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A REVIEW OF CHINA'S INSTITUTIONS

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Abstract

The spectacular economic growth in China in the past four decades has inspired a large strand of research to understand China's unconventional growth path. This paper focuses on the recent development of China's institutions, financial markets, innovations and government-business relations in the context of their roles in supporting China's growth. The government's role in finance and the economy has advantages and disadvantages as compared to developed markets in the West. Alternative financing channels and governance mechanisms, rather than the markets and banks, continue to promote growth in the most dynamic sectors of the economy, despite the fact that China has passed the early-development stage. More research is needed to understand the Chinese experience and see whether similar mechanisms are behind the growth in other economies.

JEL Classification: O5, K0, G2

Keywords: institutions, government, Property rights, markets, alternative finance, Innovation

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A Review of China's Institutions*

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1. Introduction

China's strong economic growth in the past four decades and its resilience during the global financial crisis are of great interest to the world. As the second largest global economy using market exchange rates and the largest using purchasing power parity (PPP), China is now a vital part in the global economic structure. While one can observe the measurable inputs and outcomes such as human capital accumulation, reallocation within the manufacturing sector, a large trade surplus, and high output growth (Song, Storesletten, and Zilibotti 2011), it is more important to understand how these factors are connected and translated into long-term growth. The experience in the West has formed a conventional wisdom that legality, formal institutions, and financial markets are critical to allocate and mobilize resources for production in an economy.

Allen, Qian, and Qian (2005), however, show that China has weak investor protection and under-developed markets and formal institutions; that despite the weakness, private sectors that are even more disadvantaged in terms of investor protection and credit access have grown the fastest; and that alternative (non-bank, non-market) financing and governance mechanisms have played a major role in supporting China's economic growth. Since then, a large strand of literature has offered insights on issues such as how imperfections in the formal financial institutions forced firms to rely on internal saving and alternative financing for growth, consistent with the general idea that institutions play a critical role in shaping and influencing a country's economic growth path.

In this article, we review recent developments in China's institutions and how they are related to the continuing economic advancement of the country. Despite continuing reforms in China's law and legal system, banking, and financial markets, some of which are based on western models, the development of the financial system and overall economic growth still do not converge to the path based on western experience. This paper reviews the recent development of financial institutions, markets, entrepreneurship and innovations, as well as government-business relations in the context of their roles in supporting China's growth. Due to space limitation we do not cover other institutions and sectors in the paper: these include fiscal policies, institutions related to economic development, issues related to industrial organization including global supply/value chains, FDI and capital flows, and so on.

We draw four sets of conclusions. First, the Chinese government remains a key player in the financial system and economy through regulations and intervention and through direct and indirect ownership in the corporate and banking sectors. The government's roles are a 'double-edged sword': on the one hand, interference in markets and large state-owned enterprises (SOEs) can 'crowd out' private sectors; on the other hand, the ability of designing and enforcing farsighted policies — most notably, Deng Xiaoping's 'reform and openness' general principal announced 40

years ago, and implementation through ‘crossing the river by touching the stones’ — provides an advantage over democratic and other systems captured by vested interested groups blocking fundamental changes.

Second, despite increased competition and reforms that have improved efficiency, the banking sector has not financed the growth of the most dynamic sectors of non-SOEs and households. This is where Fintech and new types of financial institutions have come in and filled (part of) the gap. The government’s massive stimulus in 2009 rescued a falling economy that relied on exporting, but led to a dramatic expansion in shadow banking. The stock market remains speculative and the performance of domestically listed firms has been quite poor relative to those from large developed and emerging markets, externally listed and matched unlisted Chinese firms. Deficiencies in the market’s institutional features such as IPO and delisting mechanisms and corporate governance can explain this underperformance.

Third, alternative financing (from non-bank, non-market channels), still plays a vital role in China’s industrial development and economic growth. International comparison shows that the prevalence of alternative financing is not unique to China; in fact, China is average in terms of using alternative finance among large emerging economies. Formal and alternative institutions (outside formal financial institutions and markets) both have their strengths and limitations and should coexist to continue promoting growth in China.

Fourth, we have witnessed a large amount of entrepreneurial activities, and the economy has become more innovative in both traditional and new industries. China is leading in some tech sectors—examples include Fintech and applications of artificial intelligence (AI). Some empirical evidence suggests that improved protection of intellectual property rights is behind the increased pace of innovations. An alternative explanation is that competition for survival suffices to motivate firms to innovate. Innovations in China have also followed paths that are different from the US and Europe with a key element being the attitude toward ‘imitation of success.’

China’s economic transformation is unprecedented. Its path and dynamics offer researchers a wealth of data observations to explore economic development and financial market issues with different perspectives. Greif and Tabellini (2010) compare the cultural and institutional bifurcation in China and Europe, pointing out that how to sustain cooperation in a kinship-dominated society like China and a city-dominated society like Europe have largely contributed to the distinct pre-modern trajectories in the institutional development. Evidence reviewed here suggests that there are distinct models for long-term growth and supportive institutions that are different from the West, and more research is needed to uncover these different institutions and growth and which are more suitable for various stages of growth in different countries.

1. Government's role in business and the economy

Recent studies on the Chinese government's role in business focus on three areas: privatization, intervention, and the value of political connections in business and the recent anti-corruption campaign. Reviewing these studies paints a picture that the Chinese economy is characterized by state capitalism with tight and substantial government control through personnel appointments and direct ownership of corporations.

However, such ubiquitous presence and control by the government might have an advantage in launching international projects with a very large scale, especially those infeasible or too costly for global markets to fund, such as the ongoing "One Belt, One Road" initiative. In addition, China's outward foreign direct investment has increased substantially over the past decade, making China the world's third largest overseas investor.

1.1 Privatization versus nationalization

China has gone through substantial efforts in liberalizing the economy and relaxing government control in the past four decades, but this process is not always smooth. Despite significant steps taken such as legislation on property protection and deepening of privatization through split share structure reform, the government still has tight control over the economy through ownership and personnel.

According to Huang, Li, Ma, and Xu (2017), the Chinese government actually runs SOEs in compliance with classic economic theories. They show that the decentralization choice of SOE production is consistent with Hayek (1945)'s argument that production units with longer distance to government, higher communication costs, larger asymmetric information, and greater firm-performance heterogeneity should be more decentralized.

Based on a proprietary survey dataset containing 3,000 firms in over 200 cities, Gan, Guo, and Xu (2017) study privatization choices, mechanisms and outcomes. They show that less political opposition to labor downsizing and greater fiscal capacity prompt cities to choose direct sales to insiders, i.e., management buyouts. This method transfers control rights to private owners, retains limited government support, imposes hardened budget constraints, allows for restructuring, and achieves performance improvement.

However, recent studies have suggested a reversal in the privatization process. Huang, Li, Ma, and Qian (2018) document a large-scale "re-nationalization" — local government re-possessing controlling ownership stakes in about a quarter of previously privatized firms during the period 1999-2007. Renationalization is more likely in provinces with newly appointed, top-ranked Communist Party leaders who are not affiliated with any of the three dominant political factions, and leads to lower profitability and labor productivity and higher firm leverage. While economic

performance remains a yardstick for politicians' career advancement (Li and Zhou, 2005), the authors find that the promotion of politicians without strong factional ties is more sensitive to measures of social stability such as local unemployment, compared with GDP growth.

A reversal in financing is also documented in rural China. Qian and Huang (2016), using bank documents and a large panel of survey data, demonstrate that China's rural financial policy in the 1980s was actually quite market-oriented in terms of employing market mechanisms, supporting entrepreneurship, and encouraging competition. These policies were abandoned in the early 1990s and replaced by frequent government interference that shifted resource and policy priorities to benefit political incumbents.

1.2 Government intervention, political risk, and their economic impact

You, Zhang, and Zhang (2017) document evidence of the government directly influencing the market through ownership of media firms and how the market prices such actions. Comparing a large sample of news articles written by state-controlled and market-oriented Chinese media, they find that articles by the market-oriented media are more critical, more accurate, more comprehensive, and timelier than those by the state-controlled media. On corporate governance issues, the market reacts only to articles written by the market-oriented media.

