest rates. As Buchak et al. (2021) observe, fintech thus facilitates a bottom-up interest rate liberalization, with direct monetary policy implications for China.

Indeed, by studying loan-level data from a P2P platform, Huang et al. (2021a) find that monetary policy easing is associated with a higher probability that fintech lenders, who serve as a lightly regulated financial intermediary, will grant loans to risky borrowers. Braggion et al. (2022) analyze P2P lending around a 2013 tightening of mortgage loan-to-value caps in several Chinese cities and show that home buyers borrow from P2P platforms to bypass the tighter loan-to-value cap.

The fintech industry underwent tremendous growth during the global COVID-19 crisis. Bao & Huang (2021) compare fintechs and banks during the COVID-19 outbreak in China and find that fintechs were more likely to expand credit access to financially constrained borrowers.

³⁰The data set used by Gambacorta et al. (2023)—a random sample of more than 2 million firms from 2017 to 2019—is worth highlighting. Unlike samples in the previous literature (e.g., Hau et al. 2021), this sample contains not only online stores residing on Alibaba's e-commerce platforms but also offline firms merely using Alipay.

However, the increased credit provision may not be sustainable, as the delinquency rate of fintech loans tripled after the outbreak (but not for banks). On the government policy side, during the summer of 2020 several Chinese local governments launched a consumption stimulus program, leveraging mobile payment platforms to dispense small-value, use-it-this-week-or-lose-it coupons. Exploiting participants' rush to first-come-first-served digital portals, Xing et al. (2021) and Liu et al. (2021c) compare spending among those who won coupons and those who just lost them and find that coupons generated an immediate increase in weekly consumption among winners by RMB 3–6 out-of-pocket spending for every RMB in government subsidy. The authors suggest that the coupon program, which delivered a much larger marginal propensity to consume than traditional policies in the United States (e.g., Johnson et al. 2006), can be a useful addition to policy makers' stimulus toolbox.

6.3. Peer-to-Peer Lending Platforms

P2P lending allows individuals to bypass traditional financial intermediaries and raise funds directly from investors, potentially providing alternative funding to Chinese small businesses. Outstanding P2P loans in China went from almost nothing in 2007 to a peak of RMB 1.3 trillion in June 2018, only to collapse due to pyramid-scheme scandals and absentee bosses, sparking public anger and a broader government crackdown.

He & Li (2021) provide a comprehensive analysis of why P2P platforms failed in China. The original P2P platform business model is to charge a service fee for connecting borrowers and lenders; lenders cannot appeal to platforms for payment if a borrower defaults. However, since Beijing initially took a light regulatory touch from 2015 to 2017, as mentioned in Section 6, most Chinese P2P platforms guaranteed their investors a return. Moreover, the platforms themselves issued short-term WMPs that promised high returns (Li et al. 2020a). P2P platforms, essentially engaging in credit and maturity transformation like traditional banks, became a breeding ground for risky lending and fraud [see the Ezubao case discussed by Li et al. (2020a)]. In November 2019, Chinese authorities mandated that all existing P2P lending platforms be converted to microlending companies within two years, essentially eliminating the Chinese P2P industry.

P2P platforms themselves need financing. Jiang et al. (2021) show that P2P platforms with SOE affiliations have higher trading volumes, attract more investors, and offer lower interest rates. Using a clever identification strategy of fake SOE affiliations, the authors demonstrate that the SOE affiliation itself serves as a positive signal. Relatedly, Li et al. (2020a) show that the number of lenders increase significantly immediately after P2P platforms obtain venture capital investment, supporting the certification effect of venture capital on the P2P industry.

7. CONCLUSION

China's financial system has become increasingly intertwined with the Chinese economy's astonishing growth over the past four decades. Unlike most existing surveys, this review is structured around AFRE, a broad PBC credit measure including bank credits, equity and bond issuances, and various shadow banking items like trust and entrusted loans. Besides contextualizing the development of China's financial markets within SOE reform from the 1990s to the mid-2000s, our review highlights how nonbank credit, representing new market-based financing channels, plays an increasing role in supporting the real economy. Furthermore, all these new financing channels were somewhat affected by the 2009 stimulus program/plan's hangover and are often ultimately tied back to the dominant banking sector with implicit guarantees. Therefore, understanding the mechanisms behind these financial channels and their intrinsic connections is crucial to alleviate capital allocation distortion and mitigate potential systemic financial risk in China.

