ESSAYS ON CHINESE FINANCIAL MARKETS

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ABSTRACT

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My dissertations aim at understanding the different aspects of the Chinese financial markets. It includes three chapters.

The first chapter studies how firm level political connections affect a firm's decision of going to court and the trial outcomes, using hand-collected data on Chinese listed firms. We found that connected firms have a win rate that is 8.6% higher than unconnected firms have. The higher win rate is most significant in cases with straightforward facts, in provinces where the local legal institutions are weak, and in cases tried in politically-connected firms' home provinces. The empirical evidence is consistent with the hypothesis that the difference in the win rates is caused by judicial bias. We show that trial outcomes have real impacts on firms' stock prices.

In the second chapter, I examine the effectiveness and cost of monetary sterilization in China. The study adapts a 2SLS method to estimate the extent of China's sterilization. It also compares the sterilization cost with the central bank's income from investing foreign exchange reserves. I conclude that the sterilization has been highly effective to date. Moreover, so far the sterilization cost of the central bank can be fully covered by the income from foreign reserve investment.

The third chapter provides a comprehensive review of China's financial system, and explore directions of future development. First, the financial system has been dominated by a large banking sector. Second, the role of the stock market in allocating resources in the economy has been limited and ineffective. Third, the most successful part of the financial system is a non-standard sector that consists of alternative financing channels, governance mechanisms, and institutions. Finally, among the policies that will help to sustain stable economic growth in China are those that reduce the likelihood of damaging financial crises, including a banking sector crisis, a real estate or stock market crash, and a "twin crisis" in the currency market and banking sector.

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CHAPTER 1

POLITICAL CONNECTIONS AND JUDICIAL BIAS:
EVIDENCE FROM CHINESE CORPORATE LITIGATIONS

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1.1 Introduction

There has been increasing economic interest in the significance of political connections in corporations, particularly in the context of emerging markets (Fisman 2001, Faccio 2006, Khwaja and Mian 2005, Fan et al. 2007). However, little of the work has paid attention to the relationships between a firm's political ties, its decision to seek protection from the judiciary, and litigation outcomes. There are a number of reasons why trial outcomes matter for corporations. In a market economy, courts serve as an important protective mechanism for entrepreneurs to secure property rights and enforce contracts (McMillan and Woodruff 1999, Frye and Zhuravskaia 2000). Litigation also has direct impacts on firms' shareholder wealth. Both Bhagat et al. (1993) and Firth et al. (2010) concluded that defendant firms suffer losses upon litigation announcements due to the potential of financial distress. Litigation is thus a direct yet undocumented channel in the literature through which political connections may affect firm values.

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In this paper, we investigate how political connections affect trial outcomes based on hand-collected data from 3,323 court rulings that include all litigations involving Chinese listed companies during 1998-2010. More than 50% of our cases are loan related, making our findings directly relevant to firms' financing decisions. Taking state ownership as a natural form of political connection, we find that listed state-owned enterprises (SOEs)[1] (either as plaintiffs or as defendants) win 8.6% more often at trial than non-SOEs. Using the personal ties of the top managers in the non-SOEs as a second proxy for political connections, we show that connected non-SOEs fare better than the unconnected ones in court rulings by 8.9%. However, personal political ties do not serve as a perfect substitute for state ownership. We find that the connected non-SOEs are still at a disadvantage compared to the SOEs.

If the politically connected firms have a higher win rate, then a potentially more important question is through what channel do the political connections take effect. There are two possible explanations: (1) connected firms are better able to acquire information about the intrinsic merits of the case, which enables them to bring stronger cases to trial or (2) connected parties play a direct role in setting the decision standard of the court. In the latter case, the judge may overlook the case facts to rule in favor of the connected party, resulting in what we define as judicial bias. The term *judicial bias* is used loosely here to refer to the judge exerting varying levels of discretion over a case verdict that is not solely based on merits, and does not necessarily indicate any unlawful activity. Nevertheless, political connections undermine the base of the judicial dispute resolution in this situation, for the judge is no longer impartial.

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[1] As will be explained later, here we define SOE as a firm with the government as its ultimate shareholder. These SOEs are publically listed companies whose stocks can be traded .

Empirically, it is hard to disentangle these two explanations since we cannot observe all of the characteristics of a case. This paper represents a first attempt in the literature to distinguish between those two possibilities. First, we argue that if the connected firms win more often due to better information about case merits, their advantages should diminish among cases with straightforward merits because it is equally easy for both the connected and unconnected firms to discover the facts in those cases. However, using the types of suits[2] as a proxy for the straightforwardness of case facts, we show that the connected firms win most often in cases with simple facts, suggesting the influence of judicial bias but not information asymmetry about merits.

Next, we find that better legal environments in a province lead to a lower win rate of connected firms. We use whether a Chinese province was opened as a leased territory or treaty port to foreign countries in the late Qing dynasty as an exogenous proxy for better local legal environments to address the reverse causality concern. Since the leased territories and treaty ports were set up more than a hundred years ago, their establishment should not affect a judge's ruling today. However, the establishment of the leased territories and treaty ports is likely to have a long-term positive impact on the local legal institution development by introducing the Western-style laws at an early stage. Similarly, using the exogenous local governor turnovers caused by circumstances such as sudden death as a proxy for periods of weakened local political connections, we show that weaker connections also lower the win rate for connected firms. Moreover, the win rate of locally connected firms is higher when the case is tried in their home province. These findings suggest that the higher win rate of connected firms can be attributed to biased courts.

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[2] I.e., loan suits, sales and purchase contract suits, tort suits, and others.

The higher win rate of connected firms has a real impact on shareholder wealth. Using an event study, we find that a winning firm has a five-day average market-adjusted cumulative abnormal return that is 50 basis points higher than that of a losing firm. Because an adverse verdict is often associated with future financial losses, the markets react upon receiving the news.

We see three contributions of this research. First, our work belongs to an increasing volume of literature on the impact of political connections on firm performance. It has been documented that corporations enjoy various benefits associated with political connections, including favorable regulatory conditions (Agrawal and Knoeber 2001, Morck et al. 2005) and access to resources such as bank loans (Khwaja and Mian 2005, Faccio 2006), which ultimately increase firm values (Roberts 1990, Fisman 2001, Claessens et al. 2008, Johnson and Mitton 2003). On the other hand, Fan et al. (2007), Yuan (2008) and Boubakri et al. (2008) found that political connectedness may destroy firm values. However, to the best of our knowledge, no prior study has demonstrated direct evidence of how political connections play a role in court decisions; nor have we seen a connection between litigation outcomes and shareholder wealth. This paper adds to the literature by offering a missing channel through which political connections can increase firm values.

Second, our study adds new evidence on formal and informal institutions that secure property and contractual rights. It draws from the emerging law and finance literature on the role of political connections in a transitional economy (La Porta et al. 1997, Allen et al. 2005, Fan et al. 2007). In countries with fewer constraints on politicians and elites, the government is more likely to violate the property rights of private producers and seek benefits for the interest

groups (Acemoglu et al. 2005). Political ties then become necessary for companies to run businesses when they cannot rely on the legal system to secure property rights (Li et al. 2008). This paper provides evidence that though SOEs receive favorable rulings in court, the judicial bias against non-SOEs can be partially corrected by the personal political ties of their top managers.

Our work also extends the large body of literature on the economic analysis of litigation behavior by incorporating the often-neglected judicial bias factor to the well-cited Priest/Klein framework (Priest and Klein 1984), which assumes that the decision between settlement and litigation is solely based on information asymmetry about case merits. In the Priest/Klein model, it is suggested that two parties take a case to court because they have divergent information on case merits. Where parties are symmetrically informed about merits, they tend to settle instead of litigate. Built on this hypothesis, Hylton (1993, 2002) argued that when parties are not symmetrically informed about the case merits, the party with informational advantage will have a more precise estimate about the likelihood of success at trial. Consequently a higher-than-50% win rate should be observed for the party with an informational advantage if the dispute finally goes to trial[3]. Our paper builds on this literature by analyzing litigation outcomes in a large, emerging market, proposing that the determinants of court outcomes should not be confined only to the parties' respective perceptions of the case merits, but also incorporate at least their prediction on the direction and extent of judicial bias. We present empirical evidence that judicial bias alone leads to a higher win rate of the favored party.

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[3]Empirical evidence on this is mixed. Kessler et al. (1996) gave a review of the findings from the U.S. courts. Evidence outside the U.S. has been limited (Ramseyer and Nakazato 1989).

Though we use China as a case study in this paper, our findings are relevant to other countries, especially those with a socialist and civil law origin. The proposed tests to distinguish judicial bias from information asymmetry about case merits can be readily applied under other legal systems. Finally, the judicial bias we document imposes an additional litigation risk on the multinational companies participating in the Chinese market, which are of increasing importance as globalization accelerates.

The rest of the paper is organized as follows: Section 1.2 provides the institutional background of the legal reforms in China. Section 1.3 presents the data. Section 1.4 outlines the empirical methodology and displays the results. Section 1.5 further supports our results with robustness checks, and Section 1.6 concludes.

1.2 Legal Reform, Political Ties and Judicial Bias: A Review of China

The Chinese legal reforms have been the subject of intense scholarly interest in the West. Existing legal studies have mainly covered the administrative cases (Pei 1997) and economics cases (He 2007), most of which focused on historical reviews of the evolution of the related law and its implementation. Quantitative evidence remains scarce. The reforms started in 1978 when Deng Xiaoping emerged as the *de facto* political leader of China following the death of Mao Zedong in 1976. The role of the legal system at first was to bring order and stability to political and social life after the chaos of the Cultural Revolution. Since then, China's phenomenal economic development and corresponding rapid social changes have dramatically increased pressures on courts to cope with the problems that other government agencies have failed to resolve. Legal reform became a government priority in the 1990s as a result of the

increasing global exposure. To provide a trust worthy legal environment for the incoming foreign investments, the government has devoted enormous resources to revamp its legal institutions, putting major efforts in the rationalization and strengthening of the legal structure.

After the Chinese Communist Party (CCP) decided at the Fifteenth Party Congress to "promote judicial reform" in 1999, the Supreme People's Court (SPC) announced a five-year reform plan to build a "fair, open, highly effective, honest, and well-functioning" judicial system. "Fairness" was highlighted as the "essence" of judicial reform and has been the central theme since then. The SPC completed the second five-year plan between 2004 and 2008. During that time, documents were issued by the SPC demonstrating a cautious awareness of the importance of bringing greater professionalism, independence, and integrity to the judiciary.

Improvements resulting from the legal reform are obvious. New Western-style laws were introduced, and existing laws were amended for more comprehensive and fair coverage. For example, the 1994 Administrative Procedure Law was introduced to allow citizens to sue officials for abuse of authority or malfeasance. The trademark law has been modified and used more extensively as a result of increasing concerns over violations of intellectual property rights of foreign corporations in the early 1990s. In late 2005 a largely rewritten Company Law was adopted, radically increasing the role of courts. A new Enterprise Bankruptcy Law was promulgated in 2006, which in many aspects resembles the modern bankruptcy law in developed countries. As of 2008, China has roughly 200,000 judges, 160,000 procurators (prosecutors), and 150,000 lawyers. Over 600 law departments and law schools send out several hundred thousand graduates[4] every year. There is a development of a legal services market as

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[4] Thirty Years of Chinese Legal Reform, *The Wall Street Journal, Dec.* 4th, 2008.

well. Foreign lawyers have accompanied foreign capital and their clients to China, which has had an immense influence on the promulgation of new Chinese laws, especially in regard to intellectual property, and corporate and securities laws.

The reform also has awakened citizen's inherent demand for court services. This change in China can be described as a transformation from a former "acquaintance society" (Fei 1948) to an arm's length one. In an acquaintance society, the courts play a less important role as networks and reputations play a dominant role in directing economic activities. However, the use of courts as a forum for dispute settlement increases as a result of the prevalence of impersonal and contractual relations (Vago 2006). Figure 1 shows the number of civil, criminal and administrative cases filed in China has been increasing from 1990 to 2008 on a per million population basis.
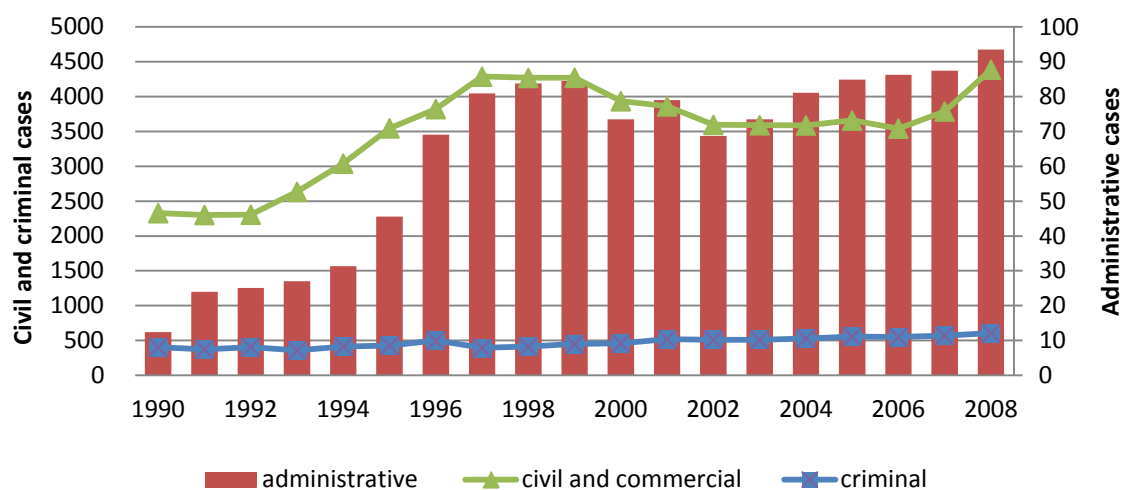
Figure 1 Number of cases per million population, national average
This figure shows how the number of cases per million population changes across the years. The left hand side y-axis is for the number of civil and commercial cases, and criminal cases. The right hand side y-axis is for the number of administrative and criminal cases.

Despite the growing demand for court services, court impartiality is still a primary concern of the public, especially when citizens are acting against the government or its affiliated enterprises (Chen 1995). Lubman (1999) indicated that the laws and court systems in China still serve more as a top-down instrument of Party control than as a framework to facilitate private transactions. Howson (2010) reviewed more than 1000 Company Law-related disputes between 1992 and 2008 in Shanghai and concluded that there is significant momentum toward the competence and autonomy of the People's Courts. However, the path toward autonomy is inconsistent; sometimes a development is followed by setbacks. As of today, litigation is still hampered by local governments and judicial corruption[5]. It is not clear whether the legal system has achieved its goal of fairness at the completion of the second five-year program.

1.3 Data Description

1.3.1 Variable of Interests

The obligation of Chinese listed companies to disclose their involvements in the lawsuits and arbitrations is stipulated in Chapter 11.1 of the Listing Rule of the Shanghai and Shenzhen Stock Exchange, respectively[6]. The WIND database, a leading Bloomberg-style data provider in

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[5] In March 2004, the Procurator-General Jia Chunwang admitted, "the procurators at all levels had not done enough to check the problems of unfairness in the implementation of laws " (Firth et al. 2010).

[6] According to the Listing Rule, a company must disclose its involvement in litigation/arbitration if the litigation/arbitration stake (of a single case or accumulative cases within 12 month) is over RMB 10 million ($1.54 million) and over 10% of the company's net assets, based on the company's last audited report. For litigations/arbitrations whose stake amount below the above threshold, the Board should also disclose if in their opinion such case would have a significant impact on the company's securities. See Chapter 11.1 of

China, collects information on all Chinese listed firms that have reported their involvements in the lawsuits, either as plaintiffs or as defendants, by reproducing the original unprocessed texts from the companies' disclosure reports. We read through all of the case reports and hand-code useful information such as the nature of the disputes (type of suit), the parties in question, the claimed stake, the trial outcomes, the level of the courts, and others. Given that a large proportion of the appealed cases do not have information on final rulings, We only consider the verdicts from the first rulings[7]. Our final sample consists of 4,089 cases filed by listed firms between 1998 and 2010[8].

Another variable of major interest in this study is the political connection status of a company. Previous literature has proposed different measures for connections, including the chief executive officer (CEO)'s contribution in an election (Khwaja and Mian 2005, Claessens et al. 2008), firms' affiliations to large business groups (Fisman 2001), and whether the board has current/past politicians as members (Faccio 2006, Fan et al. 2007, Boubakri et al. 2008, Li et al. 2008). In China's case, one analogous aspect to consider is whether the firm has the government as its controlling shareholder. State ownership creates a natural connection with the government for the company and provides benefits such as immunity from bankruptcy. The heads of the SOEs are often important members in the communist party, which characterizes them as politicians. Though the privilege of SOEs may have been restricted due to a series of financial and legal system reforms in China, anecdotal evidence suggests that SOEs enjoy

Listing Rule of the Shanghai Stock Exchange (1998) and Listing Rule of the Shenzhen Stock Exchange (1998).

[7] In China, the success rate of appeal is extremely low. The lower level of courts tend to report and "seek opinion" from their upper courts in making decisions in the first instance, especially when the stake of a case is significant. Therefore, even if the case is appealed, the upper court will generally not alter the decision of the lower court.

[8] We choose 1998 as the starting year because this is when the listing rules requiring mandatory disclosure of litigations were promulgated, both on the Shanghai and Shenzhen stock exchanges.

advantages over non-SOEs when dealing with the government[9]. For our purposes, we define a listed company to be an SOE if the ultimate holder of the company is the local (at least at a city level) or central government as recorded in CSMAR, another leading Chinese data provider.

For non-SOEs, closer bonds to the authority may be established by hiring CEOs or directors who formerly held positions in the local or central governments (See Calomiris, Fisman, and Wang 2009 and Fan et al. 2007 for documentations on politically connected CEOs). We thus argue that for non-SOEs, CEO or directors' personal ties with the government can serve as an alternative measure for the firm's political connection.

To test this, we collect data on CEO or directors' previous employment histories of the non-SOEs. We consider a non-SOE as politically connected if the company's CEO or director is or was a government official (at least a leading official of a division, i.e., Ke Zhang) or a leader of the People's Congress, or the People's Political Consultative at either the national or regional level. We first use the firm's annual reports to identify its top managers, and then we refer to the WIND database, which has some records on whether the top manager of a listed firm has held positions in the government or in the communist party. For those CEOs/directors whose information is missing, we search on internet. If there is no evidence suggesting that the CEO/director was previously connected to the government, we then conclude that the CEO/director is not politically connected. Sometimes, especially for CEOs/directors who are recently appointed, the information is harder to trace because they tend to hide their previous

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[9] For instance, in 2011, China started a reform in the steel industry with the target to "increase the global competitiveness of the steel industry." The reform plans to shutdown less efficient steel productions to solve the long standing problem of excess production capacity in China. In reality, however, the reform simply leads to massive acquisitions of non-state-owned steel companies by large SOEs such as Bao Gang and An Gang. The small scale non-SOEs, which may not necessarily be less efficient, have virtually no other choice but being acquired by a large SOE.

relationship with the government to avoid undesired publicity. Under other circumstances, government officials may not sit on the board, but instead would have someone act on their behalf. We are aware of the potential selection bias here: it is possible that some CEOs/directors are actually connected but successfully hid the information from the public. However this bias makes it harder for us to detect whether the politically connected CEOs have a positive impact on the firm's win rate. If we can correct for the bias, our results will only be stronger.