Political risk affects asset prices also by impacting the discount rate. Using the event of the Bo Xilai political scandal in 2012, Liu, Shu, and Wei (2017) document a significant drop in stock prices following this political turbulence, especially for firms that are more politically sensitive. Ang, Bai, and Zhou (2016) document a significant drop in the prices of Chengtou Bonds—fixed income securities issued by government special vehicles or private corporations to finance urban and infrastructure projects—when local officials are investigated for corruption.

International relation on political issues also impact the markets. Fisman, Hamao, and Wang (2014) show that both Japanese companies with high China exposure and Chinese companies with high Japanese exposure suffer relative declines during the adverse shocks to Sino-Japanese relations in 2005 and 2010. The effect on Japanese companies is more pronounced for those operating in industries that are more dominated by Chinese SOEs, suggesting the mediating role of political institutions in international economic collaboration.

In fact, such risk and influence of political uncertainty are not unique to China but are universal around the world. Using national elections as sources of exogenous variation in uncertainty, Cao, Li, and Liu (2017) show that political uncertainty deters foreign firms' inbound acquisitions, especially when the host country poses greater expropriation risk. Outbound cross-border acquisitions increase when there is an upcoming election in the home country, especially to

target countries with whom they have free-trade agreements, military alliances, or better governance.

1.3 The value of political connections and the anti-corruption campaign

In contrast to the conventional opinion that the market receives privatization as value-generating news, Calomiris, Fisman, and Wang (2010) document negative market responses to unexpected announcements of the sale of government-owned shares in China and positive effects upon the policy's cancellation. The authors argue that the phenomenon is due to the fact that the benefits of political ties outweigh the efficiency costs of government shareholdings. In further contrast to previous studies showing that firms with politically connected CEOs underperform (Fan, Wong, and Zhang, 2014) after share-issuing privatization (Megginson 2017), this study shows that firms managed by former government officials have positive abnormal returns.

Several other studies further explore the channels for political incentives in this state capitalism setting to create economic value. For private firms, a party membership of their CEOs enhances the firm's access to bank credit and elevates their status in the legal system (Li et al., 2008). CEOs in SOEs have political careers at stake and their promotions are part of their managerial incentive. Their political career concerns can provide an important source of implicit economic incentives. Consistent with this latter hypothesis, Cao, Lemmon, Pan, Qian, and Tian (2018) show that the likelihood that the CEO receives a political promotion is positively related to firm performance and that CEOs with a higher likelihood of political promotion have lower pay levels and lower pay-performance sensitivity. Their study suggests that it is possible for government control and shareholder interest to be aligned and that the competition in the political job market helps mitigate weak monetary incentives for CEOs in China.

Another study suggesting the alignment of government control and capitalism is Piotroski and Zhang (2014). This paper documents that incentives created by the impending turnover of local politicians can accelerate the pace of initial public offering (IPO) activity in certain politicized environments. As politicians are rewarded for capital market development, the rate of exchange-eligible firms engaging in an IPO, for both state-owned and non-state-owned entities, temporarily increases in advance of impending political promotion events. The effect is associated with political reward incentives for SOEs, but not for non-SOEs.

The Chinese government launched a large scale, top down, anti-corruption campaign since President Xi took office in 2012. While attempts to use the law to rule out corruption often fail, an interesting aspect of corruption is that its damaging effects on economic performance seem to differ significantly across countries. In large and regionally diverse countries such as China and India,

rampant corruption has not slowed down economic growth; in many African and South American countries it seems that corrupt officials severely retard economic development.

Allen, Qian, and Shen (2018) examine corruption associated with the provision of government services and goods. Local officials can charge a fee to cover the cost of provision; with an agency problem, local officials set higher than social optimal fees as bribes and corruption occurs. Central government can mitigate the agency problem by paying for performance, but this scheme is infeasible when the government is budget-constrained. This paper argues that a different approach is to introduce competition among officials. With multiple officials providing the same service or good, the fee is determined competitively, and the pernicious effects of corruption are minimized, so is the cost of implementing the optimal payment scheme by the central government.

Regarding the recent anti-corruption campaign, Lin, Morck, Yeing, and Zhao (2016) shows a positive market reaction to the government's announcement of the campaign, the value increase occurs mainly in SOEs due to reduction in top managers' private benefits and non-SOEs that are located in regions with strong market mechanisms. Griffin, Liu, and Shu (2018) find that while executives in firms with poor governance, self-dealing, and inefficiencies are more likely to be investigated, the likelihood of investigation increases (decreases) with their connection with the falling (incumbent) central political leaders.

2. Financial Institutions

A large literature is devoted to understanding the (in)efficiency, role in supporting economic growth, and the risk of China's banking sector, informal financing, and shadow banking. In this section, we review the three credit types' recent development and studies on these. Our main findings are that (i) substantial inefficiency remains in the banking sector; (ii) that shadow banking is the result of the inadequate operation of the banking sector, (iii) that informal financing remains an important support for industrial development and economic growth in China; and that the usage of informal financing is not unique in China but rather that China is quite average in terms of informal financing usage when compared to other major emerging economies in the World; and (iv) Fintech has changed the landscape of traditional credit and banking in China, best illustrated by the growth of new types of financial institutions such as Ant Financial.

2.1 The Banking System

One of the most significant changes in the banking system in the past decade is that the dominance of the Big Four banks has diminished, as smaller and foreign banks and many non-bank institutions have entered the lending and credit market. Increasing competition and collaboration among the foreign and domestic banks brought a surge of technology and management innovations

in the Chinese banking industry. As evidenced by the reduction in the overhead cost ratio, efficiency in Chinese banks has increased and the efficiency improvement is most prominent for large state-owned banks (Allen, Gu and Qian, 2017).

An important measure for enhanced bank efficiency is the establishment of internal credit rating system, and alignment of loan officers' incentive through compensation and bonus schemes with banks' risk management. Qian, Strahan, and Yang (2015) demonstrate the importance of loan officer incentives in information production and loan quality by studying a reform in banking practice in 2002-2003 - the delegation of authority to individual loan officers. They find that the bank's internal risk rating becomes a stronger predictor of loan interest rates and ex-post outcomes after the reform, especially when the loan officer and the branch president who approves the loan have a more extended working relationship.

A large strand of literature has pointed out that state-owned, large banks prefer to provide bank loans at low cost to SOEs. This phenomenon and its adverse economic consequence have persisted in recent years. Cong, Gao, Ponticelli, and Yang (2018) document that during China's economic stimulus plan of 2009-2010, the expanded credit disproportionately favored SOEs and firms with lower marginal product of capital. Ru (2018) uses proprietary data from the China Development Bank (CDB) to illustrate that banks' industrial loans to SOEs crowd out private firms in the same industry and private firms in downstream industries. Bailey, Huang, and Yang (2011) show that state-controlled banks make lending decisions (in part) to avert unemployment and social instability. This conclusion is based on the evidence that firms' poor financial performance and high managerial expenses actually increase the likelihood of obtaining a bank loan and bank loan approval predicts poor subsequent borrower performance. More strikingly, Chen, Liu, and Su (2013) argue that bribery, rather than firm performance, largely determines the extent to which private firms gain access to bank credit in China.

China successfully tackled the NPL problem in the early 2000s, when NPL/GDP reached a level above 20% (Allen, Qian and Qian, 2008). However, nonperforming loans (NPLs) started to grow again in 2011, as a result of the massive credit expansion during the stimulus. From 2014 to 2016, publicly listed and joint-stock banks collectively wrote off RMB 1.18 trillion (US\$ 183 billion) in bad loans, compared to only RMB 258 billion during 2008-2013. To tackle the corporate debt overhang problem, the Chinese Banking Regulatory Committee (CBRC) launched the Debt-to-Equity Swaps (DES) program in October 2016. This debt restructuring arrangement allows banks to transfer loans to special purpose vehicles (SPVs) to be converted to equity for companies that have a high debt burden. However, this design implicitly permits banks to issue wealth management products (WMPs) to fund their (subsidiary) SPVs, channeling household and corporate savings to investment

in underlying problematic assets. According to the CBRC, participating banks have announced a total of RMB 767.2 billion in DES contracts as of April 2017. The practice of creditor committees has also been adopted by the CBRC, which allows multiple bank lenders to coordinate credit extension and debt restructuring of financially distressed firms.