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The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

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LITERATURE CITED

- Acharya VV, Qian J, Su Y, Yang Z. 2021. *In the shadow of banks: wealth management products and issuing banks' risk in China*. Work. Pap., New York Univ., New York
- Acharya VV, Schnabl P, Suarez G. 2013. Securitization without risk transfer. *J. Financ. Econ.* 107(3):515–36
- Allen F, Gu X, Qian J, Qian Y. 2023. Implicit guarantees and the rise of shadow banking: the case of trust products. *J. Financ. Econ.* 149(2):115–41
- Allen F, Qian J, Gu X. 2017. An overview of China's financial system. *Annu. Rev. Financ. Econ.* 9:191–231
- Allen F, Qian J, Qian M. 2005. Law, finance, and economic growth in China. *J. Financ. Econ.* 77(1):57–116
- Allen F, Qian J, Qian M. 2019a. A review of China's institutions. *Annu. Rev. Financ. Econ.* 11:39–64
- Allen F, Qian J, Shan C, Zhu J. 2021. *Dissecting the long-term performance of the Chinese stock market*. Work. Pap., Imp. Coll. London, London
- Allen F, Qian M, Xie J. 2019b. Understanding informal financing. *J. Financ. Intermed.* 39:19–33
- Allen F, Qian Y, Tu G, Yu F. 2019c. Entrusted loans: a close look at China's shadow banking system. *J. Financ. Econ.* 133(1):18–41
- Amstad M, He Z. 2019. Chinese bond market and interbank market. See Amstad et al. 2019, pp. 105–50
- Amstad M, Sun G, Xiong W. 2019. *The Handbook of China's Financial System*. Princeton, NJ: Princeton Univ. Press
- An P, Yu M. 2018. Neglected part of shadow banking in China. *Int. Rev. Econ. Finance* 57:211–36
- Ang A, Bai J, Zhou H. 2019. *The Great Wall of debt: real estate, political risk, and Chinese local government financing cost*. Work. Pap., Georgetown Univ., Washington, DC
- Ayyagari M, Demirgüç-Kunt A, Maksimovic V. 2010. Formal versus informal finance: evidence from China. *Rev. Financ. Stud.* 23(8):3048–97
- Bai CE, Hsieh CT, Song ZM. 2016. The long shadow of China's fiscal expansion. *Brook. Pap. Econ. Act.* 2016(2):129–81
- Bailey W, Huang W, Yang Z. 2011. Bank loans with Chinese characteristics: some evidence on inside debt in a state-controlled banking system. *J. Financ. Quant. Anal.* 46(6):1795–830
- Banerjee A, Duflo E, Qian N. 2020. On the road: access to transportation infrastructure and economic growth in China. *J. Dev. Econ.* 145:102442
- Bao Z, Huang D. 2021. Shadow banking in a crisis: evidence from FinTech during COVID-19. *J. Financ. Quant. Anal.* 56(7):2320–55
- Basel Comm. Bank. Superv. 2013. *Regulatory Consistency Assessment Programme (RCAP): assessment of Basel III regulations—China*. BIS Tech. Rep., Bank Int. Settl., Basel, Switz.
- Basel Comm. Bank. Superv. 2017. *Regulatory Consistency Assessment Programme (RCAP): assessment of Basel III LCR regulations—China*. BIS Tech. Rep., Bank Int. Settl., Basel, Switz.
- Bian J, Da Z, He Z, Lou D, Shue K, Zhou H. 2021. *Margin trading and leverage management*. Work. Pap., Univ. Chicago, Chicago
- Bolton P, Roland G. 1992. Privatization policies in Central and Eastern Europe. *Econ. Policy* 7(15):275–309
- Braggion F, Manconi A, Zhu H. 2022. Household credit and regulatory arbitrage: evidence from online marketplace lending. *Manag. Sci.* In press. <https://doi.org/10.1287/mnsc.2022.4592>
- Brunnermeier MK, Sockin M, Xiong W. 2022. China's model of managing the financial system. *Rev. Econ. Stud.* 89(6):3115–53