Finally we collect financial and stock data for each company from CSMAR and WIND, and match the financial data at the end of the last year to the cases that are tried in this year. Since a majority of the counterparties in the suits are not listed, their financial information cannot be retrieved. We do, however, include a variable for the ownership statuses of the counterparties wherever available, which we obtain from the internet. Since the status of political connection of a firm is the core of our paper, not controlling the counterparty's state ownership status would be an important miss. We further exclude the following five types of cases from our sample: (1) cases which were not tried in the Chinese courts, including cases heard by foreign courts and arbitration, (2) non-civil cases, including criminal and administrative cases, (3) cases which were withdrawn by the plaintiffs in the first trial, (4) cases which were settled during the first trial, and (5) cases for which court judgments were not disclosed.

Matching the litigations, political connections and financial data reduces our final sample size to a total of 3,323 cases, including 2,004, or 60% cases involving SOEs. Our sample has 714 distinct firms, with 502, or 70% SOEs. Many firms are repeated players in court, generally for similar reasons, such as loan disputes. Banks, in particular, may repeatedly sue other firms for over-due loans. We control for this factor in our later regression. In terms of the

geographical distribution, the cases are widespread across the regions. Guangdong and Shanghai are the two provinces with the largest total number of cases between 1998 and 2010, while Shanghai and Hainan have the highest litigation rate on a per million person basis.

Panel A of Table 1 gives a summary of our final sample on the number of litigations each year, classified by suit types. We divide the suits into four types: (1) bank loans, (2) non-bank loans (3) sale/purchase and other contracts, (4) right infringement and other tort cases[10]. Cases related to loan and debt payment account for the majority of the litigations, but we see a variety of types of suits.

The number of tried cases reached its peak in 2005, and then dropped to a low level in 2010. This can be attributed to the banking reform propelled by the Chinese government in 2004, in which the big state banks launched their IPOs. The banks must write off the non-performing loans on their balance sheets to meet the listing criteria, leading to an increased number of the loan suits. Since 2007, the government started implementing several reforms on the financial market, including the stock reform that completes the conversion of all the non-floating shares to floating ones, and a new accounting standard that is enforced on listed firms. The number of litigations drops during the transition period. Moreover, the Chinese government has been actively advocating the idea of building a "harmonious society" since 2005 under the Hu Jintao administration. The ideology pursues a society with balance and harmony, resulting in a significant drop in the number of litigations after 2005.

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[10]A loan case here does not necessarily involve only the lender and the borrower. Disputes between a loan guarantor company and the borrower are also categorized under type 1 or 2. Type 4 includes torts such as civil tort on false statements in the securities market, disputes over trust management contract, and assets transfer and product liability.

Table 1 Distribution of suit types

This table presents the distribution of different type of cases. Cases are divided into four types: (1) bank loans, (2) non-bank loans, (3) sales/purchase and other contracts, and (4) right infringement and other torts.

Panel A: Number of cases by suit types

The panel presents distribution of different type of cases across between 1998 and 2010. The numbers in bold are the numbers of the cases of a particular suit type as percentage of the total cases in a year.

Suit type	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
1	16	36	106	76	92	90	184	275	228	167	56	58	24	1408
	38.1	**32.4**	**45.7**	**35.8**	**41.3**	**39.3**	**46.6**	**55.9**	**54.4**	**39.7**	**25.9**	**23.6**	**28.2**	**42.4**
2	6	22	44	47	38	47	73	44	65	70	31	34	16	537
	14.3	**19.8**	**19.0**	**22.2**	**17.0**	**20.5**	**18.5**	**8.9**	**15.5**	**16.6**	**14.4**	**13.8**	**18.8**	**16.2**
3	12	40	79	87	83	85	128	160	111	158	101	118	35	1197
	28.6	**36.0**	**34.1**	**41.0**	**37.2**	**37.1**	**32.4**	**32.5**	**26.5**	**37.5**	**46.8**	**48.0**	**41.2**	**36.0**
4	8	13	3	2	10	7	10	13	15	26	28	36	10	181
	19.0	**11.7**	**1.3**	**0.9**	**4.5**	**3.1**	**2.5**	**2.6**	**3.6**	**6.2**	**13.0**	**14.6**	**11.8**	**5.4**
Total	**42**	**111**	**232**	**212**	**223**	**229**	**395**	**492**	**419**	**421**	**216**	**246**	**85**	**3323**

Panel B: Distribution of cases across ownership

The panel presents the distribution of different types of cases across SOEs and non-SOEs. P/D ratio is the ratio of the number of plaintiffs over the number of defendants..

Suit type	SOE			non-SOE			Total
	Plaintiff	Defendant	P/D ratio	Plaintiff	Defendant	Combined	
1	2	673	0.30%	3	730	0.41%	1408
2	119	201	59.20%	46	171	26.90%	537
3	452	428	105.61%	80	237	33.76%	1197
4	66	63	104.76%	**30**	22	136.36%	181
Total	639	1365	46.81%	159	1160	13.71%	3323

Panel B of Table 1 shows the distribution of cases, classified by state ownership status. The SOEs tend to be plaintiffs more often, and non-SOEs are more likely to be involved in the loan suits as defendants. We see good presences of both SOEs and non-SOEs in each suit type.

1.3.2 Control variables

Our choice of control variables follows the literature convention. The control variables include the firm size, leverage ratio, cash-to-asset ratio, profitability as measured by operating profit (EBIT), whether the disclosing firm was the plaintiff, whether the disclosing firm was involved in more than four other litigations in our sample, whether the case was tried at a higher level court, and the disputable amount.

Larger firms may have more abundant resources, such as better legal staff to help them win the case. Leverage ratio and cash ratio are used as proxies for the firms' solvency. Cutler and Summer (1988) and Bhagat (1994) both concluded that the risk of financial distress may be exacerbated around the time of litigation. Profitability is controlled because the court may favor firms that make pivotal contributions to the regional economy. A plaintiff dummy is included because previous literature (Klein and Priest 1994, Hylton 1993, 2002) indicated that the plaintiff usually has an information advantage in case merits, which leads to a higher probability of winning. We control for whether the firms are repeated players in court because we want to make sure that our result is not driven by the firms' familiarity with the legal procedure. The choice of four repetitions is somewhat arbitrary. Using ten as the threshold does not change our results.

Table 2 Summary statistics

This table gives summary statistic of the main variables in the paper. Win is a dummy which equals 1 if the disclosing firm wins the case. *Plaintiff* is a dummy that equals 1 if the disclosing firm is the plaintiff. *Ln(asset)* is the natural log of the firm's total book asset as measured in RMB. *Leverage* is the leverage ratio calculated by total leverage/total asset. *Cash ratio* and *operating profit* are measured likewise. *Otherparty_nonSOE* is a dummy that equals 1 if the counterparty is a non-SOE. *Repeated_player i*s a dummy that equals 1 if the disclosing firm is involved in more than 4 other litigations. *High court* is a dummy that equals 1 if the case is tried at a higher level court. *Amount* is the disputed amount measured in 10,000 RMB.

*The maximum and minimum of the dummy variables are not presented here since it is always 1 and 0.

		Full Sample		Non-SOE subsample	
		SOE	non-SOE	connected CEO/Director	Unconnected CEO/Director
number of observation		2004	1319	1020	299
Win	Mean	0.37	0.18	0.19	0.17
	Stdev	0.48	0.18	0.39	0.38
Plaintiff	Mean	0.32	0.14	0.10	0.30
	Stdev	0.46	0.35	0.36	0.35
Ln(asset)	Mean	20.79	20.15	20.19	20.14
	Max	24.87	22.80	22.41	22.80
	Min	14.94	12.31	17.36	12.31
	Stdev	1.00	0.99	0.82	1.04
Leverage	Mean	0.93	2.54	1.77	2.82
	Max	8.50	82.55	43.08	82.55
	Min	0.02	0.05	0.05	0.07
	Stdev	0.96	2.63	3.46	28.82
Cash Over Asset	Mean	0.10	0.07	0.07	0.07
Ratio	Max	0.64	0.59	0.54	0.59
	Min	0.00	0.00	0.00	0.00
	Stdev	0.09	0.82	0.08	0.08
Operating Profit	Mean	0.002	0.01	0.006	0.006
Over Asset	Max	0.75	1.06	0.45	0.64
	Min	-0.22	-2.51	-0.54	-0.25
	Stdev	0.61	0.16	0.10	0.17
Otherparty_nonSOE	Mean	0.40	0.35	0.40	0.34
	Stdev	0.49	0.48	0.49	0.47
Repeated_Player	Mean	0.69	0.62	0.64	0.53
	Stdev	0.50	0.48	0.48	0.50
High Court	Mean	0.15	0.12	0.09	0.12
	Stdev	0.33	0.32	0.28	0.33
Disputable Amount	Mean	3635.71	3095.56	3059.02	3291.94
	Max	1197464	152000	152000	150000
	Min	0.06	1.00	2.58	1.00
	Stdev	30702.42	8111.62	7344.23	11407

A variable for the higher level court is included because the court level is associated with unobserved case characteristics. For a similar reason, the disputable amount of a case is included. Under the Chinese law, cases involving high monetary damages, or cases deemed as influential or complicated are stipulated to be tried at a higher level court. A case can be considered "complicated" for many reasons, such as the involvement of a sensitive industry or firms located in multiple cities. We also include the ownership status of the counterparty in the litigation. If there is judicial bias, then the disclosing firms are more likely to win if they face a non-SOE. To control for the regional development, we include the fixed effect for provinces where the trial takes place. Finally, we control for the fixed effects for industry, year, and suit types.

Table 2 shows summary statistics of SOEs and non-SOEs in the first two columns. Our sample consists of more SOEs than non-SOEs. Consistent with the conventional belief, SOEs are of slightly larger size, but the difference in size is not significant. The average firm size as measured by book asset is 152 million USD in our sample, which is also the average size of listed firms in China during the sample period. Not surprisingly, SOEs have a higher win rate, and are more likely to be plaintiffs. They are also more likely to be repeated players in courts, probably due to their comfort with the legal system. Non-SOEs have higher leverage, lower cash-to-asset ratios, and higher profits. Finally, SOEs are more likely to face a non-SOE counterparty in the suit, and are slightly more likely to have their cases tried at a higher level court with larger disputable amount. Neither of the above two discrepancies is statistically significant.

The last two columns of Table 3 divide the non-SOE subsample to firms with and without politically connected CEOs/directors. Less than 20% of non-SOEs do not have a

connected CEO/director. The proportion of connected CEOs/directors in our sample is higher than that reported in Fan et al. (2007). The discrepancy can be explained by a different sample period and different set of firms covered by the study. Moreover, Fan et al. (2007) only considered the political connection of the CEOs, while our data include the directors as well. In our sample, the unconnected non-SOEs are comparable to the connected ones in most financial measures, except that they have higher leverage ratios. Firms with politically connected CEOs/directors have a higher win rate, and are more likely to be repeated players. However the average win rate of non-SOEs with politically connected CEOs/directors is still lower than the average win rate of SOEs.

1.4 Empirical Results

In this section, we first use the state ownership as a proxy for political connections to show that connected firms have higher win rates than unconnected ones. We apply several tests to draw the conclusion that the difference in the win rates is driven by court's political bias rather than parties' information asymmetry about case merits. We find that the advantage of the connected firms diminishes if the case is tried in provinces with better local legal environments. The local SOEs owned by the provincial governments receive additional benefits in court if they have the cases tried locally, and suffer a drop in the win rate if the cases are tried during periods of weak local connections. Using the subsample of non-SOEs, we then illustrate that our results hold when the personal political ties of CEOs/top directors are used as an alternative measure of political connections. However, the personal connections of CEO/director cannot serve as a perfect substitute for state ownership. Finally, we demonstrate

that winning firms enjoy higher cumulative abnormal stock returns than losing firms when the verdict is announced.

1.4.1 Judicial Bias and Case Merits

This subsection uses state ownership as a proxy for political connection. We first examine whether political connections are associated with higher win rates, using state ownership as a proxy for political connections. We regress the trial outcome on the ownership status of the firm. Though the dependent variable is binomial, we choose a linear model over a logit model, because the linear model is unbiased and imposes much fewer restrictions on the data structure. More importantly, a linear model enables us to get a clear interpretation of the coefficients of interaction terms, while a logit model would not allow us to measure the average marginal effect of a variable in the interaction term (Norton et al. 2004).

Our base line regression is:

$$Win_i = \alpha + \beta_1 SOE_i + \beta' Controls_i + \varepsilon_i \qquad (1)$$

where i is the unique case id number. ε is the noise term estimated using clustered standard error at a province level. *Win* is a dummy variable that equals one when the disclosing firm wins. We define plaintiff winning as the plaintiff firm getting the full or partial amount of the compensation it requests[11]. *SOE* is a dummy variable that equals one when the firm's ultimate owner is the government. The control variables have been discussed in the previous section. The

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[11] We define defendants winning when the plaintiff loses the case. There are very few partial compensation cases.

coefficient β_1 measures the average difference in the win rates between the SOEs and the non-SOEs.

Table 3, Panel A presents the regression result in the first column under Model 1. The main finding is that SOEs have a win rate that is 8.6% higher than non-SOEs, confirming our conjecture that SOEs enjoy a higher probability of winning in courts than non-SOEs.

The results on control variables are mostly in line with our expectations. Larger firms and plaintiff firms are more likely to win. Leverage ratio enters insignificantly. Firms with a high cash-to-asset ratio or profitability have a higher winning probability, since the court may want to favor the firms which make significant contributions to the regional economy. Interestingly, repeated players have a lower probability of winning, for they may bring weaker case to court due to their comfort with the legal system or their over-confidence in favorable trial results. Whether a case was appealed, the court level, and the disputable amount have no impact on the win rate. A final important observation is that the disclosing firm is more likely to win if the counterparty is a non-SOE, further confirming the claim that non-SOEs are at disadvantage in court.

Having established that SOEs win more often, we need further evidence that the higher win rate of SOEs are pursuant to the political preference of courts. The major challenge is to distinguish the claim of judicial bias from the alternative explanation that the SOEs bring stronger cases to court. When a firm is faced with a potential dispute as a plaintiff or as a defendant, it has the choice to settle. If the SOEs can choose the best cases based on case merits to take to court and settle the rest while the non-SOEs cannot, then the SOEs will have a higher win rate in the absence of the judicial bias. Indeed, Panel B of Table 1 shows that the

distribution of suit types is different across SOEs and non-SOEs, implying that the choice of tried

cases is not random. An ideal way to deal with that is controlling for every aspect of case

characteristics, which are often unobservable. Hence, we propose an alternative test to

distinguish the story of judicial bias from the explanation that the SOEs are more capable of

spotting the stronger cases.

Specifically, we investigate judicial bias on cases with different levels of potential

information asymmetry about merits. A case is only taken to trial if the two conflicting parties

have a big enough divergence in the expectations on the trial outcome. Without judicial bias,

the divergence in expectation stems from information asymmetry about the case merits

between the two parties. Namely, the two parties possess different information or different

interpretations of the information on case facts, which leads to their divergent expectations

over a ruling. Some firms may have a superior ability to collect and process information to

others, which enables them to predict the trial outcomes more precisely. On the other hand,

firms will only agree to go to trial if they think there is a reasonable chance of winning. If the

SOEs have better information on case merits in general, they can present a higher proportion of

favorable cases to the court, resulting a higher win rate in the absence of judicial bias. Moreover,

this difference in the win rates caused by an information advantage should be the greatest on

cases whose facts are complicated and hard to retrieve, for a superior ability to acquire

information would make the greatest difference in those cases. On the other hand, the

difference in the win rates should diminish when the case merit is straight-forward, which does

not require either party to devote resources in information collection. In fact, in the absence of

judicial bias, if parties have little information asymmetry on the case merit, they would settle

instead of litigate, as in the Priest/Klein model. Cases with clear-cut facts tend to be settled

before they reach the court.

Judicial bias, however, has drastically different implications. When judicial bias is present, cases may be taken to court due to different information over case merits, or different expectations over a judge's bias. If the two parties are not symmetrically informed on the direction and degree of judicial bias, the party with informational advantage on judicial bias will have a more rational estimate about the likelihood of success at trial, and consequently has a higher chance of winning than the opposite party does. Especially for those cases with clear-cut facts, the only reason to bring such a case to court instead of settling is that one party is relying on the judge's bias to get a ruling in its favor, while the other party does not fully realize the existence or the extent of the judicial bias. On the other hand, even when there is no judicial bias, a complicated case may still be brought to court purely because of the divergent information on intrinsic case merits. Empirically, this means that among all of the cases that are taken to trial, we should observe judicial bias to be more prevalent among cases with more straightforward case merits.

The existing law and economics literature has attributed the types of suit (e.g., property rights, contract, tort, etc.) to the extent of information asymmetry between parties on case merits (Waldfogel 1995, Shavell 1996, Siegelman and Waldfogel 1999). Parties may systematically have different information about facts of a dispute, in ways that vary across suit types. For example, it is commonly argued that information asymmetry on infringements case is large because defendants know their own actions, while plaintiffs do not. This type of information asymmetry makes less sense in a contracts case, since the relevant actions by the defendant are typically observed by both parties. Following this strand of thought, we propose

to use the types of suits as a proxy for the levels of potential information asymmetry about intrinsic case merits. For the empirical test, we first eliminate the 67 cases in the sample that involve countersuing, because those cases may have specific complications that are independent of the suit type. This leaves us with a sample of 3,256 suits.

We then categorize the four types of suits into three case levels, according to how straightforward the case facts are or, in other words, according to the level of potential information asymmetry about case merits. The contract-based cases (suit types 1-3) in general have less information asymmetry about merits than the tort cases (suit type 4). Unlike a tort case, in a contract case, the two parties involved in contracts must have had previous interactions with each other before the trial. There is also more hard information available for inspection, such as the content of the contract, the balance sheets of the firms, and product certificates. Among the contract cases, we define suit type 1 and 2, the loan cases as Case Level 1, which are the cases with the most straightforward case facts. In the loan cases, the obligation of repayment only falls on one party. The performance of repayment is clearly defined and easy to prove. Both parties know exactly what happened, and there is little room for unknown information.

We define suit type 3, the purchase/sale and other contract cases, as Case Level 2. The potential level of information asymmetry of this category falls between the loan cases and right infringement cases. Other types of contracts are usually less complete than a loan contract. They may involve agreements on different aspects of the product quality, or the maintenances of an office building, which cannot be specified comprehensively. Moreover, in those cases obligations fall on both parties. One party's fulfillment of obligation is dependent on the other

party's performance of the contract. There is usually more hidden information compared with a loan case.