The inefficiency in banking not only affects banking industry stability but can also dilute the equity markets' disciplinary role. Qian and Yeung (2015) document a negative relation between bank financing and future firm performance. However, many firms with poor governance can continue to receive bank loans with interest costs comparable to others. These firms are less concerned about being penalized by the equity market and tend to engage more in tunneling activities.

2.2 Alternative finance

Financial development plays a critical role in industrial development and economic growth. Conventional wisdom based on western countries claims that it is the well-developed financial institutions such as banks and markets that fund corporations and growth, evidence from China has mostly consistently suggested otherwise. Allen, Qian, and Qian (2005) first provide aggregate and sector level evidence that credits from non-bank, non-market sources and based on reputation and relationships have supported the fastest growing sector of China in the past four decades. He, Xue, and Zhu (2016) provide industrial sector level evidence that sectors reliant on access to external finance tend to concentrate in regions with well-developed financial markets, foreign direct investment, and alternative financing channels. However, proxies for formal financial markets, such as the banking system and capital markets, have few effects on regional industrial agglomeration.

More recent analyses based on firm level and transaction level data continue to support the above conclusions. Allen, Qian, and Xie (2018a), suggest a framework to understand alternative financing based on mechanisms to deal with asymmetric information and enforcement. They show that constructive funding such as trade credits and family borrowing that relies on information advantages or an altruistic relationship is associated with good firm performance. Underground financing such as money lenders who use violence for enforcement is not.

Özer, Zheng, and Ren (2014) show that Chinese individuals exhibit spontaneous trust and trustworthiness as much as U.S. counterparts only when there is a prospect for long-term interactions. Ang, Cheng, and Wu (2015) show that foreign high-tech companies investing in China prefer regions where the partners and employees are considered as more trustworthy to mitigate the risk of being expropriated in intellectual property.

Informal financing such as that through family has the advantage in cost and information when relationship and reputation are at work. However, it suffers from the disadvantage in terms of size and promoting risk sharing. Allen, Qian, and Xie (2018b) and Lee and Persson (2017) model

these trade-offs. Moreover, using the data from the World Bank Surveys that have been conducted across countries in multiple rounds, Allen, Qian, and Xie (2018a) show that China is not an outlier but rather average in using alternative financing in international comparisons (see Table 1).

Some studies, for example, Ayyagari, Demirgüç-Kunt, and Maksimovic (2010), also using the World Bank firm surveys, question the scale and importance of informal financing in China. In response, Allen, Qian, and Xie (2018a) demonstrate that, in addition to endogeneity issues in these studies, ignoring the various heterogeneities in nonbank lending might have attributed to the under-acknowledgement of the role of informal financing in China.

Direct inter- or cross-business group transfer is another constructive nonbank financing channel. Allen, Qian, Tu, and Yu (2018) use transaction-level data to show that *entrusted* loans, one of the largest components of shadow banking in China involving firms with privileged access to cheap capital channeling funds to less privileged firms, increase when credit is tight and the pricing incorporates fundamental and informational risks. Inter-business group related party transactions have also been studied as a form of tunneling due to weak governance (Jiang, Lee, and Yue 2010). However, the intercorporate loans could be a coinsurance mechanism on credit markets. Jia, Shi, and Wang (2013) show that a credit crunch experienced by the controlling shareholding firm of a publicly listed firm increases the loan-based related party transactions including loan guarantees and intercorporate loans provided by the listed firm to the controller. In turn, when the listed firm's performance dips, the controller and its subsidiaries provide more support to the listed firm. The *value-enhancing* financing among networks are further supported by Shi, Townsend, and Zhu (2018). Using the 2006 city commercial bank (CCB) branching deregulation and the geographical variation of Chinese firms' cross-holding network, they show that holding firms' increasing access to non-local CCBs significantly improves the investment and performance of their subsidiaries in other cities.

Finally, trade credits also allow financing intermediation in a global setting through foreign direct investment (FDI). Lin and Ye (2017) show that FDI firms provide more trade credit than local firms during tight domestic credit periods and the differential responses are stronger in financially more dependent industries or Chinese provinces with less financial depth.

2.3 Shadow banking and regulations

Shadow banking is not a new phenomenon in China. It has been a part of China's financial system since the 1980s and played a positive role in financing entrepreneurial activities that have constrained access to finance (Qian and Huang 2016). Zhu (2018) categorizes shadow banking into those initiated by banks and those initiated by local governments or SOEs. He demonstrates that the former tends to be efficiency enhancing, but the latter is likely to lead to misallocation of capital.

Like its counterparts in developed markets, ‘regulation arbitrage’ is behind the growth of China’s shadow banking sector. Prior to the end of 2015, China’s central bank—People’s Bank of China (PBC) set ceilings on bank deposit rates; banks also face on-balance-sheet lending restrictions including capital ratio requirements and a limit on loan-to-deposit ratios (LDR)—loans cannot exceed 75% of total deposits. Facing these regulations, profit-seeking banks pursue less regulated activities, most notably in the form of wealth management products (WMPs): by offering higher rates than regulated deposit rates, WMPs help banks attract more savings including from bank depositors, and principal-floating products can move loan assets off the balance sheet.

These regulations led to the rise of shadow banking sector, broadly defined to be lending and all the investment products *off* the balance sheets of deposit-taking institutions/banks. Wang, Wang, Wang, and Zhou (2018) model the ‘dual-track’ system of interest rates and intermediation and its welfare implications, and Dang, Wang and Yao (2014) theoretically explain the differences between the US and Chinese shadow banking sectors. Hachem and Song (2015) provide a theoretical analysis on the interactions between large and small banks both in on- and off-balance sheet markets and show how shadow banking with off-balance sheet products can arise from bank competition.

One way shadow banking can enhance welfare is through its reallocation of credit to more efficient private sector firms, which often have difficulty accessing bank credit. Allen, Qian, Tu and Yu (2018) study a large component of the shadow banking sector—entrusted loans, which are extended by non-bank financial institutions and firms with banks serving as agents of the transactions. They find that nonaffiliated loans—loans extended to firms that are not subsidiaries of or closely affiliated with the lenders—have much higher interest rates than both affiliated loans and bank loans, and the pricing of these loans incorporates fundamental and informational risks.

In response to the global financial crisis in 2008, the Chinese government implemented a massive RMB 4 trillion stimulus plan through the major state-owned banks that in turn pumped a large volume of new loans into the economy. The stimulus and the credit expansion led to the rapid growth of the shadow banking sector, broadly defined to be all investment products off the balance sheets of banks. Acharya, Qian, and Yang (2018) show that the extent of support for the plan was different across the Big Four banks, and the scale of WMP issuance is greater for the other banks that are more constrained by on-balance sheet lending and face greater competition in the deposit market from local branches of the most rapidly expanding big banks.

He, Chen, and Liu (2018) show that credit from the shadow banking sector plays a key role in rolling over local government debt originated from bank loans during the stimulus. Chen, Ren and Zha (2018) show that contractionary monetary policy during 2009–2015 caused shadow banking loans to rise rapidly, offsetting the expected decline of traditional bank loans and hampering the

effectiveness of monetary policy on total bank credit. Figure 1 shows the growth of bank loans, local government from non-bank sources, and wealth management markets years after the stimulus plan. In addition, Allen, Gu, Qian and Qian (2018) show that implicit guarantee is a key factor behind the growth of trust products, and that the substitution of trust products and bank loans also renders the policy of restricting bank credit flowing to the real estate sector ineffective.

2.4 The Growth of Fintech

One reason for the fast growth in this sector is underdevelopment of traditional banking, especially the lack of credit access for small- and medium-enterprises (SMEs), and financial services provided to ordinary retail customers. This unfulfilled large demand makes technology-based companies' entrance into a market dominated by state-owned institutions highly profitable (e.g., Chen, 2016). Another reason for the surge in the number and scale of Fintech companies is that the regulators did not set stifling restrictions for conducting certain transactions or barriers to enter core financial services industries such as payment and lending for privately owned companies.