- Buchak G, Hu J, Wei SJ. 2021. *FinTech as a financial liberator*. NBER Work. Pap. 29448
- Cai N, Helwege J, Warga A. 2007. Underpricing in the corporate bond market. *Rev. Financ. Stud.* 20(6):2021–46
- Carpenter JN, Lu F, Whitelaw RF. 2021. The real value of China's stock market. *J. Financ. Econ.* 139(3):679–96
- Chang J, Yang T, Shi Y. 2022. Finance leases: in the shadow of banks. *Rev. Finance* 26(3):721–49
- Chen H, Chen Z, He Z, Liu J, Xie R. 2022. Pledgeability and asset prices: evidence from the Chinese corporate bond markets. *J. Finance*. In press
- Chen K, Ren J, Zha T. 2018. The nexus of monetary policy and shadow banking in China. *Am. Econ. Rev.* 108(12):3891–936
- Chen K, Wang Y, Zhu X. 2020a. *The value of information in the China's Connected Market*. Work. Pap., Univ. Int. Bus. Econ., Beijing
- Chen L. 2016. From FinTech to Finlife: the case of FinTech development in China. *China Econ. J.* 9(3):225–39
- Chen Q, Chen X, Schipper K, Xu Y, Xue J. 2012. The sensitivity of corporate cash holdings to corporate governance. *Rev. Financ. Stud.* 25(12):3610–44
- Chen T, Kung JK. 2019. Busting the “Princelings”: the campaign against corruption in China's primary land market. *Q. J. Econ.* 134(1):185–226
- Chen Y, Wang SS, Li W, Sun Q, Tong WH. 2015. Institutional environment, firm ownership, and IPO first-day returns: evidence from China. *J. Corp. Finance* 32:150–68
- Chen Z, He Z, Liu C. 2020b. The financing of local government in China: Stimulus loan wanes and shadow banking waxes. *J. Financ. Econ.* 137(1):42–71
- Clayton C, Dos Santos A, Maggiori M, Schreger J. 2022. *Internationalizing like China*. NBER Work. Pap. 30336
- Cong LW, Gao H, Ponticelli J, Yang X. 2019. Credit allocation under economic stimulus: evidence from China. *Rev. Financ. Stud.* 32(9):3412–60
- Cong LW, Howell ST. 2021. Policy uncertainty and innovation: evidence from initial public offering interventions in China. *Manag. Sci.* 67(11):7238–61
- Cull R, Xu LC. 2003. Who gets credit? The behavior of bureaucrats and state banks in allocating credit to Chinese state-owned enterprises. *J. Dev. Econ.* 71(2):533–59
- Cull R, Xu LC, Zhu T. 2009. Formal finance and trade credit during China's transition. *J. Financ. Intermed.* 18(2):173–92
- Dai L, Han J, Shi J, Zhang B. 2020. *Digital footprints as collateral for debt collection*. Work. Pap., Univ. New South Wales, Sidney, Aust.
- Deng Y, Morck R, Wu J, Yeung B. 2015. China's pseudo-monetary policy. *Rev. Finance* 19(1):55–93
- Ding Y, Xiong W, Zhang J. 2022. Issuance overpricing of China's corporate debt securities. *J. Financ. Econ.* 144(1):328–46
- Ehlers T, Kong S, Zhu F. 2018. *Mapping shadow banking in China: structure and dynamics*. BIS Work. Pap. 701, Bank Int. Settl., Basel, Switz.
- Elliott DJ, Yan K. 2013. *The Chinese Financial System: An Introduction and Overview*. Washington, DC: Brook. Inst.
- Fama EF, French KR. 1993. Common risk factors in the returns on stocks and bonds. *J. Financ. Econ.* 33(1):3–56
- Fan JP, Wong TJ, Zhang T. 2007. Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms. *J. Financ. Econ.* 84(2):330–57
- Fan L, Tian S, Zhang C. 2012. Why are excess returns on China's treasury bonds so predictable? The role of the monetary system. *J. Bank. Finance* 36(1):239–48
- Fang LH, Lerner J, Wu C. 2017. Intellectual property rights protection, ownership, and innovation: evidence from China. *Rev. Financ. Stud.* 30(7):2446–77
- Firth M, Lin C, Liu P, Wong SM. 2009. Inside the black box: bank credit allocation in China's private sector. *J. Bank. Finance* 33(6):1144–55
- Firth M, Lin C, Zou H. 2010. Friend or foe? The role of state and mutual fund ownership in the split share structure reform in China. *J. Financ. Quant. Anal.* 45(3):685–706
- Flannery MJ, Hong CY, Wang B. 2022. The effect of government reference bonds on corporate borrowing costs: evidence from a natural experiment. *Manag. Sci.* In press. <https://doi.org/10.1287/mnsc.2022.4499>