Finally, we define right infringement and other tort cases (suit type 4) to be Case Level 3 with the largest potential information asymmetry about case merits. The tort cases involve a breach of civil duties, but not contract duties. It requires the proof that the existence of duty is reasonable, and that the causation between the duty and the damage is direct. Without explicit contracts, the implicitly assumed duties are hard to prove and open to interpretation. Moreover, a major proportion of tort cases in our sample are right infringement cases. Those cases are often the so-called "stranger" cases in the sense that the plaintiffs usually do not have any interaction with the defendant until the dispute arises. It is hard for the plaintiffs to retrieve information on what the defendant did, or for the defendant to retrieve information on what the plaintiff is able to prove, especially given the fact that most of the information is internal. Without judicial bias, information advantage on intrinsic case merit would make a significant difference in predicting the trial outcomes for Case Level 3. We also control for whether the case was appealed, since the decision to appeal for a case is related with the potential complication of the case facts.

Applying our previous argument, we expect to observe that cases with clear-cut facts to exhibit higher judicial bias, which is positively correlated with the favored party's win rate. On the other hand, if the difference in the win rates is caused by information asymmetry on case merits, we should see the information advantage to be magnified on cases with more complicated facts. To test the hypothesis we run the following regression:

$$Win_i = \alpha + \beta_1 SOE_i + \beta_2 Case\_level\_2_i \times SOE_i + \beta_3 Case\_level\_1_i \times SOE_i$$
$$+ \beta_4 Case\_level\_2_i + \beta_5 Case\_level\_1_i + \beta'Controls_i + \varepsilon_i \qquad (2)$$

where *Case_level_1* is a dummy variable that equals one if the case is of Case Level 1. *Case_level_2* is defined likewise and *Case_level_3* is omitted. β_1 measures the average difference in the probability of winning between the SOEs and the non-SOEs for the cases with the most potential information asymmetry on case merits. β_2 and β_3 measure how the difference in the win rates is affected when we switch from Case Level 3 to Case Level 2 and Case Level 1, respectively. If the story of judicial bias is true, both β_2 and β_3 are expected to be greater than 0.

In Table 3, Panel A, Model 2, we present the result corresponding to Equation 2. Both *Case_level_2* and *Case_level_1* have positive coefficients when they are interacted with *SOE*. By switching from tort cases to contract cases, the difference in the win rates between the SOEs and the non-SOEs has an additional increase of 2.4%. The additional bias associated with switching from tort cases to loan cases is even larger at 5.1%. A t-test on the coefficients of the interaction terms finds that their difference of 2.7% is statistically significant at a 5% level. The SOEs enjoy larger advantages on cases with less potential information asymmetry about merits, which supports the story of judicial bias and goes against the alternative explanation that SOEs are better at identifying strong cases based on case merits. The control variables keep the same signs as in Table 3 Panel A, Model 1.

There is the legitimate concern that the above result is driven by the lender characteristics in the loan suits, since the loan suits account for the majority of the sample. If the

lenders tend to win regardless of the judicial bias, and our sample consists of mostly state owned banks which are lenders, then we would observe a higher win rate of SOEs for Case Level 1. To rule out this possibility, we run the same regression with the subsample of only defendant firms, and include a bank dummy that equals one if a bank is involved in the suit. Since lenders are almost always on the plaintiff side, using the defendant subsample ensures that our result is not driven by state-owned lenders winning the case.

Columns 3 and 4 in Table 3, Panel A present the results. Again, the SOEs have a higher win rate than the non-SOEs. The bias is more prominent on cases with less potential information asymmetry about merits. The difference between the coefficients of *Case_level_1*SOE* and *Case_level_2*SOE* is positive and statistically significant.

Another related concern is that bank loans may have special characteristics. For example, if some of the bank loans are policy loans made to support certain SOEs, those SOEs may get preferential treatments in courts. To deal with the problem, we eliminate all the bank loans and repeat the same test. Columns 5 and 6 in Table 3, Panel A present the result. Our main findings from the full sample stay unchanged. The SOEs have an average win rate that is 8% higher than the non SOEs. The advantage of the SOEs is the largest on the loan cases, creating a difference in the win rates of more than 10% (calculated as 0.062+0.042).

Finally, we refine the case categories to get clearer contrasts on the level of potential information asymmetry about case merits. Based on our four suit types, we further divide the loan cases into cases that only involve banks either as lenders or borrowers (very rarely), and cases involving guarantor companies or loan cases between two non-bank companies. The lender-borrower cases involve the simplest type of obligations, and bank loans have well-

defined repayment schedules. A case with guarantor companies may be more complicated because it involves a third party other than the lender or the borrower.

We then exclude all of the tort cases that are not infringement cases from Case Level 3, because the infringement cases are more likely to be "stranger" cases in which there is no previous interaction between the plaintiff and the defendant. On the other hand, in a tort case such as a trade secret leakage case by a former employee, the two parties have some past relationships, and it is less clear whether those cases are exposed to more information asymmetry on case merits than the contract cases.

Using refined Case Level 1 to include only bank loan cases and refined Case Level 3 to include only infringement cases and leaving the Case Level 2 intact, we run the regression specified in Equation 2 again with a bank dummy. The results are presented in Table 3, Panel B. The *SOE* still has a positive and significant coefficient. The two interaction terms between the case categories and *SOE* are of larger magnitudes as compared to the coefficients in Panel A. In a bank loan case, an SOE can have a win rate which is 17% higher than that of a non-SOE. One factor that might have contributed to such a significant discrepancy is that banks are more reluctant to fight an SOE due to its connection to the government. As we refine the case categories, the message from the previous regressions stay the same.

Table 3 Judicial bias and information asymmetry on case merit

The two panels report how the state ownership affects the trial outcomes. The dependent variable is the trial outcome, which equals 1 if the disclosing firm wins. *SOE* is a dummy that equals 1 if the firm is state owned. *Case_level_n* (where n=1, 2, or 3) is a measure for the potential information asymmetry on case merits. *Case_level_1* consists of loan cases. *Case_level_3* consists of tort cases which has the highest level of potential information asymmetry. *Case_level_2* consists of other contract cases. The control variables include the firm size (*ln(asset)*, unit: RMB), leverage ratio, cash-to-asset ratio, profit ratio, whether the disclosing firm is the plaintiff, whether the firm is involved in more than 4 other litigations (*Repeated_player*), whether the case is tried at a higher level court, and the disputable amount. We also include dummies for appeal, whether the counter-party is a non-SOE (*Otherparty_nonSOE*), the fixed effects of province, industry, year, and suit types. We estimate the robust standard errors clustered by the provinces.

Panel A

	Full Sample		Defendant subsample		Non-bank loan subsample	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Win	Win	Win	Win	Win	Win
SOE	0.086***	0.050***	0.052***	0.039***	0.084***	0.062**
	(0.014)	(0. 016)	(0.014)	(0.019)	(0.032)	(0.018)
Case_level_2*SOE		0.024***		0.063***		0.027**
		(0.007)		(0.014)		(0.013)
Case_level_2		0.016		-0.296*		-0.034
		(0.029)		(0.140)		(0.047)
Case_level_1*SOE		0.051***		0.083***		0.042***
		(0.016)		(0.014)		(0.006)
Case_level_1		-0.054*		-0.221*		0.004
		(0.029)		(0.117)		(0.043)
Bank Dummy	--	--	-0.163	-0.060	--	--
	--	--	(0.169)	(0.149)	--	--
Ln(asset)	0.036**	0.018***	0.005	0.005	0.015**	0.019*
	(0.006)	(0.006)	(0.007)	(0.007)	(0.008)	(0.011)
Leverage	0.0001	0.0000	0.0001	-0.0001	-0.0001	-0.0002
	(0.0004)	(0.0004)	(0.0004)	(0.0003)	(0.0003)	(0.0002)
Cash ratio	0.575***	0.594***	0.418***	0.355**	1.022***	0.669***
	(0.054)	(0.078)	(0.085)	(0.084)	(0.076)	(0.189)
Operation profit	0.109***	0.098***	0.025	0.056	0.034	0.021
	(0.041)	(0.041)	(0.038)	(0.039)	(0.036)	(0.093)
Plaintiff Dummy	0.447***	0.331***	--	--	0.575***	0.390***
	(0.014)	(0.013)	--	--	(0.021)	(0.020)
Repeated_player	-0.073	-0.049***	-0.073	0.017	-0.041***	-0.042***
	(0.013)	(0.014)	(0.013)	(0.014)	(0.015)	(0.017)
Appeal	0.039	0.004	0.049**	0.024	-0.038	0.019
	(0.027)	(0.807)	(0.024)	(0.016)	(0.027)	(0.016)
Otherparty_nonSOE	0.195***	0.152***	0.094***	0.045***	0.117***	0.113***
	(0.013)	(0.016)	(0.017)	(0.017)	(0.018)	(0.031)
Suit type	Yes	No	Yes	No	Yes	No
Other controls*	X	X	X	X	X	X
Observation	3323	3256	2528	2496	1897	1863
R-square	0.38	0.42	0.18	0.19	0.44	0.38

Panel B Subsample with refined case categories

This panel refines the three case categories presented in panel A. *Case_level_1_R* consists of loan cases only involving banks as either the lenders or the borrowers. All the cases that involve guarantor companies are deleted. *Case_level_2_R* consists of other contract cases. *Case_level__3_R* consists of infringement cases only. *Case_level_3_R* is omitted. The rest of the variables are defined as in Panel A.

	Model 1	Model 2
	Win	Win
SOE	0.061***	0.058**
	(0.017)	(0.029)
Case_level_2_R*SOE		0.091*
		(0.049)
Case_level_2_R		-0.083*
		(0.045)
Case_level_1_R *SOE		0.110*
		(0.061)
Case_level_1_R		-0.061
		(0.047)
Bank Dummy	0.073	0.036
	(0.121)	(0.113)
Ln(asset)	0.016**	0.019**
	(0.008)	(0.008)
Leverage	0.0002	-0.0001
	(0.0003)	(0.0003)
Cash ratio	0.870***	0.828***
	(0.073)	(0.074)
Operation profit	0.101***	0.101***
	(0.041)	(0.041)
Plaintiff Dummy	0.458***	0.291***
	(0.021)	(0.016)
Repeated_player	-0.042***	-0.039***
	(0.015)	(0.015)
Appeal	0.027	0.037
	(0.018)	(0.028)
Otherparty_nonSOE	0.136***	0.148***
	(0.019)	(0.019)
Suit type	Yes	No
Other controls*	X	X
Observation	2768	2768
R-square	0.36	0.37

In both panels, ***, **, * are significant at the 1%, 5%, and 10% levels. The numbers in parentheses are clustered standard errors.

1.4.2 Judicial Bias and Legal Environments

In the following sections we go beyond each case idiosyncrasy to present more empirical evidence in support of our claim of judicial bias. The first set of tests we run are concerned with the development of provincial-level legal institutions. We conjecture that the local legal institutions affect the extent of judicial bias against unconnected firms, because poor property rights protection is the fundamental reason that the SOEs enjoy unjustified benefits. If the difference in the winning probability is caused by a bias against non-SOEs, then it should be less prominent when the case is tried in a region with a better legal environment. Moreover, the alleviation of the judicial bias should be more significant on cases with more straightforward case facts, as those are the cases with the largest potential for judicial bias.

To our advantage, China's economic reform in the past 30 years has necessitated the establishment of an almost entirely new set of economics institutions. These institutions have been developed at a varying pace across different regions of China (Xu 2009, Ayyagari et al. 2010), partly due to divergent regional economic policies and the significant autonomous power of the local governments. Such heterogeneities in the legal institution developments across time and regions in China have offered unique opportunities for us to examine the connection between legal institutions and judicial bias in a panel-like setting[12].

The variable we use to measure the development of the local legal institutions is the Producer Property Rights Protection Index at the provincial level taken from the Marketization Index for China's Provinces. It is a widely used index that measures province-level market and

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[12] Technically speaking, we do not have a panel data set here; we only have observations of firms which are involved in litigations. There are multiple observations in each province each year, but a particular firm may only appear once.

legal developments and is jointly published by the National Economic Research Institute and China Reform Foundation annually. The Producer Property Rights Protection Index is constructed based on three components: the number of economics cases filed every year normalized by the regional GDP, the extent to which the local regulations emphasize the protection of non-SOEs, and some firm level survey evidences. A high score in the index indicates a better regional legal environment. We choose this specific measure instead of the more widely used overall marketization measure because our study puts an emphasis on the court's discrimination based on the ownership status of the firm. In regions of better property rights protection, the non-SOEs face less government exploitation, which might translate to a more fair court system.
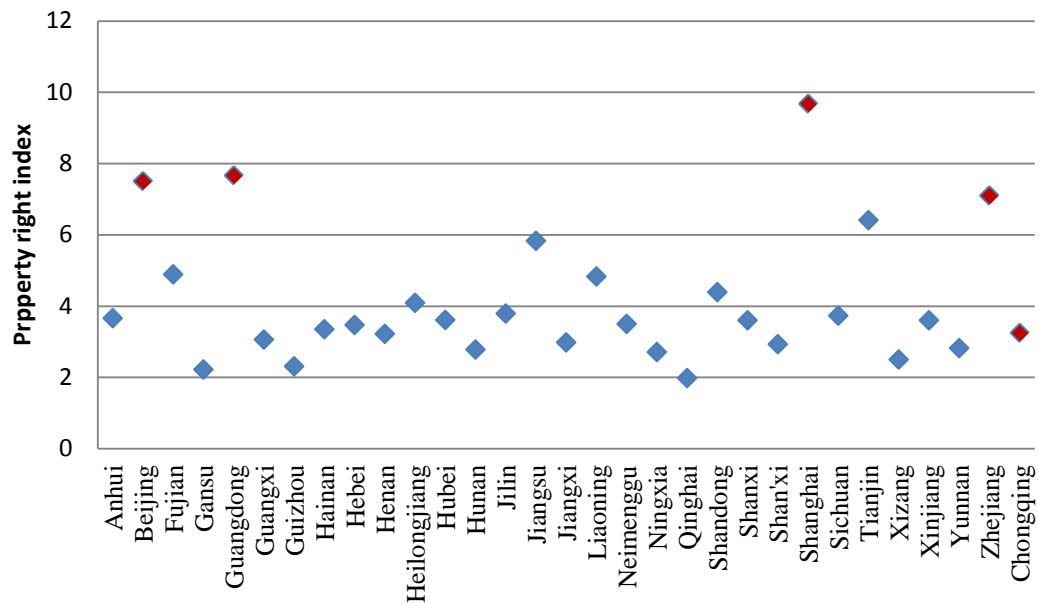
Figure 2 Average Producer Property Rights Protection Index, 1997-2007

This figure gives a summary of the Producer Property Rights Protection Index across the provinces. A higher index score means the province has better property rights protection.

Source: Marketization Index for China's Provinces (1997-2008), published by National Economic Research Institute

The most updated Marketization Index covers all of the provinces from 1997 to 2007. We match the cases after 2008 with the index value of 2007. Using the average index value between 1997 and 2007 instead does not have a significant impact on our results. Figure 2 gives a summary of the average Producer Property Rights Protection Index across the provinces. There is regional heterogeneity even within the more developed regions. Beijing, Shanghai and Guangdong have high Index scores while places like Chongqing have a low score, consistent with the anecdotal evidence that the Chongqing autonomous city has suffered from abuse of administrative power.

We match the Producer Rights Protection Index from the previous year to the year when the case was tried and the province where the case was tried[13], and run the following regressions:

$$Win_i = \alpha + \beta_1 SOE_i + \beta_2 Lag\_legal_i + \beta_3 SOE_i \times Lag\_legal_i + \beta'\ Controls_i + \varepsilon_i \qquad (3.1)$$

$$Win_i = \alpha + \beta_1 SOE_i + \beta_2 Lag\_legal_i + \sum_{n=1}^{2}\beta_{n+2}SOE_i \times Lag\_legal_i \times Case\_level\_n_i$$
$$+ \sum_{n=1}^{2}\beta_{n+4}SOE_i \times Case\_level\_n_i + \sum_{n=1}^{2}\beta_{n+6}Lag\_legal_i \times Case\_level\_n_i$$
$$+ \beta_9 SOE_i \times Lag\_legal_i + \sum_{n=1}^{2}\beta_{n+9}Case\_level\_n_i + \beta'\ Controls_i + \varepsilon_i \qquad (3.2)$$

where *lag_legal* is the lagged Producer Rights Protection Index from the province where the case was tried. In Regression 3.2, our variable of main interest is the triple interaction term of SOE, lagged legal index, and case category, which allows us to test whether the alleviation of bias varies with different levels of potential information asymmetry on case merits.

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[13] Under most circumstances it's the location of the defendant. Sometimes the plaintiff may be able to have the case tried in its home province.

Table 4 Judicial bias and legal institutions

This table reports how the local legal institutions affect the win rate of the SOEs. The dependent variable is the trial outcome. *SOE* is a dummy that equals 1 if the firm is state owned. *Case_level_n* (where n = 1, 2, or 3) is a measure for the potential information asymmetry on case merit. *Case_level_1* consists of cases with the lowest level of potential information asymmetry. We use two proxies for local legal environments (the *legal* variable). In the first two columns, we use *Lag_legal,* which is the lagged producer rights protection index. In the last two columns, we use *port_lease,* which is a dummy that equals 1 if a province was forced to open to foreigners as a treaty port or leased territory.

	legal proxy 1: Lag_legal		legal proxy 2: port_lease	
	Model 1	Model 2	Model 3	Model 4
	Win	Win	Win	Win
SOE	0.073***	0.063**	0.057**	0.024*
	(0.014)	(0.026)	(0.024)	(0.013)
legal	0.042	0.061	0.011	-0.021
	(0.045)	(0.040)	(0.039)	(0.025)
SOE* legal	-0.019*	-0.021	-0.043*	-0.055**
	(0.008)	(0.018)	(0.024)	(0.025)
Case_level_2*SOE		0.034**		0.006
		(0.014)		(0.041)
Case_level_2		-0.077		0.093
		(0.132)		(0.078)
Case_level_1*SOE		0.041**		0.013
		(0.017)		(0.013)
Case_level_1		-0.041		-0.048
		(0.168)		(0.050)
Case_level_2* legal		0.015		-0.011
		(0.024)		(0.105)
Case_level_1* legal		-0.016		-0.058
		(0.029)		(0.104)
Case_level_2* Legal*SOE		-0.006*		-0.021*
		(0.003)		(0.011)
Case_level_1* Legal*SOE		-0.009**		-0.043
		(0.003)		(0.031)
Ln(asset)	0.021***	0.019*	0.033***	0.027***
	(0.007)	(0.010)	(0.008)	(0.010)
Cash ratio	0.795***	0.631***	0.317***	0.660***
	(0.065)	(0.187)	(0.058)	(0.179)
Operating profit	0.118***	0.036	0.123***	0.013
	(0.046)	(0.092)	(0.046)	(0.009)
Plaintiff Dummy	0.488***	0.396***	0.471***	0.394***
	(0.017)	(0.018)	(0.017)	(0.019)
Repeated_player	-0.062***	-0.045***	-0.052***	-0.039**
	(0.014)	(0.019)	(0.014)	(0.018)
Otherparty_nonSOE	0.177***	0.106***	0.136***	0.111***
	(0.015)	(0.031)	(0.016)	(0.030)
Suit type	Yes	No	Yes	No
Province fixed effects	Yes	Yes	No	No
Other Controls*	X	X	X	X
Observation	3323	3256	3323	3256
R-square	0.41	0.40	0.41	0.42

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The control variables include the firm size (*ln(asset)*, unit: RMB), leverage ratio, cash-to-asset ratio, profit ratio, whether the disclosing firm is the plaintiff, whether the firm is involved in more than 4 other litigations (*Repeated_player*), whether the case is tried at a higher level court, and the disputable amount. We also include dummies for appeal, whether the counterparty is a non-SOE (*Otherparty_nonSOE*), and the fixed effects of industry, year, suit types, and province (or regional GDP). We estimate the robust standard errors clustered by the provinces.