The success of one of the largest Fintech firms in the world, Ant Financial, provides a good case study. It is now the largest credit provider to SMEs and consumers in China, with the overwhelming majority of their borrowers shut out of formal financial institutions. One key component of credit risk assessment is they have access to the 'big data' of payment records from Alipay, one of the largest (third-party) payment systems in China, as well as sales information of over a million SMEs that use the Taobao platform, the largest e-commerce platform in China. All of these platforms and entities are part of Alibaba's ecosystem, and hence Ant Financial obtains all the data for free. It is worthwhile to point out that at the initiation of Alipay and at the juncture when they began to challenge the status of Unionpay, the state-owned payment system, in China, regulators did not impose any discriminating restrictions on them; nor did the regulators impose any restrictions in utilizing (the same company's) payment and sales data in credit and lending.

Huang, Hau, Shan and Sheng (2018) utilize automated credit lines to more than a million firms trading on Taobao and show that firms' credit approval and first-time online credit boosts growth in terms of sales and transaction growth. With a similar set of data, Huang, Lin and Liu (2018) find that access to credit has a causal effect on firms to provide better services as measured by detailed seller ratings contributed by customers. The positive effect is significantly larger for firms in more competitive industries, and the access to credit also helps firms improve their resilience to operational shocks.

The other type of internet financing, Peer-to-peer (P2P), has not performed well. This sector enjoyed a short boom period (2014-2016) with little government regulation; but many online platforms, with no qualifications to be credit provider or investment manager, acted as credit

intermediaries (after raising funds both online and offline) rather than information intermediaries (Wang, Shen and Huang, 2016). Adverse selection and moral hazard problems occurred, and when the aggregate credit market conditions worsened in 2017 a number of platforms collapsed. Wang, Shen and Huang (2018) use news articles published between January 2013 and August 2017 to construct a sentiment index and find that positive sentiment tends to raise trading volume; trading volume also responded positively to the interest rates granted to lenders and negatively to the market liquidity conditions.

3. Property Rights Protection and Innovations

One of the cornerstones of Western law and institutions is property rights. We briefly review the extensive literature in industrial organization examining the relationship between the protection of intellectual property rights and the pace of innovations (see, e.g., the OECD (2004) report for more comprehensive coverage). We then review facts about China's entrepreneurial activities and innovations and discuss open questions for future research.

3.1 Evidence in China and Elsewhere

We focus on two aspects of intellectual property rights. First, whether the protection of exclusive rights (through patents, copyrights, trade secrets, trademarks, etc.) has a positive impact on the pace of innovations and second, the problems of using the law and legal institutions as the basis for disputes related to intellectual property rights. In almost all the countries with laws on intellectual property rights, the scope of patentable subject matter has *not* included *fundamental* scientific discoveries. A rationale for this omission is that, given the far-reaching impact in many fields of these discoveries, it is impossible to outline the boundaries of the patent protection. In fact, whether the *boundary* of a patent can be precisely defined is an important determinant of effective enforcement of patent law (e.g., Bessen and Meurer 2008). Once the patent is approved and issued, the primary forum for resolving disputes is the courts, which have exclusive jurisdiction over disputes involving the infringement of patents and appeals of court decisions.

There is an extensive literature in industrial organization examining the relationship between the protection of intellectual property rights and the pace of innovations during the past three decades, and the research yields mixed findings. For example, in the chemicals and pharmaceuticals industries, stronger and more effective protection has been found to lead to more R&D spending and innovations in developed countries. This positive relation is attributed to the fact that most patents are valuable with clearly defined boundaries, which, in turn, helps keep litigation costs (of alleged infringers) low. However, it is unclear whether the most important inventions and

discoveries in the chemicals and pharmaceuticals industries were made under the protection of property rights. Allen and Qian (2010) present the development of some of the most important (and profitable) medical breakthroughs during the past 150 years. They conclude that the majority (especially before 1950) of the discoveries was made by university researchers (not affiliated with corporations) and the initial invention was *not* protected by any patents. In some of the cases the patent holder is not the original inventor or discoverer.

Outside the chemical and pharmaceutical industries, prior economic research finds that in many developed countries, there is no positive relation between the protection of intellectual property rights and the pace of innovations. Instead, excessive protection deters competition, which is another key factor in spurring innovations, and small inventors do not benefit from the laws on intellectual property as much as large corporations. Based on changes in patent laws and enforcement regulations, Lerner (2002; 2005), among others, finds weak or no evidence that *strengthening* patent rights and the enforcement of patent laws spur the pace of innovations across developed countries.

Research in developing countries generally fails to establish a positive relationship between the protection of intellectual property rights and the pace of innovations. This is in part due to weak enforcement of such rights and the lack of other relevant institutions. See, for example, Djankov and Murrell (2002) for a review on the obstacles in the development of commercial laws and legal system in the economies of transition in Eastern Europe and Vietnam. China is often singled out as notoriously bad in protecting property rights. Despite the fact that China introduced the protection of Intellectual Property Rights (IPR) law in 1986, copying and imitation via reverse engineering is a common strategy across industries. Legal actions by foreign firms have seen limited or no effects in preventing these activities.

Recent studies (e.g., Lin, Lin, and Song, 2010; Lin, Lin, and Zou, 2012) demonstrate a positive cross-sectional (region) relationship between the perception of Property Rights (or IRPs) and firm innovations. In addition, Fang, Lerner, and Wu (2017) document that, regions with a better perception of IPR protection have benefited more from privatizations of SOEs in term of encouraging innovation. However, endogenous relations among economic development including privatization, marketization, and industry competition remain a concern for all of these studies. Moreover, while the IPR laws were enacted in 1986 and privatization started in the early 1990s, patent applications and approval only maintain a reasonable growth rate since the late 1990s and the near-exponential jump comes only in late 2000s. In fact, intense pressure from competition alone can provide sufficient incentives for firms to maintain an advantage for survival through *constant* innovations.

In 2006, the government enacted a Property Rights protection law. Chen, Pan, Qian, and Wu

(2018) show that firms' innovation activities increase after the law's enactment, particularly so for firms with more tangible assets and in locations with higher real estate prices. They point out the importance of enforcement in addition to law enactment, and highlight access to financing at low cost as the key factor for boosting innovations. Confirming the importance of financing, Zheng, Wang, and Xu (2018) show that bank-connected firms are granted 18-24% more patents than comparable firms during the post-RMB 4 trillion stimulus period.

Allen and Qian (2010) argue that one problem of the patent system based on the law is that it motivates rent-seeking behaviors by interest groups. A good set of examples illustrating problems of intellectual property rights are recent innovations in communications and knowledge industries based on the Internet. Some of these inventions are free of charge and are not protected by patents or copyrights, while others do charge and are protected. When it is difficult to determine whether an invention has broached the boundary of a patent, as is often the case for Internet innovations, enforcement efforts become ineffective. The efforts by vested interest groups become useless when the public is engaged in the illegal act at low cost, but these efforts become more effective when a single company is leading the implementation of new technologies. The contrast in these cases highlights the argument that using the law as the basis for the protection of intellectual property rights can induce rent-seeking behavior by the interest groups that will have the most to lose given the new technologies, and their efforts can become significant barriers to innovations.

Gao, Hsu, and Li (2018) demonstrate an inefficiency associated with the financial market. They show that publicly listed firms' patents rely more on existing knowledge and are more exploitative while private firms' patents are broader in scope and more explanatory. They conclude that the difference is driven by the shorter investment horizon associated with the stock market.

3.2 Entrepreneurship and Innovations: The Chinese model?

There have been waves of entrepreneurial activity alongside fast-paced innovations in China. Krug and Hendriscke (2002) apply the transaction cost approach for established firms and the industrial ecology concentration for new firms to understand entrepreneurship in China. Established SOEs lack the right market organizational form but rely on state coordination to facilitate long-term ventures, while the young private entrepreneurs find it costly to acquire the necessary know-how. Their field work in Zhejiang and Jiangsu shows that performance-based culture, experimentation, and selection in the industrial ecology work together to support entrepreneurship and technology advancement.