- Gale WG. 1991. Economic effects of federal credit programs. *Am. Econ. Rev.* 81(1):133–52
- Gambacorta L, Huang Y, Li Z, Qiu H, Chen S. 2023. Data versus collateral. *Rev. Finance* 27(2):369–98
- Gan J, Guo Y, Xu C. 2018. Decentralized privatization and change of control rights in China. *Rev. Financ. Stud.* 31(10):3854–94
- Gao H, Ru H, Tang DY. 2021a. Subnational debt of China: the politics–finance nexus. *J. Financ. Econ.* 141(3):881–95
- Gao H, Ru H, Townsend RM, Yang X. 2021b. *Rise of bank competition: evidence from banking deregulation in China*. NBER Work. Pap. 25795
- Gao H, Ru H, Yang X. 2022c. The informational role of ownership networks in bank lending. *J. Financ. Quant. Anal.* 57(8):2993–3017
- Geng Z, Pan J. 2021. *The SOE premium and government support in China’s credit market*. NBER Work. Pap. 26575
- Giannetti M, Liao G, Yu X. 2015. The brain gain of corporate boards: evidence from China. *J. Finance* 70(4):1629–82
- Groves T, Hong Y, McMillan J, Naughton B. 1994. Autonomy and incentives in Chinese state enterprises. *Q. J. Econ.* 109(1):183–209
- Gul FA, Kim JB, Qiu AA. 2010. Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: evidence from China. *J. Financ. Econ.* 95(3):425–42
- Guo K, Ke B, Tang S. 2022. *Spillover of privately held firms’ financial constraints: evidence from publicly listed firms’ share pledging behavior*. Work. Pap., Natl. Univ. Singapore, Singapore
- Hachem K. 2018. Shadow banking in China. *Annu. Rev. Financ. Econ.* 10:287–308
- Hachem K, Song Z. 2021. Liquidity rules and credit booms. *J. Political Econ.* 129(10):2721–65
- Hansman C, Hong H, Jiang W, Liu YJ, Meng JJ. 2022. *Anticipating the direct effects of credit supply*. NBER Work. Pap. 24586
- Hau H, Huang Y, Shan H, Sheng Z. 2019. How FinTech enters China’s credit market. *AEA Pap. Proc.* 109:60–64
- Hau H, Huang Y, Shan H, Sheng Z. 2021. *FinTech credit and entrepreneurial growth*. Work. Pap., Univ. Geneva, Geneva, Switz.
- He Q, Li X. 2021. The failure of Chinese peer-to-peer lending platforms: finance and politics. *J. Corp. Finance* 66:101852
- He Z. 2020. *Assessing China’s capital requirements and systemic challenges*. Testimony, Hearing on “China’s Quest for Capital: Motivations, Methods, and Implications,” U.S.–China Econ. Secur. Rev. Comm., Washington, DC
- He Z, Liao G, Wang B. 2022a. *What gets measured gets managed: investment and the cost of capital*. NBER Work. Pap. 29775
- He Z, Liu B, Zhu F. 2022b. *Share pledging in China: funding listed firms or funding entrepreneurship?* NBER Work. Pap. 29731
- He Z, Nelson ST, Su Y, Zhang AL, Zhang F. 2022c. *Industrial land discount in China: a public finance perspective*. NBER Work. Pap. 30504
- He Z, Wang Y, Zhu X. 2023a. *Homemade foreign trading*. Work. Pap., Univ. Chicago, Chicago
- He Z, Wang Y, Zhu X. 2023b. The Stock Connect to China. *AEA Pap. Proc.* 113:125–30
- He Z, Xiong W. 2012. Rollover risk and credit risk. *J. Finance* 67(2):391–430
- Hsieh CT, Song Z. 2015. Grasp the large, let go of the small: the transformation of the state sector in China. *Brook. Pap. Econ. Act.* Spring:295–346
- Hu GX, Pan J, Wang J. 2021. Chinese capital market: an empirical overview. *Crit. Finance Rev.* 10(2):125–206
- Hu GX, Wang J. 2022. A review of China’s financial markets. *Annu. Rev. Financ. Econ.* 14:465–507
- Huang H, Zhu N. 2009. The Chinese bond market: historical lessons, present challenges, and future perspectives. In *China’s Emerging Financial Markets: Challenges and Opportunities*, ed. J Barth, J Tatom, G Yago, pp. 523–46. Boston, MA: Springer
- Huang J, Huang Z, Shao X. 2020a. *The risk of implicit guarantees: evidence from shadow banks in China*. Work. Pap., Chin. Univ. Hong Kong, Hong Kong
- Huang JZ, Liu B, Shi Z. 2023. Determinants of short-term corporate yield spreads: evidence from the commercial paper market. *Rev. Finance* 27(2):539–79