***, **,* are significant at 1%, 5%, and 10% level. The numbers in parenthesis are clustered standard errors.

We use the lagged index to mitigate the concern of reverse causality. Even though our measure of the legal index does not explicitly take into account judicial bias at the court level, it is possible that the behaviors of the courts may have an impact on the regional legal index. For instance, if the court becomes unbiased, the SOEs may be more reluctant to bring up a suit, because they are less confident of winning. The number of economics cases would drop as a result, which affects the legal index. We do not claim to completely solve the issue of reverse causality by using the lagged index. We argue that, as the main purpose of this paper is to prove that the high win rate by the SOEs is caused by the bias, the reverse causality here is not our major concern. The fact that a smaller win rate of the SOEs may have translated into a better legal index but not the other way around still lends support to our claim that the high win rate of the SOEs is associated with court bias. Nevertheless, we will tackle the problem of reverse causality directly later in the section.

The first two columns in Table 4 present the regression results. Model 1 corresponds to Equation 3.1. As we expected, the SOEs have less chance of winning if the case is tried in provinces with higher Producer Property Rights Index scores. The interaction term has a significant coefficient of -1.9%, indicating that the difference in the winning probabilities between the SOEs and the non-SOEs decreases by 1.9% if the trial province's legal environment index increases by 1, which is the difference between Guangdong province and Heilongjiang province, and is slightly smaller than one standard deviation of the legal environment index

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across provinces. As the legal environment improves, the court becomes more independent in decision making, which in turn alleviates the discrimination against unconnected firms. The negative bias on the non-SOEs is less prominent in the regions with better legal environment, though it is not fully corrected. Moreover, Model 2 shows that the drop in the win rate is more prominent for cases with straightforward case merits, further distinguishing our story of judicial bias from the competing explanation of information asymmetry about case merits.

To formally address the problem of reverse causality, we employ an exogenous proxy for the local legal environments inspired by Fan, Wang, Zhang (2010): whether a province was forced to open to foreigners as a treaty port or a leased territory after the first Opium War in the Qing dynasty. After the first Opium War in 1842, China was forced to sign several treaties with foreign countries to establish treaty ports or setup leased territories in some of its provinces[14]. The setup of the treaty ports and leased territories increased China's openness and promoted business contact with the rest of the world. Foreign courts were set up in those areas to handle disputes involving foreigners, and the local court's jurisdiction was restricted. Since these treaty ports and leased territories were opened over 100 years ago, how a court rules an individual case now cannot have had any direct relation to their creation. However, as Fan, Wang, and Zhang (2010) argued, the establishment of these ports and territories is likely to have long-term impacts on the local legal institution development.

We create a dummy variable *port_lease* that equals one if the province was forced to

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[14]The treaty ports are located in Anhui, Chongqing, Fujian, Guangdong, Guangxi, Hainan, Hubei, Jiangsu, Liaoning, Shandong, Shanghai, Tianjin, and Xinjiang, Zhejiang. The locations of the leased territories include Tianjin (1860), Shanghai (1845), Jiangsu (1863), Zhejiang (1896), Anhui (1877), Jiangxi (1861), Fujian (1861), Shandong (1889), Guangdong (1857), Chongqing (1901) and Hubei (1861). (Taken from Fan, Wang, and Zhang 2010).

open as a port or became a leased territory, and use the *port_lease* dummy directly in place of

the legal index by running the regression:

$$
\begin{aligned}
Win_i = {} & \alpha + \beta_1 SOE_i + \beta_2 port\_lease_i + \sum_{n=1}^{2} \beta_{n+2} SOE_i \times port\_lease_i \times Case\_level\_n_i \\
& + \sum_{n=1}^{2} \beta_{n+4} SOE_i \times Case\_level\_n_i + \sum_{n=1}^{2} \beta_{n+6} port\_lease_i \times Case\_level\_n_i \\
& + \beta_9 SOE_i \times port\_lease_i + \sum_{n=1}^{2} \beta_{n+9} Case\_level\_n_i + \beta' \ Controls_i + \varepsilon_i \quad\quad (4)
\end{aligned}
$$

The underling theory is that the opening of the treaty ports and leased territories had a

positive impact on the local legal environment by introducing the Western-style laws at an early

stage. The *port_lease* dummy has a positive correlation of 0.539 with the legal index. We use

the opening of ports and leased territories as an exogenous positive shock to the regional legal

environments. It is a noisy proxy in the sense that though these provinces on average have

higher legal indices, some of them (such as Xinjiang province) may have relatively poorer legal

environments today due to other historical reasons.

The results are presented in Table 4, Model 3 and Model 4. Here we take out the province

fixed effects because the *port_lease* dummy is a province-level variable that is not time-varying.

Provincial gross domestic product (GDP) per capita is included as a control of regional economic

development. The win rate of the SOEs drops by 4.3% in the provinces that were forced to open

as treaty ports and leased territories. The decrease is larger on cases with more straightforward

case facts, as demonstrated in Model 4. Both of the triple interaction terms between SOE, case

category, and the port/leased territory dummy have the right negative signs. The interaction

term *Case_level_2*port_lease*SOE* is significant, but *Case_level_1*port_lease*SOE* is

insignificant due to the noise. The regression results support our previous argument that the judicial bias is reduced in regions with better local legal environments.

As a further robustness check, we also employ a two stage least square (2SLS) method. In the first stage, the Producer Rights Index of a province is regressed on two instruments: the *port_lease* dummy, and the latitude of the province. We interact the two instruments with the SOE dummy and use the variables to instrument for the interaction term of the Producer Rights Index and SOE. Latitude of a province (measured at the center of the province's capital city) is included as an instrumental variable to capture the geographic feature of a region, since a region's latitude has a great effect on its climate and weather. It has been argued that natural environment puts restrictions on the institution development (Acemoglu 2005). The 2SLS leaves our findings largely unchanged[15].

1.4.3 Judicial Bias and Local Connections

The second set of tests makes use of the distinction between national SOEs and local SOEs. A national SOE is owned by the central government, while a local SOE is owned by a provincial or city level government. There are 1,089 cases involving local SOEs in our sample. Compared with the national SOEs, the local SOEs' political connections are constrained by their geographic locations. A local SOE in one province is likely to be favored by the local court, but may not necessarily enjoy the same benefit if the trial takes place elsewhere. Thus, we should observe more bias favoring a local SOE if the case is tried in its home province. The related regression is:

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[15] Results are not reported here for conciseness. Tables are available upon request.

$$Win_i = \alpha + \beta_1 SOE_i + \beta_2 Home\_province_i + \beta_3 LSOE_i$$
$$+ \beta_4 LSOE_i \times Home\_province_i + \beta' \ Controls_i + \varepsilon_i \qquad (5.1)$$

where *LSOE* is a dummy variable for local SOE and *Home_province* is a dummy which equals one

if the case is tried in the home province of the disclosing firm.

Furthermore, the strength of local political connections is likely to be affected when

there is a turnover of the provincial governor. A change in the provincial governor is usually

followed by turnovers of other provincial and city level officials, since new governors would

want to promote people closer to them. The governor turnover thus significantly weakens, if not

destroys, the existing connection a local SOE has with the current local government. During this

period, the control of the old political power has dissolved while the influence of the new

political power has yet to be established. Even if the governor turnover is expected, there are

only limited things a local SOE can do to secure a new connection in advance, since there is

uncertainty over who will be the successor. The national SOEs are less exposed to this problem,

because they can rely on the central government.

Under normal circumstances, such turnovers of governors would again expose us to a

reverse causality problem. The decision of the reappointment of a governor can depend on

various political and economic factors during the governor's tenure. However there are a few

exceptions; sudden death is an obvious one. Moreover, according to the regulation on the

appointment and selection of party leaders in China, provincial governors have a term of 5 years

and can be reappointed only once. By the end of the 10th year in office, governors have to be

transferred to a different position. Another regulation is that government leaders have to step

down once reaching the age of 65. These are the three exceptional circumstances where the

turnovers can be considered to be exogenous. In particular, we denote that a province has an exogenous regime shift if its governor or its provincial party secretary leaves the office for the following reasons: sudden death, reaching the 10th year of tenure, and surpassing the age of 65. Among the 173 total governor turnovers we document across the provinces between 1997 and 2010, 46 of them are defined as exogenous. There are 255 cases in 14 provinces which happened during the exogenous regime shifts.

Exogenous reappointment of new provincial leaders represents a shock to the local political environment. This is a period when the local government has the least interference over court decisions, and when the local SOEs benefit the least by having the trial in their home provinces. In fact, the average number of locally tried cases involving local SOEs drops from the sample average of 6 per year per province to 2.5 per year per province during the exogenous leader changes, indicating that the local SOEs are indeed more reluctant to participate in litigations during the governor turnovers. Eliminating the cases which are tried during endogenous leader changes, we are left with a sample of 2,038 cases to run the following regressions:

$$
\begin{aligned}
Win_i = {} & \alpha + \beta_1 SOE_i + \beta_2 LSOE_i + \beta_3 Leader\_change_i + \beta_4 LSOE_i \times Leader\_change_i \\
& + \beta' Controls_i + \varepsilon_i
\end{aligned} \tag{5.2}
$$

$$
\begin{aligned}
Win_i = {} & \alpha + \beta_1 SOE_i + \beta_2 LSOE_i + \beta_3 Leader\_change_i + \beta_4 LSOE_i \times Leader\_change_i \\
& + \beta_5 Home\_province_i \times Leader\_change_i + \beta_6 LSOE_i \times Home\_province_i \\
& + \beta_7 LSOE_i \times Home\_province_i \times Leader\_change_i + \beta' Controls_i + \varepsilon_i \tag{5.3}
\end{aligned}
$$

where *LSOE* and *Home_province* are defined as before. The variable *Leader_change* is a dummy variable that equals one whenever there is an exogenous province leader change. In Equation 5.3, our main interest is in the triple interaction term of *Home_province*, *LSOE,* and

Leader_change. We test whether the leader switch has a larger detrimental impact on the local

SOEs when the case is tried in the local SOE's home province.

Table 5 Judicial bias and local connections

This table reports the regression results of how the local state-owned enterprises enjoy additional benefits when the cases are tried in their home provinces. The dependent variable is the trial outcome. The independent variables include the following: a *SOE* dummy for state owned firms, a *LSOE* dummy for firms owned by the provincial or lower level government. *Home_province* is a dummy that equals 1 if the case is tried in the disclosing firm's home province. *Leader_change* is a dummy that equals 1 whenever there is an exogenous provincial governor turnover.

	Model 1	Model 2	Model 3
	Win	Win	Win
SOE	0.064**	0.038**	0.043**
	(0.029)	(0.019)	(0.020)
LSOE	0.005	0.011	0.031
	(0.029)	(0.028)	(0.030)
LSOE*Home Province	0.028**		0.030
	(0.014)		(0.026)
Home Province	-0.016		0.026
	(0.020)		(0.017)
Leader Change		0.017	-0.018
		(0.036)	(0.051)
LSOE* Leader Change		-0.048**	-0.053
		(0.023)	(0.050)
Leader Change*Home Province			0.067
			(0.053)
LSOE*Home Province* Leader Change			-0.047*
			(0.025)
Ln(asset)	0.035***	0.023**	0.025**
	(0.006)	(0.006)	(0.006)
Leverage	0.0003	0.0000	0.0001
	(0.0004)	(0.0004)	(0.0004)
Cash ratio	0.669***	0.512***	0.107***
	(0.063)	(0.066)	(0.047)
Operating profit	0.124**	0.098**	0.097**
	(0.042)	(0.042)	(0.042)
Plaintiff Dummy	0.396***	0.349***	0.342***
	(0.012)	(0.012)	(0.012)
Repeated_player	-0.067***	-0.054***	-0.050***
	(0.013)	(0.013)	(0.013)
Appeal	-0.007	-0.006	-0.003
	(0.016)	(0.016)	(0.016)
Otherparty_nonSOE	0.195***	0.196***	0.196***
	(0.014)	(0.017)	(0.014)
Other controls	X	X	X
Observation	3323	2038	2038
R-square	0.36	0.37	0.38

The control variables include the firm size, leverage ratio, cash-to-asset ratio, operating profit, whether the disclosing firm is the plaintiff, and whether the disclosing firm is involved in more than 4 other litigations (*Repeated_player*). We also include the ownership status of the counterparty (*Otherparty_nonSOE*) and the appeal status of a case. We estimate the robust standard errors clustered by the provinces. Other control variables include: high court dummy, disputable amount, type of suits, province dummy, industry, and year controls. None of these are significant.

***, **, * are significant at the 1%, 5%, and 10% levels. The numbers in parentheses are clustered standard errors.

Regression results are presented in Table 5. Model 1 shows that besides the average favor a SOE receives, a local SOE enjoys a 2.8% increase in the win rate when the case is tried in its home province. Model 2 demonstrates that the judicial favor on the local SOEs diminishes by 4.8% as a result of local political regime switches. Model 3 includes the triple difference term with a negative coefficient, implying that the local SOEs having their cases tried at the local provinces suffer higher than average drops in the win rates during the provincial leader turnovers, which is what we would expect if the advantage of the SOE is caused by judicial bias. The interaction term between *LSOE* and *Home_province* is still positive in Model 3. The interaction term between local SOE and leader change remains negative, but becomes insignificant. The impact of leader changes on the local SOEs is concentrated on the cases tried in their home provinces.

1.4.4 Self-Established Political Connections by Non-SOE and Judicial Bias

Up to this point in our research, we have used only the state ownership as a proxy for political connections and have shown that the non-SOEs suffer discrimination in court decisions. Facing such a disadvantage, the non-SOEs seek other means to compete with the SOEs. One of the most widely used methods is to rely on the personal networks of their top managers. To be

specific, the non-SOEs can hire CEOs or directors who have previously held positions as leading government officials. This kind of personal tie helps firms establish some insider connections with the government and gain political advantages, and is commonly observed in emerging markets. Faccio (2006) studied listed firms in 47 countries and found that political connections are prevalent among listed firms. Both Cull and Xu (2004) and Li et al. (2008) did work specifically on China and found that in regions with a less developed market and weaker legal system, firms are more likely to have connected CEOs/directors.

Based on our previous observations, we conjecture that the non-SOEs with CEO/director connections have an advantage in court compared with those non-SOEs without connections. The CEO/director connection here is only defined within the subsample of non-SOEs because the SOEs are connected by default through their ownership statuses. Tests in this section only involve the subsample of non-SOEs, proposing an alternative measure of political connections and at the same time mitigating the potential concern that the difference in the win rates between SOEs and non-SOEs is caused by some unobserved dissimilarities, but not by political connections.

We first re-estimate the regressions as in Table 3 using the subsample of all the non-SOEs, replacing the SOE dummy with a dummy of CEO/director connection, which equals one if the firm's top official (CEO or director) is previously affiliated with the government.

Table 6 Non-SOE subsample: Judicial bias and case merit information asymmetry

This table reports the regression results of how the personal connection in a non-SOE affects the trial outcomes. The dependent variable is the trial outcome. The independent variables include the following: *CEO/DIR connection* is a dummy variable that equals 1 if the non-SOE has a CEO/director who was previously connected to the government. *Case_level_n* (where n = 1, 2, or 3) is a measure for the potential information asymmetry on case merit. *Case_level_1* consists of loan cases, which has the lowest level of potential information asymmetry. *Case_level_3* consists of tort cases, which has the highest level of potential information asymmetry. *Case_level_2* consists of purchase/sales contract cases which lie in between. *Case_level_3* is omitted. We also include the interaction terms of *Case_level_n* with *CEO/DIR connection*. The control variables include the firm size (*ln(asset)* with asset measured in RMB), leverage ratio, cash-to-asset ratio, profitability, whether the disclosing firm is the plaintiff, whether the firm is involved in more than 4 other litigations in our sample (*Repeated_player*), and whether the case was appealed. We also include the ownership status of the counterparty (*Otherparty_nonSOE*). Other control variables include: high court dummy, disputable amount, type of suits, province dummy, industry and year controls. None of those are significant.

	Full sample		Only Defendant	
	Model 1	Model 2	Model 3	Model 4
	Win	Win	Win	Win
CEO/DIR connection	0.089**	0.026***	0.063**	0.039*
	(0.041)	(0.001)	(0.028)	(0.020)
Case_level_2		0.065***		0.019**
*CEO/DIR connection		(0.026)		(0.008)
Case_level_2		0.039		0.004
		(0.091)		(0.010)
Case_level_1		0.137***		0.081***
*CEO/DIR connection		(0.024)		(0.024)
Case_level_1		-0.067**		-0.035
		(0.024)		(0.054)
Bank Dummy			-0.130	-0.140
			(0.151)	(0.171)
Ln(asset)	0.017*	0.035	0.007	0.008
	(0.010)	(0.024)	(0.009)	(0.009)
Leverage	0.0002	0.0002	0.000	-0.0000
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Cash ratio	0.590***	0.731***	0.033***	0.112**
	(0.135)	(0.295)	(0.019)	(0.050)
Operating profit	0.105*	0.066	-0.027	-0.030
	(0.064)	(0.131)	(0.051)	(0.050)
Plaintiff Dummy	0.489***	0.366***	--	--
	(0.027)	(0.041)	--	--
Repeated_player	0.190	0.200	-0.008	-0.001
	(0.142)	(0.141)	(0.011)	(0.017)
Appeal	0.057***	0.058***	0.063***	0.065***
	(0.024)	(0.024)	(0.019)	(0.020)
Otherparty_nonSOE	0.077***	0.076*	0.075***	0.041**
	(0.021)	(0.045)	(0.025)	(0.021)
Suit type	Yes	No	Yes	No
Other Controls	X	X	X	X
Observation	1319	1304	954	947
R-square	0.32	0.33	0.07	0.08

***, **,* are significant at 1%, 5%, and 10% level. The numbers in parentheses are clustered standard errors.

Table 6 presents the test results, using the first definition of Case Levels. Non-SOEs with connected CEOs/directors win with higher probabilities. The bias is more significant on cases with less potential information asymmetry, which is demonstrated by the positive coefficients of the terms *Case_level_2*CEO/Dir_Connection* and *Case_level_1 *CEO/Dir_Connection* in Model 2. Model 3 and Model 4 use subsamples of defendant firms. As seen previously, the results in the first two columns are not driven by the lenders winning the cases. A t-test confirms that *Case_level_2*CEO/Dir_Connection* has a coefficient that is smaller than the coefficient of *Case_level_1 *CEO/Dir_Connection* in both Model 2 and Model 4. We also perform the test under the refined definition of Case levels, and the results still hold[16]. The control variables keep the original signs, though some of them become insignificant.