Mr. Kai-Fu Lee, a venture capitalist and former artificial intelligence (AI) researcher in the U.S., elaborated on the differences between China and the U.S. in the field of AI and its applications (*New York Times*, 09/22/2018). In his view, the U.S. still maintains an advantage in visionary research

and fundamental discoveries, while China now leads in a number of areas of practical implementation. The reasons for China's catching up in implementation are three-fold. First, China has abundant data, which is valuable for all applications of new discoveries in AI and results from millions of Chinese conducting many business and daily transactions online (e.g., on Alibaba's various platforms and those of Tencent, the other tech giant). Second, there is a fundamental difference in the 'culture' of innovations. In Silicon Valley, entrepreneurs equate innovation with doing something fundamentally different from all the existing models and products, and there is much stigma attached to mimicking others. The result is that not all possibilities of new technologies have been fully exploited. In China, as mentioned above, a common strategy in all the industries including tech is imitating a successful business model and then modifying it. Once a concept/product/service is proven, many new companies enter the industry, and the survivors after multiple rounds of ferocious competition can capture very large markets. Third, also discussed above, there hasn't been much regulations restricting the imitation and growth of these firms, which is also different from the U.S. and other developed economies. Much more research can be done to examine entrepreneurship in China.

4. Financial Markets

China's stock market has risen five-fold in the last decade, reaching over \$5 trillion in total market capitalization as of May 2018, making it the world's second largest (behind the U.S.) if stocks listed and traded in the Hong Kong exchange are included. There has also been substantial progress in the market's internationalization, including the Shanghai-Hong Kong Stock Connect launched in 2014, the Shenzhen-Hong Kong Connect in 2016, and the Shanghai-London Connect, which is scheduled to be launched at the end of 2018. These investment channels improve cross-border capital flow while capital controls are still in place. The bond market has also grown very fast. The pace of the growth in the real estate market has slowed down and the gap between coastal areas and inland areas has grown larger. In this section, we review the development during the last decade in the largest financial markets.

4.1 Trading, Performance and Inefficiency in the Stock market

The Chinese stock market started in 1990 with the establishment of two domestic stock exchanges: the Shanghai Stock Exchange (SSE hereafter) and Shenzhen Stock Exchange (SZSE). The SME and GEM Boards that support small and medium-sized firms and those from new and growth industries have been introduced in the SZSE in 2004 and 2009. The number of listings in the Chinese domestic, A-share market has more than doubled to over 3200 in the past decade. The performance of the A-share market over the period 2000-2017, relative to developed and large emerging markets,

externally listed (mostly in Hong Kong and the U.S.) Chinese firms as well as matched unlisted firms in China, has been strikingly poor. In fact, the gap in operating performance between A-share listed firms and externally listed and matched unlisted Chinese firms is greater than the well-known gap between SOEs and non-SOEs.

Allen, Qian, Shan, and Zhu (2018) examine *institutional* features of the markets in explaining the poor performance of the A-share market and its disconnection with China's economic growth. First, problematic IPO and delisting processes exacerbate the adverse selection of firms in the market. With much higher levels of investment compared to listed firms from the US, Japan, India and Brazil, Chinese firms generate lower net cash flows, implying low investment efficiency. Lower cash flows are associated with more related-party transactions. Both of these results indicate deficiencies in corporate governance as the other main reason for the poor performance.

Most of the recent evidence points to inefficiencies in the market. Among very limited types and amounts of derivatives, warrants (on stocks) were issued as part of the compensation for retail investors during the 2005 'split-share' reform. During 2005-2008, over a dozen put warrants went so deep out of the money that they were almost certain to expire worthless. However, they were traded with a daily turnover rate over 300 and at substantially inflated prices compared to the fundamental values. In studying these warrants, Xiong and Yu (2011) conclude that the 'bubble' in prices were due to shore-sale constraints and heterogeneous beliefs—buyers of the warrants were willing to pay inflated prices as long as they have the option to sell it to someone with an even more optimistic belief for a speculative profit. Gong, Pan, and Shi (2016) show that new investors initiated the bubble at the opening call auction and were the key driving force to sustain the bubble until the maturity of the warrant. Liu, Zhang, and Zhao (2014) demonstrate that this warrant bubble even had a contagious and spill-over effect on the stock market.

The rise and fall of the market in 2015 have attracted much attention from investors, academia, and regulators. One factor that contributed to the bubble in the market during the first half of 2015 was margin trading, especially the highly levered, shadow-financed margin accounts that were not closely regulated or monitored until after the market crash. Bian, He, Shue, and Zhou (2018), using account-level trading data of a large sample of margin accounts, document direct evidence for deleveraging-induced fire sales during the crash. Bian, Da, Lou, and Zhou (2018) further explore the contagion effect of this deleverage-induced fire-sale through the network of margin investors.

The government intervention on this market crash, as Huang, Miao and Wang (2016) document, has both benefits and costs. On one hand, they find that government intervention during the market crash increased the value of the rescued firms with a net benefit estimated to be

between RMB 2,464 and 3,402 billion. The value creation comes from the increased stock demand by the government, the reduced default probabilities and the increased liquidity. On the other hand, the long-run costs of government intervention are of concern. The massive stock purchases by the government prevented market discovery of stock prices, leading to price deviation from fundamentals. Its trial and error approach may have created more uncertainty in the market, which in turn may have exacerbated market volatility. The rescue may also have created a moral hazard problem going forward.

Recent papers also examine investors behavior and find evidence of irrationality. Hirshleifer, Jian, Zhang (2016) find that even the superstition on cultural lucky numbers influences the initial public offerings (IPO) in the Chinese equity market. Not only is the usage of lucky numbers unexpectedly frequently used in IPOs, but also newly listed firms with lucky listing codes experience inferior post-IPO abnormal returns. Gao, Shi, and Zhao (2018) find that investors who recently experienced good luck, measured by winning an allotment for an IPO, become overconfident and trade more frequently and lose more money than investors who don't have an allotment. Pan, Tang, and Xu (2015) develop a measure of abnormal turnover ratio that isolates speculative trading from trades driven by liquidity and other reasons. They show that, in Chinese markets the abnormal turnover ratio is significant and predicts negative performance.

Jia, Wang, and Xiong (2017), using segmented dual-class shares of Chinese firms—A shares traded in mainland China by local investors and H shares traded in Hong Kong by foreign investors — document a rich pattern in the differential reactions of local and foreign investors to analyst recommendations. Because of the investors' differential reactions, analyst recommendations may exacerbate, rather than attenuate, the market segmentation between the two share classes.

These irrational behaviors might be partly explained by the dominance of retail investors in the Chinese equity market. Choi, Jin, and Yan (2012), using holdings data on a representative sample of all Shanghai Stock Exchange investors, show that increases in ownership breadth (the fraction of market participants who own a stock) by retail investors are associated with overpricing and predict low returns. Hong, Jiang, Wang, and Zhao (2014) show that not only status competition can explain excessive trading (among retail investors), but also the uneven rise of affluence across Chinese cities between 1998 and 2012. By studying stock returns and account-level trading records, Titman, Wei, and Zhao (2018) find evidence consistent with the hypothesis that some firms manipulate stock prices around stocks splits and expropriate retail investors.

Lack of corporate transparency might be another reason for the market inefficiency. In an efficient market, stock price movement should reflect more firm-specific information. Building on earlier work by Morck, Yeung, and Yu (2000), and Jin and Myers (2006), Gul, Kim, and Qiu (2010) find

stock price synchronicity remains high in the Chinese markets and is particularly higher when the largest shareholder is government related but is lower for firms with foreign ownership and auditors. Similarly, Firth, Wang, and Wong (2014) show that firms with low corporate transparency, measured by state ownership, related party transactions, earnings management, and quality of audit firms, are more affected by investor sentiment than are firms with high corporate transparency.

Carpenter, Lu and Whitelaw (2016) examine the Chinese stock market for the period of 1995-2014 with cross-sectional tests, and find that stock prices impound information about firms' fundamentals, such as earnings, in ways similar to that of the US market, especially after financial reforms in the 2000s.