- Huang Y, Ge T, Wang C. 2019. Monetary policy framework and transmission mechanisms. See Amstad et al. 2019, pp. 38–62
- Huang Y, Li X, Wang C. 2021a. What does peer-to-peer lending evidence say about the risk-taking channel of monetary policy? *J. Corp. Finance* 66:101845
- Huang Y, Pagano M, Panizza U. 2020b. Local crowding-out in China. *J. Finance* 75(6):2855–98
- Huang Y, Panizza U, Portes R. 2021b. *Corporate foreign bond issuance and interfirm loans in China*. NBER Work. Pap. 24513
- Huyghebaert N, Quan Q, Sun L. 2014. Financing decisions after partial privatization in China: Can a stock market quotation really provide discipline? *J. Financ. Intermed.* 23(1):27–46
- Jefferson GH, Rawski TG. 1994. Enterprise reform in Chinese industry. *J. Econ. Perspect.* 8(2):47–70
- Jian M, Wong TJ. 2010. Propping through related party transactions. *Rev. Account. Stud.* 15(1):70–105
- Jiang F, Kim KA. 2015. Corporate governance in China: a modern perspective. *J. Corp. Finance* 32:190–216
- Jiang F, Kim KA. 2020. Corporate governance in China: a survey. *Rev. Finance* 24(4):733–72
- Jiang F, Kim KA, Nofsinger JR, Zhu B. 2017. A pecking order of shareholder structure. *J. Corp. Finance* 44:1–14
- Jiang G, Lee CM, Yue H. 2010. Tunneling through intercorporate loans: the China experience. *J. Financ. Econ.* 98(1):1–20
- Jiang G, Yue H, Zhao L. 2009. A re-examination of China's share issue privatization. *J. Bank. Finance* 33(12):2322–32
- Jiang J, Liao L, Wang Z, Zhang X. 2021. Government affiliation and peer-to-peer lending platforms in China. *J. Empir. Finance* 62:87–106
- Jiang J, Zhan X. 2019. [History of Chinese state-owned commercial banks reform]. Beijing: China Financ. Publ. House (In Chinese)
- Jiang W, Wan H, Zhao S. 2016. Reputation concerns of independent directors: evidence from individual director voting. *Rev. Financ. Stud.* 29(3):655–96
- Jin S, Wang W, Zhang Z. 2022. The real effects of implicit government guarantee: evidence from Chinese SOE defaults. *Manag. Sci.* In press. <https://doi.org/10.1287/mnsc.2022.4483>
- Johnson DS, Parker JA, Souleles NS. 2006. Household expenditure and the income tax rebates of 2001. *Am. Econ. Rev.* 96(5):1589–610
- Kiyotaki N, Moore J. 1997. Credit cycles. *J. Political Econ.* 105(2):211–48
- Kornai J. 1979. Resource-constrained versus demand-constrained systems. *Econometrica* 47(4):801–19
- Kornai J. 1980. *Economics of Shortage*. Amsterdam: North-Holland
- Kroeber AR. 2020. *China's Economy: What Everyone Needs to Know*. Oxford, UK: Oxford Univ. Press
- Lam WR, Wang J. 2018. *China's local government bond market*. Work. Pap., Int. Monet. Fund, Washington, DC
- LaPorta R, de Silanes FL, Shleifer A, Vishny RW. 1998. Law and finance. *J. Political Econ.* 106(6):1113–55
- Lardy NR. 2014. *Markets over Mao: The Rise of Private Business in China*. New York: Columbia Univ. Press
- Lee CM, Qu Y, Shen T. 2022. Gate fees: the pervasive effect of IPO restrictions on Chinese equity markets. *Rev. Finance* 27(3):809–49
- Li B, Ponticelli J. 2022. Going bankrupt in China. *Rev. Finance* 26(3):449–86
- Li E, Liao L, Wang Z, Xiang H. 2020a. Venture capital certification and customer response: evidence from P2P lending platforms. *J. Corp. Finance* 60:101533
- Li F, Qian J, Wang H, Zhu J. 2020b. *Stock pledged loans, capital markets, and firm performance in China*. Work. Pap., Shanghai Jiaotong Univ., Shanghai
- Li K, Wang T, Cheung YL, Jiang P. 2011. Privatization and risk sharing: evidence from the split share structure reform in China. *Rev. Financ. Stud.* 24(7):2499–525
- Lian P, Wang K, Zhang C. 2022. *Insider trading regulations in China*. Work. Pap., Hong Kong Univ. Sci. Technol., Hong Kong
- Liao L, Liu B, Wang H. 2014. China's secondary privatization: perspectives from the split-share structure reform. *J. Financ. Econ.* 113(3):500–18
- Lin C, Liu H, Ni C, Zhang B. 2022. State controlling shareholders and payout policy. *J. Financ. Quant. Anal.* In press. <https://doi.org/10.1017/S0022109022001132>
- Lin C, Morck R, Yeung BY, Zhao X. 2016. *Anti-corruption reforms and shareholder valuations: event study evidence from China*. Work. Pap., Natl. Univ. Singapore, Singapore