Next we test the implications of local legal environments. As before, we expect the judicial bias to be alleviated in regions with more developed legal institutions. In the first column of Table 7, improved legal environment exerts a correcting force on the bias and makes the connected firms less advantageous, though the magnitude of correction is not as big as in the full sample case. In Model 2, the decrease in the win rate of the connected firm is the greatest on cases with the most straightforward case facts (Case Level 1). In Model 3 and Model 4 we directly add the dummy for the opening of ports or leased territories in place of the legal index to confirm the results. The difference in the win rates drops by 5.8% in the provinces that were forced to open as treaty ports or leased territories. We also perform a 2SLS and the results are largely unchanged. Results are not presented here for conciseness.

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[16] Results are available upon request.

Table 7 Non-SOE subsample: Judicial bias and legal institutions

This table reports how the local legal environments affect the connected non-SOEs' win rate. The dependent variable is the trial outcome. *CEO/DIR connection* is a dummy variable that equals 1 if the non-SOE has a CEO or a director who was previously connected to the government. *Case_level_n* (where n=1,2,or 3) is a measure for the potential information asymmetry on case merit. *Case_level_3* consists of cases with the highest level of information asymmetry. We use two proxies for local legal environments (*legal* variable). In the first two columns, we use *Lag_legal*, which is the lagged producer rights protection index. In the last two columns, we use *port_lease*, which is a dummy that equals 1 if a province was forced to open to foreigners as a treaty port or leased territory.

	legal_proxy 1: Lag_legal		legal_proxy 2: port_lease	
	Model 1	Model 2	Model 3	Model 4
	Win	Win	Win	Win
CEO/DIR conn.	0.011*	0.039*	0.072**	0.056**
	(0.007)	(0.016)	(0.026)	(0.027)
legal	0.008***	0.009***	0.052***	0.027
	(0.002)	(0.002)	(0.020)	(0.065)
CEO/DIR conn.* legal	-0.006***	-0.007**	-0.058*	-0.057
	(0.002)	(0.002）	(0.031)	(0.069)
Case_level_2* CEO/DIR conn.		0.015		0.034**
		(0.016)		(0.015)
Case_level_2		0.191		-0.096
		(0.134)		(0.184)
Case_level_1* CEO/DIR conn.		0.023**		0.094
		(0.010)		(0.064)
Case_level_1		0.042		0.211
		(0.090)		(0.158)
Case_level_2* legal		-0.047		0.076
		(0.041)		(0.054)
Case_level_1* legal		0.021		-0.024
		(0.041)		(0.089)
Case_level_2* Legal* CEO/DIR conn.		-0.015***		-0.013
		(0.002)		(0.017)
Case_level_1* Legal* CEO/DIR conn.		-0.069***		-0.029***
		(0.023)		(0.008)
Ln(asset)	0.012	0.023**	0.019***	0.024**
	(0.015)	(0.008)	(0.007)	(0.008)
Cash ratio	-0.003	0.004	0.736***	0.477***
	(0.005)	(0.003)	(0.062)	(0.121)
Operating Profit	0.104*	0.088*	0.075*	0.102*
	(0.057)	(0.029)	(0.040)	(0.058)
Plaintiff Dummy	0.335***	0.276***	0.487***	0.287***
	(0.020)	(0.027)	(0.016)	(0.027)
Repeated_player	-0.062***	-0.037**	-0.068***	-0.029
	(0.014)	(0.019)	(0.014)	(0.020)
Otherparty_nonSOE	0.067***	0.121***	0.077*	0.132***
	(0.028)	(0.035)	(0.061)	(0.018)
Province fixed effects	Yes	Yes	No	No
Other Controls:	X	X	X	X
Observation	1319	1304	1319	1304
R-square	0.37	0.38	0.35	0.36

The control variables include the firm size (*In(asset)*, unit: RMB), leverage ratio, cash to asset ratio, profit ratio, whether the disclosing firm is the plaintiff, whether the firm is involved in more than 4 other litigations (*Repeated_player*), whether the case is tried at a higher level court, and the disputable amount. We also include dummies for appeal, whether the counter-party is a non-SOE(*Otherparty_nonSOE*), the fixed effects of industry, year, suit types and province (or regional GDP). We estimate the robust standard errors clustered by the provinces.

  ***, **, * are significant at the 1%, 5%, and 10% levels. The numbers in parentheses are clustered standard errors.

We further divide the sample to firms whose CEOs or directors are locally connected and whose CEOs or directors have political connections outside their local provinces. There are 625 cases involving locally connected non-SOEs. We expect the firms with local connections to enjoy extra benefits if their cases are tried locally. We also expect the exogenous local governor turnovers to have a negative impact on the win rate of locally connected firms. Within the non-SOE subsample, we have 167 cases tried during exogenous provincial leader changes.

Table 8 presents the results. Model 1 shows that the locally connected firms receive extra favors from the courts when the cases are tried locally. Model 2 demonstrates that the change in the local governor has a negative impact on the win rate of the locally connected non-SOEs. During the regime switch, the difference in the probabilities of winning between locally connected and unconnected non-SOEs drops by 7.1%. Column 3 shows that the additional advantage enjoyed by the locally connected firm in the local courts diminishes during the time of leader change, consistent with our full sample results.

The impacts of other control variables are of the same direction and comparable magnitude with the full sample case. However, the *Leader_change* dummy has a significant negative coefficient now, as contrary to the full sample case. During the regime switch, an average non-SOE is less likely to win in court. This can be explained by an overall uncertainty caused by the governor turnover, which affects non-SOEs more severely than SOEs.

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Table 8 Non-SOE subsample: Judicial bias and local connections

This table reports the regression results of how the local state-owned enterprises enjoy additional benefits when the cases are tried in their home provinces. The dependent variable is the trial outcome. The independent variables include the following: a *CEO/DIR connection* dummy for connected firms, a *LConnection* dummy local connection. *Home_province* is a dummy that equals 1if the case is tried in the disclosing firm's home province. *Leader_change* is a dummy that equals 1 whenever there is an exogenous provincial governor turnover.

The control variables include the firm size, leverage ratio, cash-to-asset ratio, operating profit, whether the disclosing firm is the plaintiff, and whether the disclosing firm is involved in more than 4 other litigation (*Repeated_player*). We also include the ownership status of the counterparty (*Otherparty_nonSOE*) and the appeal status of a case. Other control variables include: high court dummy, disputable amount, province dummy, industry, and year controls. None of those are significant.

	Model 1	Model 2	Model 3
	Win	Win	Win
CEO/DIR connection	0.071*	0.028*	0.013***
	(0.033)	(0.011)	(0.004)
LConnection	0.022	0.032	0.043
	(0.042)	(0.022)	(0.032)
LConnection * home province	0.045**		0.032**
	(0.021)		(0.015)
home province	-0.023		0.038
	(0.026)		(0.023)
Leader Change		-0.087***	-0.084
		(0.031)	(0.063)
LConnection* Leader Change		-0.071**	0.071
		(0.031)	(0.051)
Leader Change* home province			-0.078
			(0.058)
LConn. * Leader Change* home province			-0.025**
			(0.012)
Ln(asset)	0.021**	0.013	0.022**
	(0.012)	(0.012)	(0.013)
Leverage	0.0003	0.0002	-0.0005
	(0.000)	(0.0003)	(0.002)
Cash ratio	-0.961***	-0.412***	-1.153***
	(0.102)	(0.004)	(0.117)
Operating profit	0.111**	0.111**	0.106**
	(0.048)	(0.049)	(0.048)
Plaintiff Dummy	0.478***	0.386***	0.575***
	(0.027)	(0.028)	(0.031)
Repeated_player	-0.022	0.011	-0.019
	(0.019)	(0.018)	(0.023)
Appeal	0.015	0.022	0.022
	(0.020)	(0.020)	(0.020)
Otherparty_nonSOE	0.072***	0.087***	0.074***
	(0.023)	(0.025)	(0.028)
Other Controls	X	X	X
Observation	1319	919	919
R-square	0.38	0.41	0.64

***, **, * are significant at the 1%, 5%, and 10% levels. The numbers in parentheses are clustered standard errors.

1.4.5 Self Established Political Connections vs. State Ownership

The question asked next is whether the CEO/director connections of non-SOEs can completely eliminate their disadvantages against the SOEs. If this is the case, then the non-SOEs are able to level the playing field without any formal policy interference. Since the majority of the non-SOEs have some form of political connections, we may conclude that only a small fraction of the privately owned firms suffer the judicial bias. To test this, we use the subsample of all of the SOEs and politically connected non-SOEs to re-run the main regression Equations 1, 2, and 3.1. We find that the connected non-SOEs are still more likely to lose compared to the SOEs, though the coefficient is of a smaller magnitude (6.8%) compared to the full sample case. The non-SOEs' disadvantages still diminish as potential information asymmetry on case merits gets smaller, but the local legal index no longer has a significant impact on the win rate of the SOEs. We do not present the full table here for conciseness. The overall message is that our main findings hold in the subsample only including connected non-SOEs, but the impact of political connections is weaker due to the self-established political ties.

1.4.6 Effect of Litigation Outcomes on Stock Performances

Previous literature has shown that litigation announcements have negative impacts on listed firms' stock prices (Bhagat et al.1994, Firth et al. 2010) due to the potential financial distress. Among others, Jarrell and Peltzman (1985) and Garber and Adams (1998) analyzed the impacts of product liability verdicts on firm values in the United States. However, no existing literature has looked at the wealth impact of the court rulings across all suit types. Like product liability cases, most inter-corporation lawsuits involve considerable monetary compensations. If

the market reacts to the potential financial distress brought by litigation announcements, it should also react to the realized losses of the losing firms once the uncertainty in the verdict is resolved.

In this section, we provide a succinct test to examine the effect of trial outcomes on the firm's stock prices. We show that market responds differently to favorable and adverse rulings. The judicial bias against unconnected firms has a real wealth impact on the firms.

To examine the market impact of court rulings, we employ an event study method and collect the dates on which the disclosing firms announces the trial outcome and treat it as the event date. The announcement date is usually within a couple months after the verdict date. Though the verdict is already made, the court makes no effort to make the information publically available. Given that many lower level courts do not have well maintained websites, the best most courts can do is to post the verdicts on the bulletin boards outside, which makes it essentially impossible for the non-local investors to get timely information. Moreover, under certain circumstances,[17] listed firms are allowed to postpone revealing their involvements in pending litigations until the verdicts come out. Some firms choose to do so. Not able to know that firms are involved in litigation, the investors are unlikely to pay attention to particular courts' bulletin boards. As a result, while insiders may hear about the ruling right after (or even before) the formal verdicts are released, most people learn about rulings from the disclosing firms' announcements.

Using a market adjusted model, we calculate the cumulative abnormal returns (CAR) over an event window of (1,5), which means that the CARs are measured from the day after the

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[17] E.g., when the compensation amount is below a threshold.

announcement to 5 trading days afterward. The market beta of the stocks is calculated using daily returns from the fiscal year just prior to the year in which the event occurs.

Table 9 reports the summary statistics of the CAR on different subgroups. We divide our sample to winning and losing firms. There are more losing firms in the sample. The winning firms have an average CAR(1,5) of 0.12%, and the losing firms have an average CAR(1,5) of -0.47%. Though as in Column 2,the t-test cannot reject the hypothesis that the winning/losing firm has a higher/lower-than-0 CAR, a one tail t-test rejects the null hypothesis that the winning firm's CAR is smaller or equal to that of a losing firm at a 5% level (Column 5). The test confirms our conjecture that the winning firm enjoys a better return. To take into consideration the possible information leakage before the verdict announcement date, we also try an alternative event window of (-2,2) (results not reported here). The difference between the mean CARs of winning and losing firms is of the same sign and similar magnitude. However the standard error is larger, and the one tail test is only significant at a 10% level.

Table 9 t-test on CAR(1,5)

This table compares the five-day CARs of the winning and losing firms after the firms' verdict announcement date. Column 1 is the number of observations. Column 2 is the equal weighted CAR. Columns 3 and 4 are the minimum and maximum CARs. Column 5 is the t-test result of whether the CAR is statistically different between the two groups.

***, **, * are significant at the 1%, 5%, and 10% levels. The numbers in parentheses are standard errors.

	1	2	3	4	5
	Obs.	Mean	Min	Max	diff. in mean (winning-losing)
Winning (Win=1)	939	0.12% (0.04)	-17%	26%	0.59%** (0.10)
Losing (Win=0)	2384	-0.47% (0.08)	-23%	38%	

To formally test the market impact of the trial outcomes, we employ an ordinary least squares (OLS) regression:

$$CAR_i = \alpha + \beta_1 win_i + \beta_2 Pol\_Conn_i + \beta'Controls_i + \varepsilon_i \quad (6)$$

where *Pol_Conn* is a dummy for politically connected firms, measured by the state ownership status of a firm or the CEO/director's personal connections in a non-SOE. The dependent variable is CAR(1,5) around the event date. We run the test for both measures of political connection. We also run separate tests for loan cases because those are the cases with the most direct impact on firms' financing decisions.

The first column (all suit types) of Table 10 presents the results for the full sample. We include the trial outcomes and other firm level control variables in the regression, while controlling for province, suit type, industry, and year fixed effect as before. Consistent with our t-test result from the summary statistic table, the *win* variable has a positive coefficient of 0.0053, which is significant at a 10% level. A 0.53% difference in stock returns translates to a 5.2 million RMB (0.66 million USD) difference in the shareholder wealth if multiplied by the average total market value of all the firms in our sample. The ownership status, size, leverage, cash ratio and profitability do not have significant impacts on the CAR, which should be expected as the financial situation of a firm is observable before the trial outcome gets revealed. In the second column we run the regression with only loan cases. The coefficient of *win* is again positive and of comparable magnitude. A win on the loan cases generates a 5-day CAR that is 45 basis points higher.

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Column 3 and 4 of Table 10 present the result within the non-SOE subsample. Again, the winning firms have a 5 day CAR that is on average 0.5% higher than the losing firms have. The result holds for the loan cases as well.

In conclusion, the trial outcome has a real impact on firms' shareholder value. The unconnected firms endure economic losses as a direct result of their lower chances of winning. We report a new channel through which the unconnected firms could suffer a financial loss.

Table 10 Regression analysis on CAR(1.5)

The dependent variable *CAR* is the market adjusted cumulative abnormal returns of 5 days after the verdict announcement. *Win* is the trial outcome, which equals 1 if the disclosing firm wins. *SOE* is a dummy variable, which equals 1 if the firm is state owned. *CEO/DIR connection* is a dummy variable that equals 1 if the non-SOE has a CEO/director who is connected to the government. The control variables include the firm size, leverage ratio, operating profit, and cash-to-asset ratio. We also control for the fixed effects of province, suit types, industry, and year.

***, **, * are significant at the 1%, 5%, and 10% levels. The numbers in parentheses are clustered standard errors.

	Full Sample		Non-SOE only	
	All suit type	Loan Cases	All suit type	Loan Cases
	CAR(1,5)	CAR(1,5)	CAR(1,5)	CAR(1,5)
Win	0.0053*	0.0045**	0.0049*	0.0046***
	(0.0022)	(0.002)	(0.003)	(0.0011)
CEO/Dir Connection			0.0011	0.0018
			(0.070)	(0.0019)
SOE	-0.0011	-0.0017		
	(0.002)	(0.009)		
lnasset	-0.003	-0.003	-0.001	-0.004
	(0.003)	(0.003)	(0.004)	(0.007)
leverage	-0.0004	-0.002	-0.0003	-0.001
	(0.002)	(0.002)	(0.001)	(0.003)
cash ratio	0.002	0.0064	-0.0005	0.0083
	(0.035)	(0.0052)	(0.002)	(0.009)
Operating Income	0.011	0.007	0.001	-0.005
	(0.022)	(0.024)	(0.027)	(0.005)
suit type	Yes	No	Yes	No
Other controls	X	X	X	X
Observation	3323	1954	1319	784
R squared	0.005	0.008	0.004	0.003

1.5 Robustness Check

To alleviate possible omitted-variable bias, we add other control variables such as sales growth, receivable/asset ratio, and whether the two parties involved in a suit were from the same province. Our findings remain unchanged: sales growth enters insignificantly; receivable ratio has a negative impact on the probability of winning for both SOEs and non-SOEs; and having the two parties come from the same province does not have significant impact.

Additionally, we try different measures for the local legal environment. In particular, we use an index of financial intermediary development and legal institution (Marketization Index No. 7) instead of the Property Producer Rights Index. The results remain quantitatively unchanged, and we will not report the results here for conciseness.

We also use leverage from bank loans as a proxy for firms' political influence, following Calomiris, Fisman, and Wang (2010). Generally, higher leverage ratios imply that the SOEs are more subject to soft budget problems, which signals firms' close relationships with banks. Only when SOEs have strong ties with banks or the government can they get loans with ease. However, as in Calomiris, Fisman, and Wang (2010), our regression with leverage yields mixed results. High leverage ratios, which signal firms' political strength, are also an indicator for high bankruptcy risk. It is hard to separate these two effects. Using short leverage encounters the same problem.

The last step taken is to use a logit model instead of a linear model to run the main regressions in the paper. The means of the coefficients of the interaction terms are of the right signs and significant, but of different magnitude.

1.6 Conclusion

In this paper, we document firm-level empirical evidence on judicial bias against politically unconnected firms in China. Using state ownership as a natural form of political connection, we find the SOEs have a winning probability that is 8.6% higher than the non-SOEs, based on a hand-collected sample of 3,323 corporate litigations during 1998-2010. Since winning firms are shown to receive higher cumulative abnormal returns around the verdict announcement, the judicial bias against non-SOEs has a real wealth impact on firms. The effect of political connection in predicting the litigation outcome is more pronounced when the case merit is more straightforward, which distinguishes our story of judicial bias from the alternative explanation that SOEs win more often in an unbiased court due to their superior information on the case merits. We further find that the biases against the unconnected firms in trial are alleviated in regions with improved local legal institutions, during times of provincial leader switches, and when the case is not tried in the home province of the SOE.

Moreover, the non-SOEs can partially correct the judicial biases by establishing political ties through top managers. Using the personal ties of the top managers in the non-SOEs as a second proxy for political connections, we find that the connected non-SOEs fare better than the unconnected ones in court rulings. The difference between their win rates is similarly influenced by the local legal institution development, provincial leader switches, and whether the case is tried locally. However, the connected non-SOEs still will less often compared to the SOEs. The overall evidence is consistent with the judicial bias against unconnected firms in China, which has a negative effect on the firms' shareholder wealth.