4.2 Corporate Governance and the Split-share Structure Reform

The conflicts of interests between controlling and minority shareholders remains the main problem in Chinese firms' governance issues, because of the dominance of state and family ownership. Earnings management, related party transactions, and expropriation are prevalent, despite the fact that the market reacts negatively to the disclosure of such transactions (Jiang, Lee, and Yue 2010). Cheung, Rau, and Stouraitis (2009) show that minority shareholders are expropriated through these related party transactions if firms are controlled by local governments. However, firms controlled by the central government benefit from related party transactions, which are often conducted with their government parents. Qian and Yeung (2015) show that the tunneling is especially high in firms with preferential access to bank loans, suggesting the inefficiency in the banking industry erodes the disciplinary role of the markets leading to overall poor corporate governance.

The CSRC introduced several regulations around 2000 to reduce expropriation from minority shareholders by controlling blockholders. Examples are increasing the rights of minority shareholders at firms' annual shareholders' meeting, prohibiting the issuance of loan guarantees by a firm to its controlling shareholder, and requiring higher disclosure standards on asset transfers to related parties. The market reacted positively to these regulations especially in firms that were perceived to have weak governance and firms that have no political connections (Berkman, Cole, and Fu 2010).

Studying the role of political connections on corporate governance has yielded mixed evidence in China. While many studies show that the political connections reduce investment efficiency, other studies show the positive value political connections bring to firms. Cao, Pan, Qian, and Tian (2017) approached the debate by considering the dynamics of the relationship by showing that while political connections could be an advantage when the incentives are aligned, they could lead to inefficiency such as CEO entrenchment when private firms lose bargaining power with their

political connections. By studying the performance of distressed firms, Fan, Huang, and Zhu (2013) also show that the firms' relation with local government and the presence of institutional investors play a significant role for the recovery of the firms. Poor governance might be partially explained by the lack of talent and experience. The Chinese government introduced a series of policies to attract overseas educated and trained Chinese with financial expertise to return to China. Among them, many joined boards of directors. Giannetti, Liao, and Yu (2015) examine the impact of these directors with foreign experience on firm performance in emerging markets. They show that firm performance increases after firms hire directors with foreign experience.

Li, Brockman, and Zurbrugg (2015) demonstrate that cross-listing on Hong Kong improves corporate governance of Chinese firms not only because of stricter listing rules and stronger investor protection, but also because of foreign investors' ability to utilize firm-specific information. They show that the cross-listed H-shares are traded with much less synchronicity than their A-share counterparts.

The split share structure reform initiated in 2005 is one of the most important reforms implemented in the Chinese stock market. Prior to 2005, nearly all Chinese publicly traded firms had, under legal mandate, a split share structure in the domestic (A share) market. Under this ownership structure, all shares had the same voting and cash rights, but only some were tradable on the secondary market. The tradable shares (TS), on average about one-third of the firms' outstanding shares prior to the reform, were traded on the secondary market by minority shareholders, including domestic individual investors and institutional investors. The non-tradable shares (NTS), on average about two-thirds of the total prior to the reform, were often held by controlling shareholders such as agents of the state, SOEs, founders, strategic investors, or employees (Chen, Michaely, and Qian 2018).

Much of the inefficiency in China's stock market could be attributed to the split share structure, such as the lack of market control in disciplining the conflict of interests among controlling and minority shareholders and insufficient price discovery. Two previous attempts to eliminate the split share structure, in 1999 and 2001, were abandoned immediately after the trial announcement due to TS holders' concerns regarding price dilution from the sudden increase in tradable security supply. In 2005, the Chinese central government initiated a mandatory reform plan to eliminate the structure for all firms. This reform avoided a plunge in stock prices by a transfer of benefits from the non-tradable shareholders to the tradable shareholders. The former group gains from better risk sharing at the cost of price dilution for tradable shareholders (Li, Wang, Cheung, and Jiang 2011). The compensation is even higher when the state is the main non-tradable shareholders of the firm

(Firth, Lin, and Zou 2010). This reform succeeded and triggered a series of exogenous changes to firms' ownership structure and hence improved related governance, liquidity issues.

A number of studies take advantage of this experiment to understand how market characteristics affect corporate behavior. Campello (2017) documents a large spectrum of corporate policies in Chinese firms before and after the reform. Chen, Chen, Schipper, Xu, Xue (2012) argue that removing the trading friction leads to better incentive alignment between controlling shareholders and minority shareholders, resulting in a lower cash holding and higher investment. Liao, Liu, and Wang (2014) also show that the reform quickly boosted SOE output, profits, and employment, but it does not impact as much in firms' operating efficiency and corporate governance. Chen, Qian, Michaely (2018) demonstrate that the reform relaxes firms from dividend pressure, improving financing flexibility, because the increased liquidity for the controlling shareholders allows them to sell shares to meet their cash needs.

4.3 Bond Markets and Real Estate Markets

Over the past decade, China has quickly developed its bond market as an integral part of the financial system reform, along with interest rate liberalization. Bond market capitalization scaled by GDP, rose from 35% in 2008 to more than 90% in 2017. For comparison, the U.S. bond market has been staying slightly above 200% of the U.S. GDP during the same time period. There are three major categories of fixed-income securities based on issuing entities: government bonds, financial bonds, and corporate (non-financial) bonds. Figure 1d shows that China bond market size increases relative to the stock market size, while the same measure for the U.S. declines over this period.

An interesting feature of the corporate bond market is that bonds with identical fundamentals are simultaneously traded on two parallel but segmented markets, the exchange market and the interbank market. A policy shock in December 2014 led to a class of AA+ and AA bonds being ineligible for repo on the exchange, yet their haircuts were little affected on the interbank market. Chen, Chen, He, Liu and Xie (2018) compare how bond prices changed across markets and rating classes around this event, and find that an increase in haircut has a substantial impact in bond yields, thus providing direct evidence that asset pledgeability affects bond prices.

The largest component of this increase in the bond market is aforementioned Chengtou Bonds issued by local government financing vehicles. Ang, Bai and Zhou (2018) offer a comprehensive study on this segment of the market. There are three interesting features of these bonds. First, they often have land pledged as collateral. Second, until 2018 when the Ministry of Finance officially declared bankruptcy is possible for these bonds, they were implicitly guaranteed by local governments. Third, they are dual listed both on the interbank and the exchange markets. Related to each of the features, Amstad and He (2018) provide a comprehensive review of the

interbank market. Wang, Wei, and Zhong (2015) find that retail investors play a significant role in explaining the pricing wedge between the interbank and exchange markets for the dual-listed bonds. Wang and Xu (2018) develop a model for asset pledgeability, and offer empirical support using the primary bond market data in China. Both Bai and Zhou (2018) and Liu, Lyu, and Yu (2017) examine the implicit government guarantee in the Chengtou Bonds. Jin, Wang, and Zhang (2018) study the event of first bond default by a central SOE in 2015 to estimate the value of implicit guarantee; and Huang, Huang, and Shao (2018) examine the same question by looking at financial bonds issued by commercial banks.

For the real estate market, the most fascinating fact is the housing market boom. The most important questions are, first, whether there is a bubble in the market, and second, the real effects of the boom. Between 2000 and 2010, the U.S. housing market went through a spectacular boom and bust cycle, which led to the global financial crisis and caused acute and prolonged damages worldwide. Real prices of U.S. homes grew by 5 percent per year between 1996 and 2006, and then declined by 6.4 percent per year between 2007 and 2012 (Federal Housing Finance Agency). Annual construction exceeded 1.9 million housing units in 2005 and 2006, and then dropped to an average of 688,000 units per year between 2009 and 2013.

Yet this US housing cycle looks pale compared to the great Chinese housing boom. In China's top cities, real prices grew by 13.1% annually during 2003-2013 (Fang, Gu, Xiong, and Zhou 2016). Real land prices in 35 large Chinese cities increased almost five-fold between 2004 and 2015 (Wu, Gyourko, and Deng 2016). Between 2003 and 2014, China added 100 billion square feet of floor space, or 74 square feet per person (National Bureau of Statistics of China 2014), and built an average of 5.5 million apartments per year. In 2014, 29 million people worked in China's construction industry, or 16% of urban employment. By comparison, the construction industry accounted for 8% of total employment in the U.S. at the peak of its most recent housing boom.