- Lin JY, Cai F, Li Z. 1998. Competition, policy burdens, and state-owned enterprise reform. *Am. Econ. Rev.* 88(2):422–27
- Lin JY, Sun X, Wu HX. 2015. Banking structure and industrial growth: evidence from China. *J. Bank. Finance* 58:131–43
- Liu C, Wang S, Wei KJ, Zhong N. 2019a. The demand effect of yield-chasing retail investors: evidence from the Chinese enterprise bond market. *J. Empir. Finance* 50:57–77
- Liu C, Xiong W. 2019. China's real estate market. See Amstad et al. 2019, pp. 183–208
- Liu J, Stambaugh RF, Yuan Y. 2019b. Size and value in China. *J. Financ. Econ.* 134(1):48–69
- Liu LX, Liu Q, Liu X, Zhu N. 2021a. *Overpricing in municipal bond markets and the unintended consequences of the administrative solutions: evidence from China*. Work. Pap., Peking Univ., Beijing
- Liu LX, Lyu Y, Yu F. 2021b. [Local governments' implicit obligation and pricing of LGFV bonds]. *J. Financ. Res.* 498(12):170–88 (In Chinese)
- Liu LX, Shu H, Wei KJ. 2017. The impacts of political uncertainty on asset prices: evidence from the Bo Scandal in China. *J. Financ. Econ.* 125(2):286–310
- Liu M. 2009. [30 years of reform and opening up in the Chinese banking sector]. Beijing: China Financ. Publ. House (In Chinese)
- Liu Q, Shen Q, Li Z, Chen S. 2021c. Stimulating consumption at low budget: evidence from a large-scale policy experiment amid the COVID-19 pandemic. *Manag. Sci.* 67(12):7291–307
- Liu Z, Wang P, Xu Z. 2021d. Interest-rate liberalization and capital misallocations. *Am. Econ. J. Macroecon.* 13(2):373–419
- Luohan Acad. 2019. *Digital technology and inclusive growth*. Tech. Rep., Luohan Acad., Hangzhou, China
- Ma C, Rogers JH, Zhou S. 2021. *The effect of the China Connect*. Work. Pap., Fudan Univ., Shanghai
- McGregor J. 2012. *No Ancient Wisdom, No Followers: The Challenges of Chinese Authoritarian Capitalism*. Torrington, CT: Prospecta Press
- Meggingson WL, Nash RC, Van Randenborgh M. 1994. The financial and operating performance of newly privatized firms: an international empirical analysis. *J. Finance* 49(2):403–52
- Meggingson WL, Netter JM. 2001. From state to market: a survey of empirical studies on privatization. *J. Econ. Lit.* 39(2):321–89
- Meng Q, Ni X, Zhang J. 2022. A tale of riskiness: the real effects of share pledging on the Chinese stock market. *Pacific-Basin Finance J.* 73:101754
- Merton RC. 1974. On the pricing of corporate debt: the risk structure of interest rates. *J. Finance* 29(2):449–70
- Mo J, Subrahmanyam MG. 2020. *What drives liquidity in the Chinese credit bond markets?* Work. Pap., New York Univ., New York
- Morck R, Yeung B, Yu W. 2000. The information content of stock markets: Why do emerging markets have synchronous stock price movements? *J. Financ. Econ.* 58(1–2):215–60
- Pang C, Wang Y. 2020. Stock pledge, risk of losing control and corporate innovation. *J. Corp. Finance* 60:101534
- PBC (People's Bank of China). 2013. *Financial Stability Report 2013*. Shanghai: China Financ. Publ. House
- Peng WQ, Wei KJ, Yang Z. 2011. Tunneling or propping: evidence from connected transactions in China. *J. Corp. Finance* 17(2):306–25
- Piotroski JD, Wong T, Zhang T. 2022. Political networks and stock price comovement: evidence from network-connected firms in China. *Rev. Finance* 26(3):521–59
- Piotroski JD, Zhang T. 2014. Politicians and the IPO decision: the impact of impending political promotions on IPO activity in China. *J. Financ. Econ.* 111(1):111–36
- Qian Y, Ritter JR, Shao X. 2022. Initial public offerings Chinese style. *J. Financ. Quant. Anal.* In press
- Ritter JR, Welch I. 2002. A review of IPO activity, pricing, and allocations. *J. Finance* 57(4):1795–828
- Ru H. 2018. Government credit, a double-edged sword: evidence from the China Development Bank. *J. Finance* 73(1):275–316
- Song Z, Storesletten K, Zilibotti F. 2011. Growing like China. *Am. Econ. Rev.* 101(1):196–233
- Song Z, Xiong W. 2018. Risks in China's financial system. *Annu. Rev. Financ. Econ.* 10:261–86
- Sun G. 2019. *China's shadow banking: bank's shadow and traditional shadow banking*. BIS Work. Pap. 822, Bank Int. Settl., Basel, Switz.
- Sun Q, Tong WH. 2003. China share issue privatization: the extent of its success. *J. Financ. Econ.* 70(2):183–222