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CHAPTER 2

STERILIZATION IN CHINA: EFFECTIVENESS AND COST

2.1 Introduction

Due to growing exports and speculative capital inflows, China has experienced twin surpluses on both the capital and current accounts since 2001. The current account has been positive since the 1990s and grew substantially after 2005. In order to maintain the crawling peg exchange rate system it adopted in 2005, China has to keep purchasing the excess supply of foreign currencies to prevent its domestic currency the RMB from abrupt appreciations. As a result the country has been accumulating foreign reserves at a rapid pace. It surpassed Japan in 2006 to become the largest foreign reserves holder in the world, holding more than $2.85 trillion of reserves as in Dec., 2010 and more than $ 3 trillion in the first quarter of 2011. Figure 3 plots monthly foreign reserves as shown on the balance sheet of China's central bank, People's bank of China (PBC). The stock of foreign reserves has been increasing for every month since 2004 except for one month in 2008, one month in 2009 and May 2010. Some people attribute these drops to foreign capital outflows.

A large stock of foreign reserves has both pros and cons. On the plus side, abundant foreign reserves enable a country to maintain a stable exchange rate and to meet its foreign debt obligations. It can also be used to cushion the sudden shocks on a country's current and capital account. On the other hand, an increase in foreign exchange reserves leads to an accumulation of foreign assets, which is a component of the reserve money (i.e. the money base). Without intervention, this can translate into an expansion of the domestic monetary base.

Table 11 shows a typical balance sheet of the central bank of China. The asset side consists of foreign assets and claims on domestic government and other intuitions. Foreign assets are mainly composed of foreign exchange and gold. On the liability side, reserve money (the money base) consists of currency issued and deposits as reserves. From the balance sheet, one can calculate the net foreign assets (NFA) and net domestic assets (NDA) of the monetary authority. The bottom of the table shows how those two variables are defined. By definition, Reserve Money=NFA+NDA. An increase in NFA directly contributes to the increases in the reserve money, which then affects the broad money supply M2 through the identity M2=Reserve Money × money multiplier

Source: CEIC
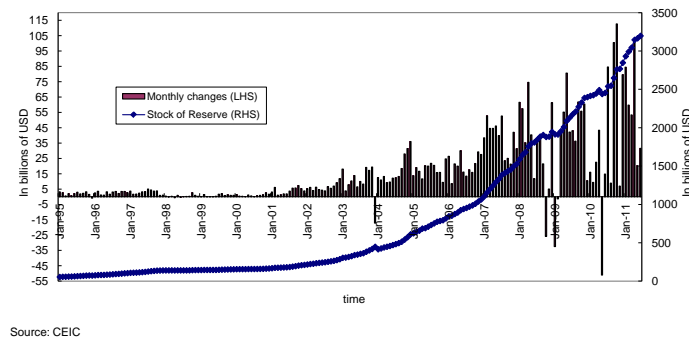
Figure 3 Foreign Exchange reserves flows and stocks

Thus an increase in foreign reserves, ceteris paribus, causes monetary expansion and puts inflationary pressures on the economy, resulting in an appreciation of the real exchange rate. For those reasons, the accumulation of foreign reserves poses a challenge for domestic macroeconomic management. Many East Asian countries have experienced similar problems

induced by large private capital inflows that started in the late 1980s. This quickly drew attention from the literature on open economy macroeconomics. Montiel, Peter J (1998, 1) refers to it as the "capital inflow problem".

Table 11 Balance Sheet

Total Asset	Total Liability
Foreign assets	Reserve money
Claims on government	Deposits of financial corporations excluded from Reserve Money
Claims on depository corporations	Bond outstanding
Claims on other financial and non -financial corporations	Foreign liabilities
Other assets	Other liabilities
	Deposits of government

Net Foreign Assets = Foreign assets - foreign liabilities

Net Domestic Assets = Claim on depository corporations

+ Claims on other financial and non-financial corporations +Claim on government

+ Other assets - Deposits of financial corporations excluded from Reserve Money

- Bond outstanding - Deposits of government - Other liabilities

= Reserve Money = Net Foreign Assets

To offset the expansionary effect of the increasing foreign reserves, the central bank can sterilize the foreign assets by taking opposite actions with the domestic assets, or implement other contractionary monetary policies. As Takagi, Shinji and Esaka, Taro (1999) documents, sterilization is a common practice for monetary authorities of East Asian countries such as Indonesia, Korea and Malaysia, during the capital inflow episode of 1987 -- 1997. It is widely believed, as previous literature points out, that China has sterilized at least some of its rising foreign reserves. However, the exact effectiveness of sterilization is unclear. Since China

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has applied different methods at different times, "it is not straightforward to assess exactly how much sterilization has taken place" (Prasad, Eswar and Goodfriend, Marvin. 2006, 24).

Despite China's effort to neutralize the expansionary effect of increasing foreign reserves, there are reasons why sterilization may not be as effective as the central bank wishes it to be. The famous "Trilemma" states that it is impossible for a country to achieve the following three goals simultaneously: monetary independence, exchange rate stability and financial integration. While choosing a combination of managed exchange rate and monetary independence, China has to impose effective capital controls. Nevertheless it has been documented that capital controls in China are somewhat porous. For example, Prasad, Eswar and Wei, Shangjin (2005, 440) documented large swings in the errors and omissions category under foreign reserves of China, which is "indicative of unrecorded capital flows into China". If this is the case, then a change in domestic assets will induce further capital inflows or outflows, which undermine domestic monetary policies such as sterilization.

The changes in domestic assets and foreign reserves thus have a contemporaneous relationship. Changes in one variable induce changes in another. A simple OLS would lead to a biased estimation due to endogeneity. Furthermore, since domestic monetary conditions are controlled by the central bank and are affected by many other factors besides foreign exchange reserves, it is necessary to estimate some monetary reaction functions of the central bank.

Prior work examining the effectiveness of monetary sterilization of China has employed different methods to circumvent the problems above. Wu, Ying (2006) performed a Johansen cointergration test on changes in NFA and NDA. He found that the coefficient of NDA in response to one unit change in NFA is -0.41. This is called the sterilization coefficient and a

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coefficient of -1 implies complete sterilization, since a unit increase in NFA is then fully offset by a contemporaneous decrease in NDA. A coefficient of 0, on the other hand, indicates zero sterilization. Wu's result thus implies incomplete sterilization. This method, while straightforward to understand, ignores all the other monetary factors that may have affected NFA and NDA. He, Dong et al (2007) estimated a reduced VAR model with interest rate and domestic credit as controls, and gained a sterilization coefficient of -1. A VAR model uses lagged variable and has a clear advantage of circumventing the endogeneity problem. Nevertheless, VAR can only identify coefficients of lagged variables, making it impossible to detect the contemporaneous impact.

Among others, Ouyang, Alice Y., Rajan, Ramkishen S. and Willett, Thomas D. (2007a) applied two-stage least squares (2SLS) to estimate two simultaneous equations. The major challenge here is to find valid instruments that help to separately identify NDA and NFA. They used government expenditure as an instrument for NDA and the real effective exchange rate for NFA. The estimated sterilization coefficients ranged from -0.5 to -0.92 for the period of 1999 to 2005, which implies a close to full sterilization. However their argument of government expenditure having no direct effect on capital inflows is not very convincing. It is easy to imagine a scenario where fiscal expansions have an effect on the interest rates, which triggers outflows of capital. Kim, Woochan (2003) also documents empirical evidence that a high budget deficit has a negative effect on capital account liberalization using OECD data.

Following Ouyang, Rajan and Willett (2007a), in this paper I apply 2SLS to estimate the degree of recent sterilization in China, but with different instruments and updated data. This paper confirms their result that China has been able to carry out an almost complete

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sterilization up to the first half of 2010. The coefficients of capital mobility in this paper are comparable to those of Ouyang, Rajan and Willett (2007a). However unlike their paper, I find no obvious trend of increase in the degree sterilization, lending no support to the claim that sterilization has become harder over the years.

The question that naturally comes next, which is also a question that has been drawing a lot of attention recently (e.g. Prasad and Wei 2005, Green, Stephen 2006, Ouyang, Rajan and Willett 2007, Zhang, Ming 2009), is whether the cost of sterilization can be fully covered by the PBC's income from foreign reserve investment. If not, the sterilization cost is likely to soon become too high for the central bank to sustain. Consequently the central bank may lose its control of the domestic monetary base. The answer here is not an obvious one. Some people have argued that China has been earning a premium from its foreign reserves accumulation due to a low domestic rate (Prasad and Wei 2005), while others are worried that the increasing issuance of PBC bills, which is the central bank's main sterilization tool, will soon impose too big a burden on the PBC (Zhang 2009).

In the second part of the paper, I compare the PBC's cost of sterilization and its income from foreign reserves investment. As Prasad and Wei (2005) conjecture, the PBC's income from foreign reserves investment has exceeded its sterilization cost consistently from 2003 to 2010. To my knowledge this is the first study to calculate and compare the actual sterilization cost of the PBC and its income from foreign reserves investment. I also make some simple linear projections of those costs and income. The projection shows that there is no sign of unsustainability in the near future. However, the continuous appreciation of the RMB may have a profound negative impact on the PBC's income from foreign reserves in domestic

currency terms.

The next section briefly documents crucial background information on China's foreign reserves management and the evolution of the country's foreign exchange reserves, clarifying the concept and process of sterilization. It also discusses China's major sterilization tools: open market operation and raising required reserves. Section 2.3 explains the 2SLS method applied in this paper, describes the data and the empirical results. Section 2.4 shows the calculation and projection of the PBC's cost of sterilization and its income from foreign reserves investment. The final section concludes the paper.

2.2 Overview of foreign exchange reserves and sterilization tools in China

2.2.1 China's foreign reserves management and evolution

Traditionally, the State Administration of Foreign Exchange (SAFE), which is a subsidiary of the PBC, is responsible for managing foreign reserves held by the central bank. The foreign reserves are recorded on the PBC's balance sheet and invested in low risk assets such as long term government bonds. In recent years however, the PBC has been making other uses of its foreign reserves.

Some foreign reserves were used to recapitalize the large state owned financial institutions. As a part of financial reforms, the Central Huijin Investment Company Limited was established in December 2003 as an investment subsidiary to improve the capital quality of the big state owned banks to prepare them for IPOs. The purpose of the Central Huijin is to improve corporate governance and initiate reforms of the banking sector, by creating an organizational

structure where the PBC and the China government can operate as shareholders of the state owned banks. It had a registered capital of 50 million RMB which came from the Ministry of Finance, but its investment fund came from the PBC. From 2003 to 2008, the PBC made a few capital injections through Huijin to different state owned commercial banks and insurance companies, some of which came out of the foreign exchange reserves. For example, it took a total of $45 billion from foreign reserves to invest in the Bank of China, the China Construction Bank and its subsidiary at the end of 2003. It made a capital injection of $15 billion to The Industrial and Commercial Bank of China in 2005.

Table 12 Huijin's investment

Institutions	Date	Amount (billions)	Miscellaneous
Bank of China	Dec. 2003	22.5 $US	
China Construction Bank	Dec. 2003	20 $US	
Jianyin Investment Company	Dec. 2003	2.5 $US	
Bank of communication	June 2004	3 RMB	
Industrial and Commercial Bank of China	April 2005	15 $US	
Galaxy Security Company	June 2005	10 RMB	
Shenyin & Wanguo Security Company	Aug. 2005	2.5 RMB	Plus 1.5 Billion RMB in loan
Guotai Junan Securities Co	Aug. 2005	1 RMB	Plus 1.5 Billion RMB in loan
China Galaxy Financial Holding Co.	Aug. 2005	5.5 RMB	
China reinsurance (group) Co.	April 2007	2 $US	
China Everbright Banks	Nov. 2007	20 RMB	
National Development Bank	Dec. 2007	20 $US	
Agricultural Bank of China	Oct. 2008	19 $US	

Source: CEIC

Table 12 shows a list of capital injections of the Central Huijin Investment Company to

state owned companies[18]. Some of the capital injection came from the foreign reserves directly (i.e. those amounts denominated in US dollars), some were said to come from repaid central bank loans (i.e. the 3 billion RMB injection to the Bank of Communication)[19]. If I assume that all the capital injections are completed within a month and use the exchange rate at the month end to convert the RMB amount to dollars, Huijin has injected an overall of $108.4 billion into state owned banks and the Galaxy Security company. As described above, some of the injections are taken from the foreign reserves. If one wants to consider the foreign exchange held by China as a country, this amount should be added back.

In September 2007, the China Investment Corporation (CIC) was established with the intent of utilizing the accumulating reserves for the benefit of the state. Special Treasury bonds of 1.5 trillion yuan ($207.91 billion) were issued by the Ministry of Finance to create the capital that the CIC needed. The Ministry of Finance then used the proceeds to purchase foreign exchanges from the PBC and put them under the management of the CIC. The CIC later acquired the Central Huijin Company from the PBC with $ 67 billions and made it a full subsidiary. As a result, many of CIC's investments and capital injections are still made under the name of Huijin. The net effect of the establishment of the CIC on the PBC's balance sheet is a total reduction of $140.9 billion in foreign reserves.

The CIC makes occasional announcements about its investment, but the overall transparency of its investment strategy is low. Compared with the SAFE, the CIC makes more aggressive investments in equities. Table 13 shows an (incomplete) list of its investment projects.

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[18] In September 2007, Huijin had effectively become a subsidiary of the CIC, which will be covered later. However it keeps operating and serving its purpose of recapitalizing stated owned banks.
[19] See the introduction of Huijing in Chinese: http://www.mecin.cn/Invest/Invest20080919000619.htm

Besides the PBC and its subsidiaries, financial firms and individuals of China are also allowed to make investments in foreign markets and thus hold some foreign exchange. Since 2001, domestic investors, including individual residents, have been allowed to invest their own foreign exchange in B-shares[20]. Starting from 2002, qualified foreign institutional investors (QFII) have been allowed to invest in the domestic capital market. Since 2004, insurance companies have been allowed to use their own foreign exchange to invest in the international capital market. When restrictions on qualified domestic institutional investors (QDII) were lifted in April 2006, domestic fund management companies (asset management companies) began to establish and sell products (mutual funds) to invest in the international capital market, first in a trial run by Hua An Fund Management in September 2006, and then in earnest from September 2007, after the China Securities Regulatory Commission (CSRC) established a new set of rules. In 2007, firms were allowed to hold foreign exchange in a current account at their discretion. In the same year, annual foreign exchange purchases and sales quotas for individuals were raised to US$ 50,000 to meet their needs for holding and using foreign exchange

Table 13 CIC's incomplete list of investment

Institutions	Date	Amount ($billions)	Type of investment
The Blackstone Group	May 2007	3.0	Pre-IPO, 9.4% equity
China Railway Group	Nov. 2007	0.1	Pre-IPO, equity
Morgan Stanley	Dec. 2007	5.0	mandatory convertible securities, 9.9% equity
Visa	Mar. 2008	0.1	Pre-IPO, equity
JCFlowers	April 2008	3.2	Private Equity Fund

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[20] China B shares are virtually the same as common shares (which are referred to as A shares), except that they were originally developed as stock shares for foreign investors. They are listed on Shanghai and Shenzhen stock exchanges and are denominated in RMB, but are payable in foreign currency. Before 2001, only foreign investors were allowed to purchase B shares.

As China is moving to a more liberal foreign exchange policy, the PBC and state banks are no longer the only institutions that can hold foreign exchange legally. However, since monetary sterilization is solely implemented and managed by the PBC, and I am interested in whether the PBC's foreign reserves investment return is enough to cover its sterilization cost, I only take into consideration the foreign reserves listed on the balance sheet of the PBC in this paper. All the other foreign exchange not currently held by the central bank are ignored in the estimation.

China has experienced a rapid increase in foreign reserves since 2003, due to the recorded twin surpluses in the current and capital accounts. Figure 4 shows the evolution of China's balance of payments. The current account surplus clearly contributes the most to the huge growth in foreign reserves. It was $12 billion in 1990. It grew rapidly and reached $249.9 billion in 2006, then $426.1 billion in 2008 and dropped back to 297.1 billion in 2009 due to a slowdown in exports. A closer look reveals that the current account surplus has come mainly from the trade surplus, the share of which in the current account surplus was 84% in 2009[21]. At the same time, net exports grew from 2.5% of GDP in 2004 to 8% of GDP in 2008 and then 5% in 2009. The contribution of net exports to GDP growth also increased dramatically from an average of 3% from 2001 through 2004 (0.36 percentage points of GDP growth), to an average of 21% from 2005 through 2007 (2.4 percentage points of GDP growth). It dropped to 8% in 2008 due to a change in the economic conditions abroad. The capital account, mainly coming from FDI, was mostly positive during the period 1995 to 2009 as well, implying a net capital inflow. Since 2001, China has received annual FDI in excess of USD 40 billion. However the error and omission term was mostly negative before 2002, implying a net unrecorded capital outflow.

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[21] CEIC database, 2009

The sign was reversed after 2002 and before 2009, when the global financial crisis took place.

Source: National Bureau of Statistics, China
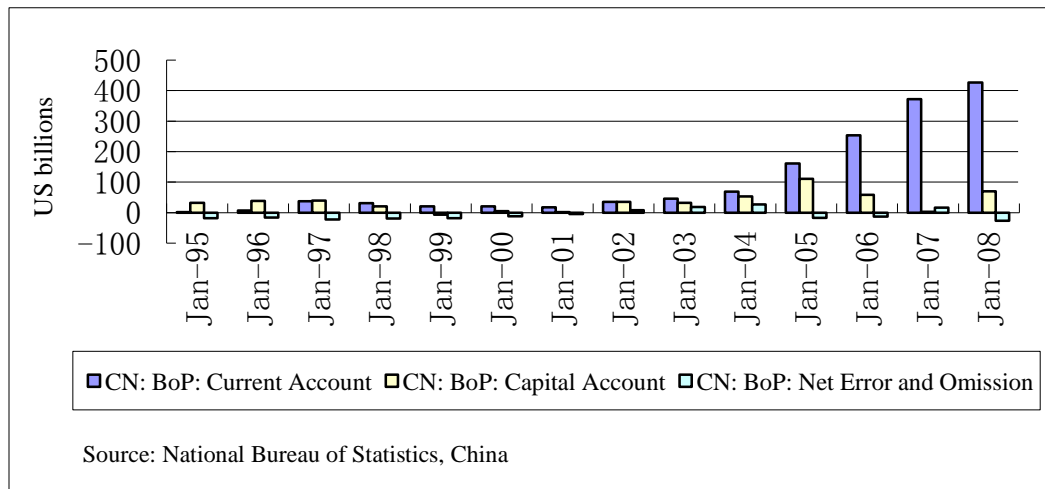
Figure 4 Balance of Payment of China

The rapid accumulation of foreign reserves, combined with China's crawling peg exchange rate, calls for sterilization. Sterilization happens when the monetary authority tries to gain control of the reserve money in face of an exogenous increase in the NFA, by taking opposite actions with the net domestic assets. In other words, as the NFA increases, we may see the NDA decrease as a result of sterilization. Reserve money is kept unchanged in this way, preventing the broad money supply from soaring. However, an increase in the reserve money or the broad money supply per se does not necessarily mean that the PBC has lost control. The central bank may want the monetary base to increase anyway to keep up with economic growth, as in China's case. Figure 5 shows that both the reserve money and the broad money supply have been increasing in China as foreign reserves accumulate. Nevertheless the reserve money increases at a slower pace especially after 2005, indicating the operation of sterilization. The

following section gives an overview of China's major sterilization tools.