Chen and Wen (2017) interpret China's housing boom as a *rational* bubble emerging from its economic transition. Rational expectations of a strong future demand for alternative stores of value can thus induce currently productive agents to speculate in the housing market. Deng, Morck, Wu, and Yeung (2014) show that the credit expansion resulted from the stimulus contributed to the surge in the land and real estate prices, especially when SOEs are involved in bidding. Urban land is allocated by leasehold sales by local officials, and sales must be conducted publicly, by either English or "two-stage" auctions. Cai, Henderson, and Zhang (2013) find corruption through the choice of auction format and pre-auction side deals between favored bidders and local officials. They show that both sales prices and competition are significantly less for two-stage auctions compared to English auctions.

With data on land values in 35 major Chinese markets and a panel of firms outside the real estate industry, Wu, Gyourko and Deng (2015) estimate investment equations that yield no evidence of a collateral channel effect—a drop in housing price would adversely affect investment by firms that use housing as collateral. They attribute their finding to financially constrained borrowers appearing able to credibly to commit to repay debt in China. Chen, Liu, Xiong, and Zhou (2017) employ a data set including 1.65 million land transactions (hand collected) in 284 cities from 2000 to 2015 with matched land transactions of publicly listed firms and *do* find a collateral channel. They also find a *speculation* channel—rising land prices (Figure 3) induce land-holding firms, which have access to financing, to buy more land and reduce other investments and a *crowding out* channel—in response to rising land prices, banks grant more credit to land-holding firms, crowding out financing to non-land-holding firms.

How will the housing boom end? Glaeser, Huang, Ma and Shleifer (2017) conclude that a crash is not inevitable, and if new construction is sufficiently restricted prices can remain high given the growing demand in top-tier cities. The social costs of restricting new supply could be significant, though, because of both the lower employment and reduced growth of China’s hyper-productive cities. Like many other sectors we have analyzed in the paper, the outcome of the housing boom largely depends on decisions made by the Chinese government.

5. Conclusion

We have reviewed China’s institutional development and the related academic research in the past decade. Specific focus is devoted to the government’s role in business and the economy, banking sector, financial markets, alternative (non-bank, non-market) financing sources, and entrepreneurship and innovations. We summarize our findings with a few conclusions. First, the government is an active and important player in the financial system and economy through policies, regulations and through ownership in the corporate and banking sectors. As compared to developed markets in the West, the government’s role in finance and the economy has both advantages and disadvantages.

Second, increased competition and reforming state-owned banks have improved efficiency of the large banking sector, but it has not financed the growth of the most dynamic sectors of non-SOEs and households. Fintech and new types of financial institutions have arisen to fill part of the funding gap. The stock market remains speculative and domestically listed firms have underperformed listed firms from large developed and emerging markets, externally listed and matched unlisted Chinese firms. Reforming the market’s institutional features such as IPO and

delisting mechanisms and corporate governance can improve the composition of the firms and the market's long-term performance.

At the other end of the spectrum, alternative financing channels and governance mechanisms continue to promote growth in the non-state sectors including firms in the growth industries, despite the fact that China has passed the early-development stage. These financing channels also play important roles in other emerging economies. Formal and alternative institutions—those outside formal legal and financial institutions, both have their strengths and limitations and should coexist to continue promoting growth in China and other countries.

Fourth, a large amount of entrepreneurial activities and innovations have been spurred in China in the past decade. Some empirical evidence attributes the increased pace of innovations to improved protection of intellectual property rights. An alternative explanation is that enforcing property rights protection through the legal system motivates rent-seeking behaviors by interest groups, while competition among firms for survival and capturing market shares suffices to motivate firms to innovate.

More research is needed to understand the different paths for growth in China and see whether similar mechanisms are behind the growth in other economies. In particular, we highlight a few important unanswered questions: a) entrepreneurship and innovations are one major area that is under-researched by financial economists, and how firms such as Alibaba, Tencent and Huawei have become world leaders in their respective sectors needs to be better understood; b) with better access to data, especially unlisted firms and their alternative financing channels, more studies can examine the cost of alternative finance and their roles in promoting growth; c) China's investment abroad by the government or government initiated projects such as "Belt and Road", as well as investment by privately owned firms, in developed and developing countries, and their effects on local economy and growth.

Finally, China's institutions are evolving. Given recent changes in political and economic systems around the globe, there is uncertainty how different sets of institutions can co-exist and interact to promote global peace and growth. The alternative is that countries become increasingly hostile toward each other and this leads to more fragilities in growth or even to a new 'cold war.'

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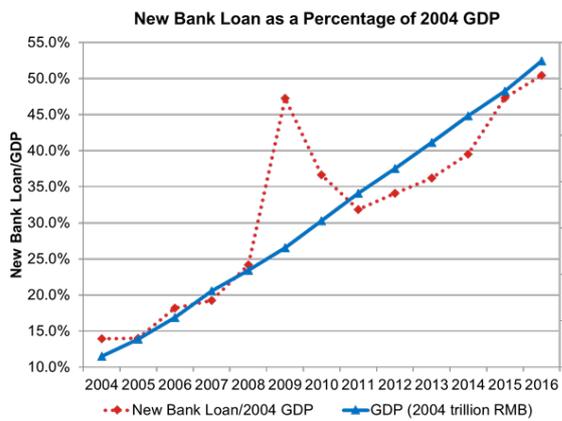
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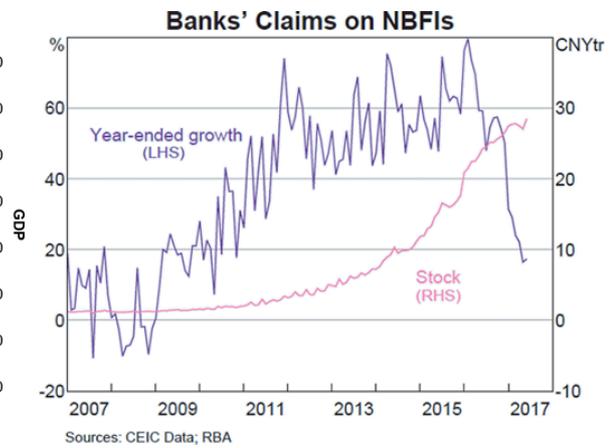
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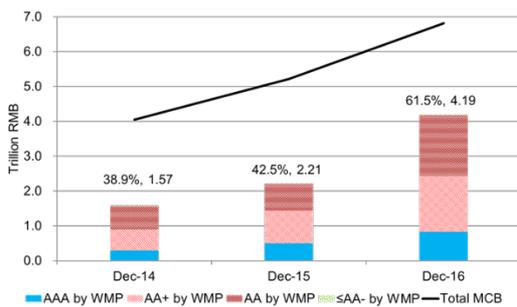
Figure 1: Bank loans, local government debt, and Wealth Management Products markets following the stimulus package



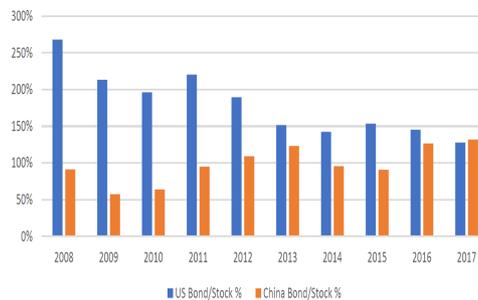
(a). Bank loan and GDP
Source: Chen, He, Liu, and Xie (2018)