- Sun R. 2020. Monetary policy announcements and market interest rates' response: evidence from China. *J. Bank. Finance* 113:105766
- Tan Y, Tian X, Zhang X, Zhao H. 2020. The real effect of partial privatization on corporate innovation: evidence from China's split share structure reform. *J. Corp. Finance* 64:101661
- Wang C. 2005. Ownership and operating performance of Chinese IPOs. *J. Bank. Finance* 29(7):1835–56
- Wang T. 2019. Monetary policy instruments. See Amstad et al. 2019, pp. 63–86
- Wang X, Xu LC, Zhu T. 2004. State-owned enterprises going public: the case of China. *Econ. Transit.* 12(3):467–87
- Wei Z, Xie F, Zhang S. 2005. Ownership structure and firm value in China's privatized firms: 1991–2001. *J. Financ. Quant. Anal.* 40(1):87–108
- Xing J, Zou E, Yin Z, Wang Y. 2021. “Quick Response” economic stimulus: the effect of small-value digital coupons on spending. NBER Work. Pap. 27596
- Xiong W. 2018. *The Mandarin model of growth*. NBER Work. Pap. 25296
- Xu X, Wang Y. 1997. *Ownership structure, corporate governance, and corporate performance: the case of Chinese stock companies*. Policy Res. Work. Pap., World Bank Group, Washington, DC
- Zhang J, Wang P, Qu B. 2012. Bank risk taking, efficiency, and law enforcement: evidence from Chinese city commercial banks. *China Econ. Rev.* 23(2):284–95
- Zhang J, Zhang Y. 2022. *The invisible hand of the state in privatization*. Work. Pap., Chin. Univ. Hong Kong, Shenzhen, China
- Zhou L. 2004. The incentive and cooperation of government officials in the political tournaments: an interpretation of the prolonged local protectionism and duplicative investments in China (in Chinese). *Econ. Res. J.* 6(33):r40
- Zhu H, Jiang L, Ng G. 2013. *China: the concept of Total Social Financing*. Tech. Rep., JPMorgan Chase Bank, New York
- Zhu N. 2016. *China's Guaranteed Bubble*. New York: McGraw Hill
- Zhu X. 2021. The varying shadow of China's banking system. *J. Comp. Econ.* 49(1):135–46
- Zilibotti F. 2017. Growing and slowing down like China. *J. Eur. Econ. Assoc.* 15(5):943–88

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Errata

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