Source: CEIC database
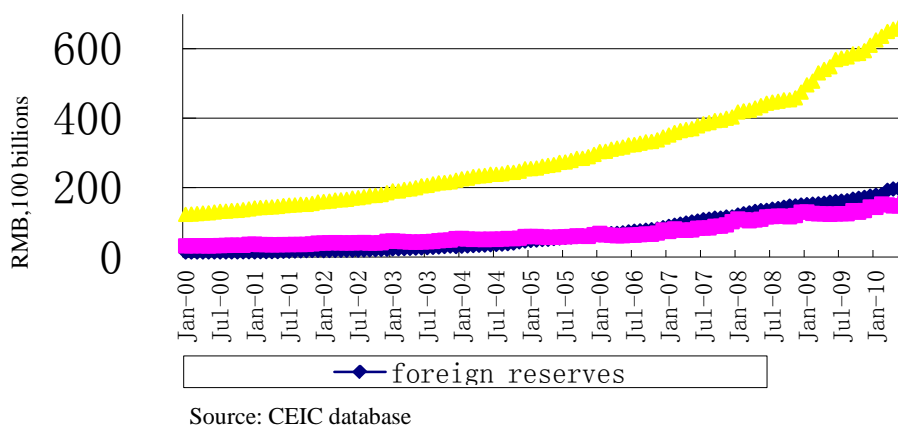
Figure 5 reserve money and the broad money supply in China,

2.2.2 Major sterilization tools

According to the monetary report published quarterly by the PBC, the main sterilization methods of China are open market operations (OMO) and raising required reserve ratios. Table 14 gives a summary of how the two methods work. OMO reduces the domestic assets by taking the excess liquidity out of the system, while raising required reserves reduces the money multiplier. From a central bank's point of view, however, increasing the level of required reserves as an attempt to sterilize affects the liability side of its balance sheet in a similar way that open market operations do. If the interest paid on required reserves is equal to the interest on central bank bills, the two methods have the same impact on the central bank. Generally the cost of sterilization using required reserves is lower than open market operations, since the central bank pays minimum interest on required and excess reserves.

Table 14 Sterilization process

Method	Steps
OMO bond issuance or repo	1. NFA increases by ΔNFA. 2. $RM = NFA + NDA$ increases by ΔNFA. 3. NDA decreases by ΔNDA, and RM is back to previous level 4. $M2 = RM \times mm$ in unchanged
Raise required reserve ratio	1. NFA increases by ΔNFA. 2. RM increases 3. mm decrease. 4. $M2 = RM \times mm$ in unchanged as a net effect

where RM is reserve money, and mm is the money multiplier

Open market operations in China mainly include bond issuance and short term repurchase operations (repos, usually within 91 days). There are also non-market tools such as transferring the deposits from the commercial banking system to the central bank and "window guidance"(moral suasion). In recent years, the PBC also started making foreign exchange swaps with big commercial banks as a tool of controlling liquidity. In November 2005 it was reported that the PBC made its first one-year swap of a total amount of $6 billion with 10 domestic commercial banks[22]. Unfortunately, the PBC usually doesn't make public announcements on swaps. Since 2005, the amount and timing of the PBC swaps remain secretive. Partial information can only be inferred from the annual reports of those commercial banks which are involved in the swaps with the PBC and are publicly listed. For example, China Construction Bank revealed a foreign exchange swap of $9 billion with the PBC in its 2006 annual report. Bank of China and the National Development Bank also revealed swaps of $41.5 billion and $22.9 billion

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[22]From Xinhua News:
http://big5.xinhuanet.com/gate/big5/news.xinhuanet.com/fortune/2007-04/17/content_5987783.htm

respectively with the PBC in 2006[23].

Before 2002, open market operations are mainly done by issuing government bonds. In September 2002 the PBC replaced the outstanding Treasury securities with central bank bills, when the stock of government bonds available shank to a low level. The first new PBC bill was issued in April 2003. Since then the PBC has been issuing bills on a weekly basis. There have been 265 total issuances by Aug. 2010 and the volume of PBC bond outstanding is RMB 4.6 trillion up to April 2010[24], exceeding the volume of currency issue. PBC bills usually have a term of less than 1 year. The most frequently issued bills are the 3 month bills and the 1 year bills. Occasionally the PBC has also issued 3-year bills for urgent sterilization need (in late 2004 and early 2005, also at the beginning of 2007 and 2010) and 6 month bills (mostly before 2006). The PBC bills are issued as zero coupon bonds and are auctioned off to banks and other financial institutions at some discounted values in each issuance. They are traded in the interbank bond market, and are usually held by financial institutions such as commercial banks and money funds. Ever since their issuance, the central bank bills have replaced the Treasury and become the main tool in sterilization[25]. In May 2004, the PBC also announced the start of repo sales to depositary institutions (Green, Stephen 2005). Figure 6 shows the net central bank bill issuance since 2000, and figure 7 shows the total PBC bonds outstanding as a percentage of foreign reserves from 2000 to 2010. Both figures show an increasing trend in sterilization especially after 2006, using the amount of PBC bills as an indicator.

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[23] Banks are not required to reveal swap transactions in their annual reports. Even if they do, they may choose not to reveal the name of the counterparty. For example Bank of Communications revealed a swap of $5 billion in 2006 without giving the name of the other party. Thus it is very hard to get a good estimate of the PBC's swaps.
[24] http://fc.fund123.cn/Content.aspx?ArticleID=1671
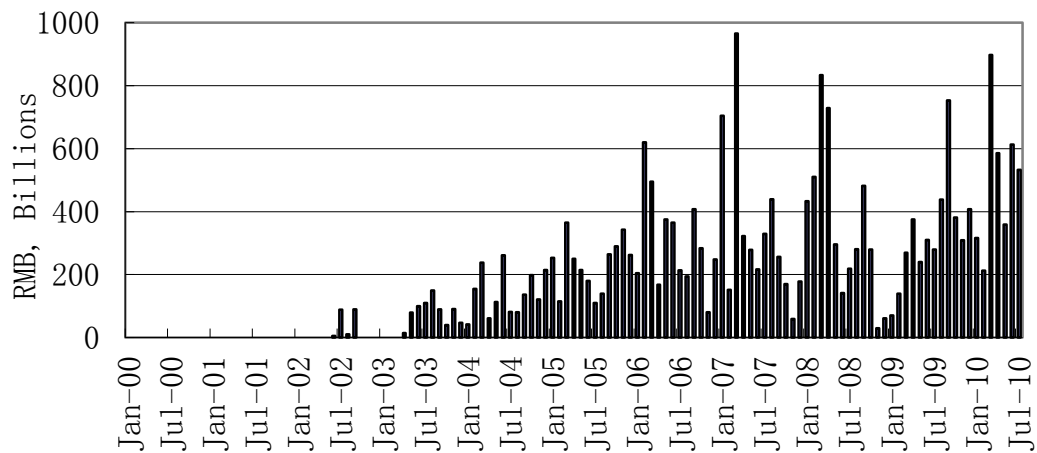
Figure 6 Issuance of PBC bill
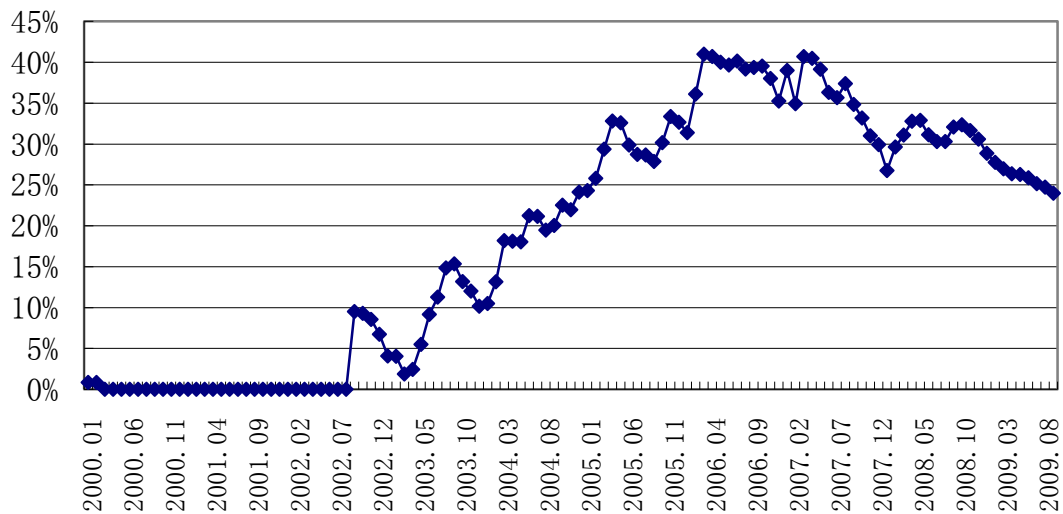
Figure 7 Bond outstanding as % of foreign reserves from Balance sheet of PBC

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[25]The government keeps issuing Treasury notes, of course. Those notes are no longer used as OMO tools.

In general, altering reserve requirements as a tool of monetary control is always dealt with cautiously since it's considered to have too drastic an effect on the money supply through changing the money multiplier (Feinman, Joshua N. 1993). For example, the Federal Reserve has left reserve requirements essentially unchanged since the passage of the MCA in 1980[26]. One change happened in April 1992 to lower the requirement on transaction deposits from 12 percent to 10 percent. It is not uncommon for emerging economies in Asia to raise required reserve ratios as a method of sterilization though. Countries like Malaysia, Korea and Philippines have all used the method during the capital inflow episode (Takagi and Esaka 1999).

China has been gradually raising the required reserve ratios since the third quarter of 2003, corresponding to an increase in foreign reserves inflows. The required reserve ratio was raised from 6% and reached its peak value of 18.5% in December 2010[27]. However, in practice the effect of changing required reserve ratios may be limited in China's case, since depository institutions tend to maintain high excess reserve ratios (usually the same or even higher than the required ratio in the early years) due to a lack of alternative investment channels as the PBC has traditionally paid interest on both required and excess reserves. It was also believed that part of the excess reserves is used for interbank settlement and liquidity management purposes (Goodfriend and Prasad 2005). An increase in the required reserve ratio may simply lead to a decline in the excess reserve ratio, leaving the money multiplier unchanged. To discourage the holding of excess reserves, China has decreased the interest on excess reserves from 1.62%

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[26] The Monetary Control Act, which mandated universal reserve requirements to be set by the Federal Reserve for all depository institutions. For more description on MCA, see J Feinman, "Reserve Requirements: History, Current Practice, and Potential Reform".

[27] China has introduced differentiated reserve requirements into the banking system in 2004. The second-tier banks, including the joint stock commercial banks which do not meet certain standard in terms of capital adequacy are subject to a higher reserve requirement than what is cited here.

(which was the same as the interest on required reserves) in 2003 to 0.72% in 2008.

Figure 8 plots the sum of required and excess reserve ratios. As described before, there is a trend of increase in required reserve ratio since 2003. However the total reserve ratio was actually dropping slowly until the end of 2006, when the increase in required reserve ratio started to accelerate. Before 2006 a large part of the effect of increases in required reserve ratios was offset by drops in excess reserves. This may be the reason for the PBC to have increased its bond issuance throughout the years to conduct a more effective sterilization. To get an idea of the effectiveness of sterilization, figure 9 plots quarterly changes in NFA and NDA of China. Here foreign assets are calculated using the product of foreign reserves denominated in US dollars and exchange rates (RMB/US$). The changes in net foreign assets are adjusted for exchange rates to exclude the revaluation effect (see section 2.3 for the details on data and adjustment). Net domestic assets are defined as reserve money minus net foreign assets. The plot shows that China's net domestic assets have been declining since 2002, corresponding to a simultaneous increase in net foreign assets. Both figure 5 and figure 9 imply sterilization to some degree, but the implication is far from clear.
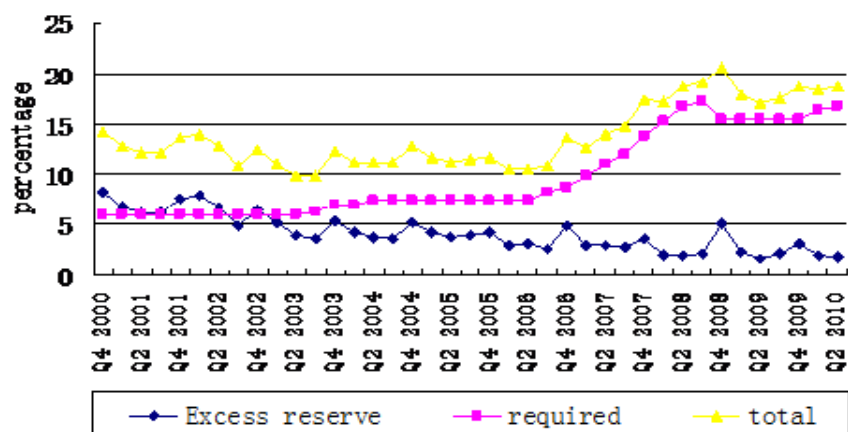
Source: PBC, author's calculation

Figure 8 required reserve ratio
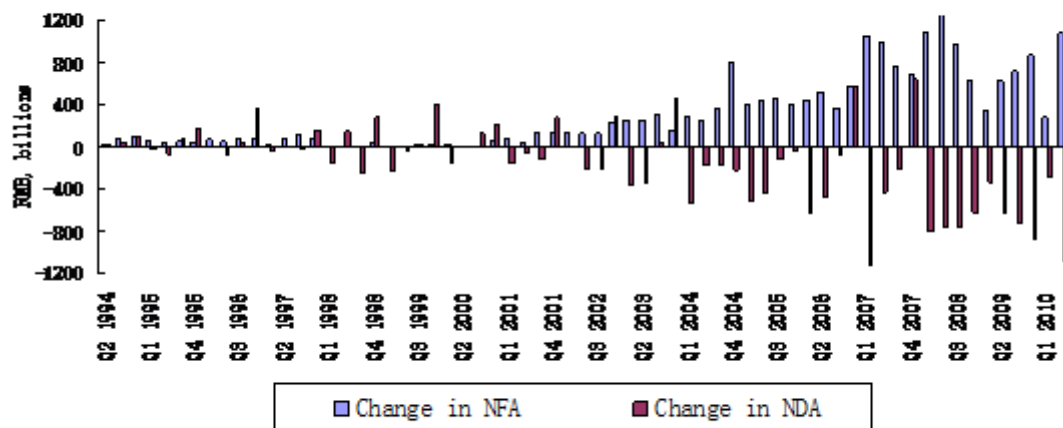
Source: IFS, author's calculation

Figure 9 Quarterly Change in Net Foreign Reserve and Net Domestic Reserve of Central Bank of China

2.3 Sterilization coefficient estimation: data, methodology and empirical results

2.3.1 2SLS description

In this paper, I estimate the sterilization effect with 2SLS with innovative instrumental variables for NDA and NFA. Namely I propose to use the dummy variable for the 4th quarter as an instrument for NDA, and the past twelve month RMB/US$ exchange rate volatility as an instrument for NFA. As will be explained later, unlike government expenditure, the dummy variable for the 4th quarter is unambiguously exogenous to the changes in NFA. The twelve month exchange rate volatility is also highly correlated with NFA.

One concern with this regression is the lack of theoretical foundation for the choices of control variables. Among a rich literature on monetary reaction functions, Brissimis, Sophocles N. et al (BGT) (2002) explicitly derives two simultaneous equations used to estimate NFA and NDA from minimizing a simple loss function of the monetary authority, subject to some constraints. Ouyang, Alice et al. (2006) modified the BGT model and applied it to several Asian economies. Largely based on the BGT model and Ouyang et al (2007a)'s modified model, I specify a set of two simultaneous equations as follows:

$$
\begin{aligned}
\Delta NFA_t &= \alpha_0 + \alpha_1 \Delta NDA_t + \alpha_2 \Delta mm_t + \alpha_3 \Delta CPI_{t-1} + \alpha_4 \Delta NX_{t-1} + \alpha_5 \Delta(r_t^* + E_t e_{t+1}) \\
&\quad + \alpha_6 y_{ct-1} + \alpha_7 ex\_vol_{t-12,t} + \alpha_8 \Delta G_t + \varepsilon_t \\
\Delta NDA_t &= \beta_0 + \beta_1 \Delta NFA_t + \beta_2 \Delta mm_t + \beta_3 \Delta CPI_{t-1} + \beta_4 \Delta NX_{t-1} + \beta_5 \Delta(r_t^* + E_t e_{t+1}) \\
&\quad + \beta_6 y_{ct-1} + \beta_7 I_{Q4,t} + \beta_8 \Delta G_t + \eta_t
\end{aligned}
$$

NFA and NDA are adjusted[28] net foreign assets and net domestic assets respectively. Those are the main variables of concern. The control variables include mm (the money multiplier), CPI (price levels), NX (net exports), G (government expenditure), r* (3-month US

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[28] Meaning adjusted to exclude the revaluation effect. Method of adjustment will be described later.

Treasury annual rate), e (nominal exchange rate RMB/US$), and finally y_{ct-1} (cyclical GDP). The first difference of the data is employed here to avoid a unit root problem.

α_1 is the offset coefficient. It measures how foreign capital inflow responds to a change in domestic monetary environment. My main interest lies in the sterilization coefficient β_1, which measures how domestic assets respond to a change in net foreign assets. A β_1 of -1 would indicate complete simultaneous sterilization. An α_1 of -1 implies perfect capital mobility.

In BGT, both α and β_1 are predicted to be negative. An increase in NDA implies an expansionary monetary policy, suppressing the domestic interest rate. This will result in a foreign capital outflow, which leads to a decrease in NFA. When capital controls are present, as in the case of China, capital mobility may be less than perfect, which translates into an α greater than -1. The sterilization coefficient β should be negative too, as long as the central bank is trying to mitigate the expansionary effect of an increase in NFA.

The set of equations can be estimated with two-stage least squares (2SLS). The two equations are separately identified by $exvol_{t-12,t}$, which is the past twelve month RMB/US$ exchange rate volatility calculated by month-end exchange rate in the first equation and I_{Q4}, which is a dummy variable that takes value 1 if it's the 4th quarter, and 0 otherwise in the second equation. The choice of $I_{Q4,t}$ is an innovation. It is due to the fact that Chinese commercial banks tend to hold significantly more reserves in each 4th quarter in preparation for large withdrawals before the Chinese New Year, according to the quarterly monetary report of the PBC. The New Year follows the lunar calendar and usually falls in February. It is a tradition for people to exchange gifts, buy new clothing and decorations, and repay their loans in the New Year. Children also receive cash from parents and relatives (the red packets). The NFA,

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however, should not be significantly impacted by the arrival of the Chinese New Year. In fact, the correlation between ΔNDA_t and I_{Q4} is 0.53, while the correlation between ΔNFA_t and I_{Q4} is -0.005.