(b) Bank's claim on NBFIs
Source: Reserve Bank of Australia

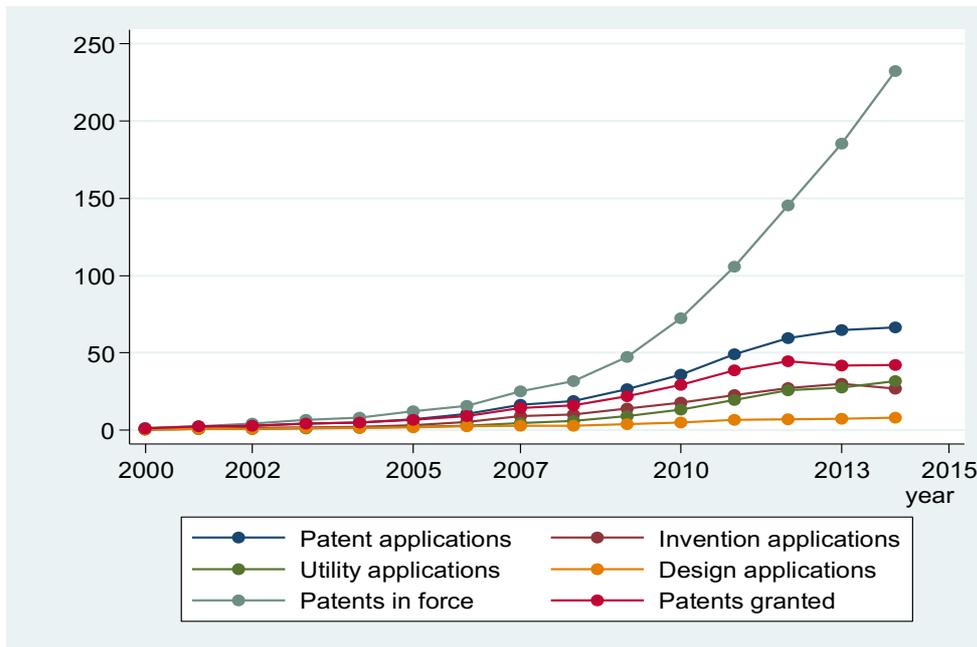


(c) Wealth Management Products
Sources: Chen, He, Liu, and Xie (2018)



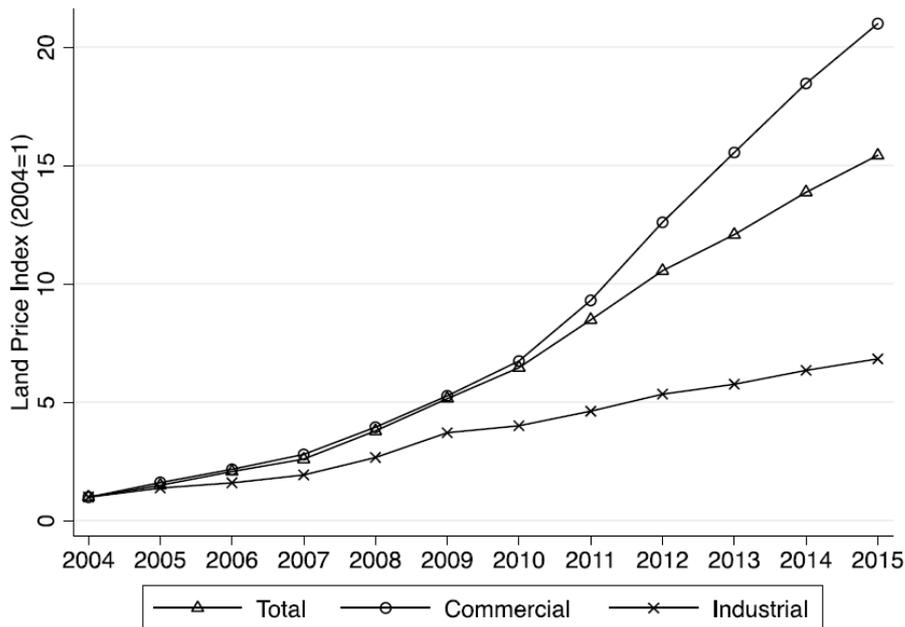
(d). US and China Bond/Market cap
Sources: Amstad and He (2018)

Figure 2: Patent application and grants in China since 2000



Sources: Chen, Pan, Qian, and Wu (2018)

Figure 3: Land prices in China 2004-2015.



Sources: Chen, Liu, Xiong, and Zhou (2018)

Table 1

Financing sources by country.

This table presents the financing composition (percentage of the total financing) for each country. *Bank Financing* includes financing from domestic and foreign banks; *Operation Financing* includes Credit Card and Leasing arrangements. *Constructive informal financing* includes *trade credit* and *Interpersonal loans*. *Underground financing* is measured with *other informal financing*. *Access to Financing as Business Constraint* ranges from 0 to 4 indicating how severe the access to financing imposes constraints on the firms' business development (4 indicates most severe, 0 indicates least severe). In panel A and B, we report the financing composition for working capital and new investment respectively

Panel A: Financing in working capital (%)

Country	Year of Survey	# of firms	Bank Financing	Equity Financing	Government Fund	Retained Earnings	Operation Financing	Trade Credit	Inter-personal loan	Other Informal	Other	Constructive +Underground (TC, IPL, OI)
Bangladesh	2002	974	33.21	0.51	0.48	55.82	0.51	4.17	4.26	0.46	0.58	8.90
Brazil	2003	1,505	26.95	3.03	2.26	43.99	1.50	15.37	2.52	2.53	1.84	20.42
Chile	2004	922	27.35	0.48	1.76	52.16	1.82	6.80	0.97	0.36	8.31	8.13
China	2003	1,902	26.51	11.54	0.38	13.13	NA	2.29	5.76	1.82	38.57	9.87
Egypt	2004	704	6.05	2.66	0.20	85.62	0.28	1.67	2.49	0.09	0.94	4.25
Indonesia	2003	482	17.74	1.61	0.94	39.93	1.18	3.63	8.89	6.61	19.47	19.13
Pakistan	2002	936	4.92	12.87	1.28	65.27	1.43	4.70	6.99	1.29	1.26	12.98
Philippines	2003	650	8.48	5.99	0.29	61.87	0.62	11.54	8.25	1.09	1.87	20.89
South Africa	2003	505	15.64	0.65	0.15	66.94	1.03	11.68	1.14	0.21	2.57	13.02
Sri Lanka	2004	369	22.69	12.76	1.89	32.15	1.44	10.24	2.67	0.35	15.81	13.26
Thailand	2004	1,385	45.69	11.04	0.58	24.82	NA	13.61	1.48	1.11	1.38	16.19
Turkey	2005	599	19.65	10.23	6.40	49.25	3.72	6.57	3.56	0.16	0.46	10.29
Vietnam	2005	1,096	27.60	26.36	0.84	27.23	0.72	7.43	5.30	0.65	3.04	13.38
Total		12,029	24.36	8.43	1.21	42.72	1.26	7.75	4.10	1.31	9.10	13.16

Panel B: Financing in new investments (%)

Country	Year of Survey	# of firms	Bank Financing	Equity Financing	Government Fund	Retained earnings	Operation Financing	Trade Credit	Inter-personal loan	Other Informal	Others	Constructive +Underground (TC, IPL, OI)
Bangladesh	2002	884	29.60	0.38	0.26	60.04	1.77	2.64	4.31	0.35	0.65	7.30
Brazil	2003	1,248	14.24	4.27	8.61	56.26	3.52	8.69	1.12	1.05	2.25	10.85
Chile	2004	655	30.74	1.21	2.55	47.48	6.08	3.51	0.60	0.23	7.60	4.34
China	2003	1,331	20.53	12.35	0.48	15.29	NA	1.04	5.93	1.78	42.60	8.75
Egypt	2004	523	6.63	3.70	0.19	87.03	0.08	0.80	0.95	0.00	0.62	1.75
Indonesia	2003	203	19.61	1.72	2.35	39.53	3.43	2.44	10.78	7.76	12.37	20.99
Pakistan	2002	222	6.70	15.95	1.28	56.97	3.50	1.96	10.20	2.71	0.72	14.87
Philippines	2003	179	13.29	4.34	0.20	57.96	1.52	7.96	10.17	0.59	3.97	18.73
South Africa	2003	462	16.12	0.09	0.50	59.51	16.25	0.62	0.84	0.22	5.86	1.68
Sri Lanka	2004	252	15.16	2.66	2.17	50.84	4.54	2.13	1.58	0.28	20.63	3.99
Thailand	2004	1,382	58.33	13.45	0.35	19.33	NA	3.53	1.82	0.68	1.95	6.03
Turkey	2005	402	23.24	9.56	5.67	46.82	7.09	4.40	2.62	0.17	0.42	7.20
Vietnam	2005	930	28.04	26.97	3.23	30.41	0.55	1.01	4.64	0.54	3.82	6.19
Total		8,673	26.52	8.96	2.39	42.13	3.98	3.23	3.34	0.93	9.58	7.50

Source: Allen, Qian, and Qian (2018), Table 13.