The choice of $exvol_{t-12,t}$ follows Brissimis, Gibson and Tsakalotos(2002), which claims that exchange rate deviation only affects the change in NFA but not NDA. Though China has maintained a fixed exchange rate until July 2005, we are still able to observe small fluctuations of the RMB/US\$ rate during the whole sample period. In any month t (since I use quarterly data, t can only be March, June, September or December here), $exvol_{t-12,t}$ is calculated as the standard deviation of monthly exchange rate from t-12 to t. The correlation between $exvol_{t-12,t}$ and ΔNFA_t is 0.52, while it is -0.08 between $exvol_{t-12,t}$ and ΔNDA_t. The other alternative instrument real effective exchange rate only has a correlation of less than 0.03 with ΔNFA_t.

The rest of control variables in the equations are chosen according to existing empirical literature in the area[29]. Those are the variables that motivate foreign capital flows in or out of the country, and variables that are important to monetary policy decisions. In particular, the use of the lagged terms in price change, cyclical income and net export further alleviates the endogeneity problem.

For some control variables in the above equations, it is obvious that their coefficients should take certain signs. Other coefficients require more detailed discussion.

The coefficients of the money multipliers in both equations, α_2 and β_2 are expected to be negative. A high mm_t indicates an overall expansionary policy and a low total reserve ratio.

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[29] E.g. see Brissimis, Gibson and Tsakalotos(2002), He.D., C.Chu, C.Shu and A. Wong(2005), Ouyang, Rajan and Willett(2006).

Expansionary policy leads to a drop in interest rate which induces capital outflow. A low total reserve ratio leads to a low level of reserve money and thus a smaller NDA component on the central bank's balance sheet.

Both coefficients of price change should be negative, since a higher inflation leads to reduced capital inflows as well as a contractionary monetary policy. However there may exist a time lag between inflation and policy responses. In that case it is hard to predict which way the coefficients of price changes would go. The coefficients of net export is expected be positive for NFA, since an increase in NX contributes to NFA, *ceteris paribus*.

$\Delta(r_t^* + E_t e_{t+1})$ is a measurement of foreign interest rate adjusted by exchange rate. α_5 is negative since both an increase in foreign interest and an expected depreciation of domestic currency signal better investment opportunities abroad. β_5 is also expected to be negative since the uncovered interest parity implies that the central bank would want to raise the domestic interest rates as a response to a positive $\Delta(r_t^* + E_t e_{t+1})$.

The coefficient of cyclical income, α_6, may be negative since an increase in real GDP worsens the balance of payments. However a high GDP may induce more capital inflows as it is a sign of overall economy strength. Similarly, the government usually decides to take a counter-cyclical monetary policy which leads to a negative β_6. On the other hand it is also possible that the government wants to stimulate the economy even more after economic growth, making β_6 positive. Similar arguments can be applied to α_8 and β_8, where government expenditure may have an ambiguous effect on NDA and NFA.

Finally, α_7 is expected to be negative since a more volatile exchange rate impedes capital inflows. However it is also possible that a more flexible exchange rate regime induces

more speculative capital inflows. β_7 is expected to be positive since NDA increases with the arrival of Chinese New Year.

2.3.2 Data and Empirical results

2.3.2.1 Data summary

Most literature points out (both qualitatively and quantitatively) that sterilization did not become an issue in China until around 2000. This paper employs quarterly data from Q1 1995 to Q2 2010. Ideally data of high frequency should be used, however, monthly GDP of China are not available. I recognize the sample size is small, thus the estimated coefficients should be viewed with caution. All the data are from the CEIC database, IFS and the PBC's website, taken at the end of each period.

ΔNFA_t, ΔNDA_t, ΔNX_t and ΔG_t are scaled with the GDP of the corresponding period. The change in money multipilers and interest rates are expressed in logs. The Hodrick-Prescott (HP) method is applied to find the trend of the real GDP. Cyclical income is then calculated using the formula $\frac{\ln(\text{Real GDP})-\text{HP trend}}{\text{HP trend}}$. Following Ouyang, Rajan and Willett (2007a), the expected nominal exchange rate $E_t e_{t+1}$ is approximated in two ways: perfect foresight and static expectation. In perfect foresight, $E_t e_{t+1}$ equals $ln e_t$. With static expectation, $E_t e_{t+1}$ equals $ln e_{t+1}$.

A standard ADF test is applied to test the stationarity of all the variables. The null hypothesis is that the variable has a unit root. Table 15 shows the summary statistics of the ADF test. All the variables are stationary at 5% significant levels.

The net foreign assets are calculated as the difference between foreign reserves

minus gold and foreign liability. Foreign reserves data is from IFS and is dollar denominated. Foreign liability is taken from the PBC's balance sheet and is recorded mark-to-market in domestic currency (RMB). Thus net foreign assets are calculated as follows:

$$NFA_t = (foreign\ reserves_t \times e_t) - foreign\ liability_t$$

where e_t is the exchange rate of RMB against \$US.

It is obvious that the value of NFA may change due to fluctuations in exchange rate. This type of change is not caused by an inflow of foreign assets and is irrelevant to the study. To exclude the revaluation effect, I follow Aizenman, Joshua and Glick, Reuven. (2009) and calculate the adjusted NFA at time t-1 as $NFA_{t-1}(\dfrac{e_t}{e_{t-1}})$

Table 15 ADF test result

Variable	Test Stat (t)	Type of Test
ΔNFA_t	t 5.496 ** (0.000)	with trend
ΔNDA_t	-8.367 ** (0.000)	without trend
Δmm_t	-9.206** (0.000)	
ΔCPI_{t-1}	-6.285** (0.000)	
ΔNX_{t-1}	-11.756** (0.000)	
$\Delta(r_t^*+E_t e_{t+1})$	-3.217** (0.002) for perfect foresight -3.391**(0.001) for static expectation	
y_{ct-1}	-10.143** (0.000)	
$\triangle G_t$	-15.151** (0.000)	
$\Delta ex\_vol_{t-12,t}$	-1.748** (0.04)	

Note: (**)denotes significanceat 5% level

Therefore the change in net foreign assets excluding the revaluation effect is

$$\Delta NFA_t = NFA_t - NFA_{t-1}(\frac{e_t}{e_{t-1}})$$

Here I make a simplistic assumption that all the foreign reserves are in US dollars. Ideally, if the exact currency composition of China's foreign reserves is known, the revaluation effects should be adjusted for each currency. However no data is available on the exact composition of China's foreign reserves. In section 2.4 of the paper some approximations of the composition of China's foreign reserves are proposed, however as will be shown later in this section, a robustness check with a different currency composition does not change the major findings. Previous literature[30] also suggests that estimation results on sterilization are usually robust to different currency compositions of reserves.

Table 16 Summary statistics of the variables.

NFA and NDA are adjusted[31] net foreign assets and net domestic assets respectively. Other variables include mm (the money multiplier), CPI (price levels), NX (net exports), G (government expenditure), r* (3-month US Treasury annual rate), e (nominal exchange rate RMB/US$), and finally y_{ct-1} (cyclical GDP). ex_vol is the past twelve month RMB/US$ exchange rate volatility

Variable	Obs.	Mean	Std. Dev.	Min	Max
ΔNFA_t	62	0.0619	0.048	-0.001	0.201
ΔNDA_t	62	-0.026	0.081	-0.205	0.158
Δmm_t	62	0.0076	0.060	-0.123	0.149
ΔCPI_{t-1}	62	0.031	0.052	-0.021	0.238
ΔNX_{t-1}	62	0.006	0.010	-0.021	0.025
$\Delta(r_t^*+E_t e_{t+1})$	62				
Perfect insight		-0.005	0.010	-0.05	0.001
Static expectation		-0.004	0.010	-0.05	0.001
y_{ct-1}	62	0.000	0.019	-0.033	0.048
ΔG_t	62	-0.005	0.095	-0.204	0.129
$ex\_vol_{t-12,t}$	62	0.038	0.061	0.000	0.257

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[30] Ouyang et al. (2006), Prasad and Wei (2005)
[31] Meaning adjusted to exclude the revaluation effect. Method of adjustment will be described later.

Finally the change in NDA is calculated as the residual under the identity: $\Delta NDA_t = \Delta RMt - \Delta NFAt$

where RM stands for reserve money and is taken from the balance sheet of the PBC. Table 16 gives the summary statistics of all the variables.

2.3.2.2 Empirical results

I use 2SLS to estimate the set of simultaneous equations. To avoid potential problems of autocorrelation and heteroskedasticity in residuals, Newey-West covariance is computed up to 3 lags. Small sample correction is performed for all the estimations. Table 17 presents summary statistics of the regression result. The numbers in the parentheses are standard errors.

The sterilization coefficient is between -0.934 and -0.793, indicating a high level of, but less than full sterilization by the PBC during my estimation period. This number is smaller than the estimated coefficients in Aizenman and Glick (2008). The reason for the divergence may lie in the fact that they used a simple OLS instead of 2SLS. The offset coefficient is between -0.650 and -0.649, implying some degree of capital mobility despite strict capital controls in China. This is related to the speculative "hot money" that flows into China under an expectation that the RMB will appreciate. As Goodfriend and Prasad (2006,5)pointed out, "the effectiveness of capital controls (in China) inevitably erodes over time" since domestic and international investors find channels such as exaggerating export invoices to evade them. This offset coefficient here is comparable to and slightly smaller than the estimation obtained in Ouyang, Rajan and Willett (2007a).

Table 17 Regression results.

NFA and NDA are adjusted[32] net foreign assets and net domestic assets respectively. Other variables include mm (the money multiplier), CPI (price levels), NX (net exports), G (government expenditure), r* (3-month US Treasury annual rate), e (nominal exchange rate RMB/US$), and finally y_{ct-1} (cyclical GDP). ex_vol is the past twelve month RMB/US$ exchange rate volatility

	Perfect Foresight		Static Expectation	
Explanatory Var	ΔNFA_t	ΔNDA_t	ΔNFA_t	ΔNDA_t
Constant	0.024 (0.023)	0.027* (0.015)	0.023 (0.024)	0.034*** (0.012)
ΔNFA_t	__	**-0.793** (0.340)**	__	**-0.934*** (0.232)**
ΔNDA_t	**-0.650** (0.312)**	__	**-0.649** (0.313)**	__
Δmm_t	-0.689** (0.303)	-1.01*** (0.179)	-0.683** (0.303)	-1.00*** (0.181)
ΔCPI_{t-1}	0.175* (0.103)	0.219*** (0.054)	0.187* (0.107)	0.208*** (0.051)
ΔNX_{t-1}	0.292 (0.313)	0.514 (0.557)	0.283 (0.316)	0.553 (0.567)
$\Delta(r_t^*+E_t e_{t+1})$	-0.137 (0.298)	0.198 (0.464)	-0.276 (0.359)	-0.402 (0.402)
y_{ct-1}	-0.075 (0.432)	0.553 (1.64)	-0.063 (0.435)	0.589 (1.57)
ΔG_t	-0.030 (0.103)	0.122 (0.345)	-0.027 (0.104)	0.127 (0.331)
$I_{Q4,t}$	__	-0.012 (0.039)	__	-0.012 (0.036)
$ex\_vol_{t-12,t}$	0.064 (0.105)	__	0.039 (0.119)	__
Excluded Instruments	$I_{Q4,t}$	$ex\_vol_{t-12,t}$	$I_{Q4,t}$	$ex\_vol_{t-12,t}$
R-square	0.93	0.86	0.93	0.88
Centered R-square	0.81	0.84	0.81	0.86

(*), (**), (***) denotes significance at 10%,5% and 1% level

The coefficients of Δmm_t are significant and of the right sign. The coefficients of ΔCPI_{t-1} are at least marginally significant, and has a significant positive impact on ΔNDA_t and ΔNFA_t. This can be due to the fact that both the monetary authorities and foreign investors need some time to react to a change in domestic price conditions, while the price change affects domestic assets more directly. Moreover, while NFA and NDA are relatively volatile, CPI are stable (with quarterly changes usually less than 2%) for most periods covered by the study, with the exception of the last three quarters of 2003, the last quarter of 2007 and first two quarters

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[32] Meaning adjusted to exclude the revaluation effect. Method of adjustment will be described later.

of 2008. This may cause statistical difficulties to detect the true relationship between the variables. ΔNX_{t-1} is of the right sign and $\Delta(r_t^* + E_t e_{t+1})$ has the wrong sign in one specification, but both are insignificant.

Surprisingly, $I_{Q4,t}$ is of the wrong sign and both $I_{Q4,t}$ and $ex\_vol_{t-12,t}$ are insignificant. The first stage F-stat for $ex\_vol_{t-12,t}$ are 8.05 and 11.38 for the two cases. The first stage F-stat for $I_{Q4,t}$ is comparable. Those values are smaller than the conventional critical value of 10.3 for weak instrument test[33]. This suggests that the use of $I_{Q4,t}$ and $ex\_vol_{t-12,t}$ might be exposed to a weak instrument problem, which can lead to biased results in 2SLS. However Angrist, Joshua D. and Pischke, Jorn-Steffen (2008) point out that a Monte-Carlo simulation shows that just identified IV is approximately unbiased unless the instrument is extremely weak. This provides me with some confidence in interpreting the results.

As a robustness check, lagged control and dependent variables are added to the right hand side of the equation, as independent variables. The coefficients of CPI_{t-2} are of the right negative sign but insignificant, this lends some support to the previous explanations on positive coefficients of price changes. The offset coefficients are largely unchanged, while the sterilization coefficients remain negative but become significant only at a 10% level. The reason behind this is probably that NDA responds to contemporaneous changes as well as lagged changes in NFA. Sterilization may be completed over a couple of quarters. With a small sample size, it is harder to obtain significant coefficients for every lagged NFA. In fact as the next section shows, a simple VAR implies that the sterilization is mostly completed within the next two periods. The result is also robust to a different composition of the foreign reserves, namely 70%

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[33] See, for example, Stock, James H and Yogo, Moto (2005)

US dollars and 30% Euros[34].

Inspired by Aizenmand and Glick (2008), I estimate the sterilization coefficients with 2SLS using 40-quarter rolling samples. The sample period begins with 1995 Q1 to 2004 Q4, moves to 1995 Q2 to 2005 Q1 and ends with 2000 Q3 to 2010 Q2. There are 23 rolling periods in total. Figure 10 and Figure 11 shows a plot of the rolling coefficients with 95% confidence intervals. The x-axis corresponds to the end of the 40th quarter of each rolling sample. The coefficients are steady but with a slight downward trend, suggesting an increase in the degree of sterilization. However no definite conclusion can be reached given the large standard errors. This is not a direct contradiction to the findings in Aizenman and Glick (2008) or Ouyang, Rajan and Willett (2007a) though, since the two studies cover different sample periods.
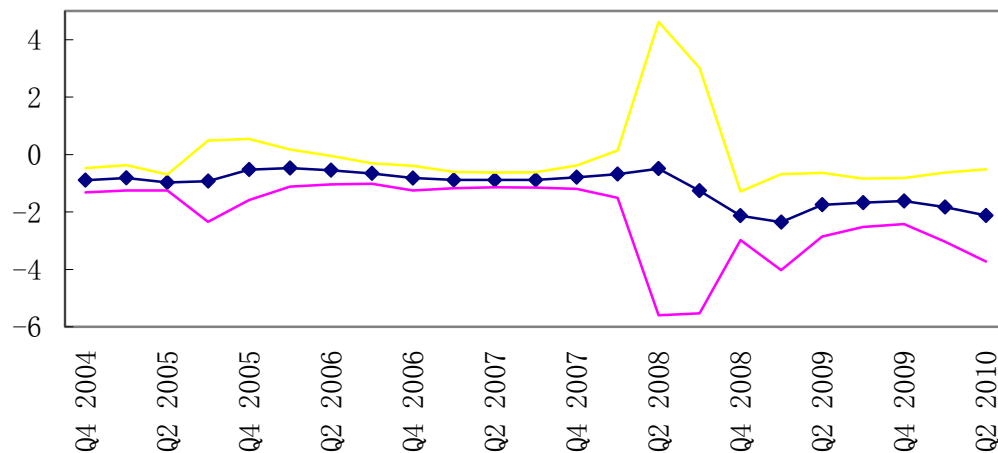
Figure 10 Sterilization Coefficients from rolling regression
Perfect foresight

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[34] Results are not reported here to ensure conciseness of the paper.
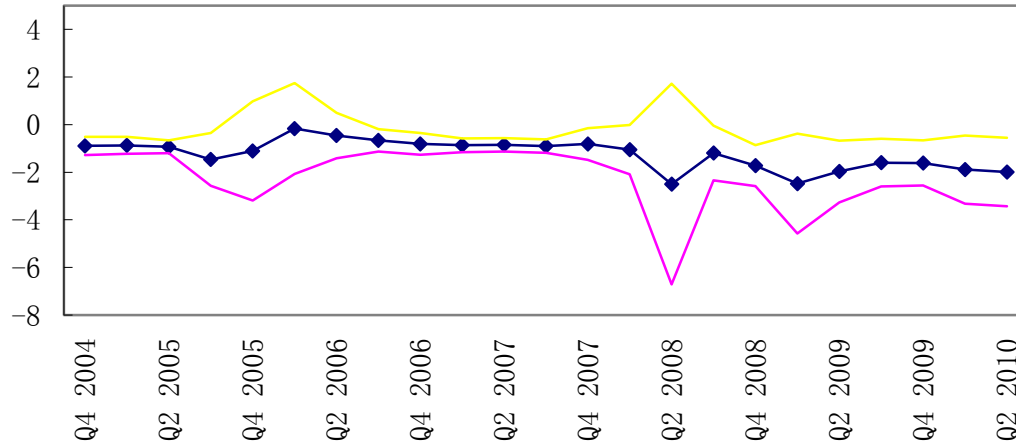
Figure 11 Sterilization Coefficients from rolling regression
Static Expectations

To further check the robustness of the result, I replace NDA by M2 and estimate the following equation:

$$\Delta M2 \;=\; \lambda_0 \;+\; \lambda_1 \Delta NFA_{t-1} \;+\; \lambda_2 \Delta mm_t \;+\; \lambda_3 \Delta CPI_{t-1} \;+\; \lambda_4 \Delta NX_{t-1} \;+\; \lambda_5 \Delta(r_t^* \;+\; E_t e_{t+1})$$
$$+\; \lambda_6 y_{ct-1} \;+\; \lambda_7 \Delta G_{t-1} \;+\; v_t$$

Here ΔNFA_{t-1} is used instead of ΔNFA_t to break the mechanical relationship between NFA and contemporaneous money supply. The regression gives a λ_1 of .630 with a standard error of 0.616 for static expectation, and 0.669 with a standard error of 0.602 for perfect foresight. In both cases the λ_1 coefficient is not significantly different from 0. This implies that NFA from previous period has no significant impact on current M2.

2.3.2.3 Robustness check: VAR to detect the effect of NFA on the price levels

If China has been successfully sterilizing the inflows of foreign capital, it should be able to insulate its domestic monetary conditions from the increase in NFA to a large degree. Figure 12 plots the percentage change in China's quarterly CPI and NFA from 1994 to 2010. Despite a continuous increase in NFA, CPI seems to be quite stable after 1997 except for the spikes in late 2003 and early 2008. To take a closer look at the problem, I study the direct impact of the changes in net foreign assets on domestic price levels by applying the following reduced form VAR:

$$\Delta NFA_t = \Phi_1 + \sum_{i=1}^{k} \Phi_{11,i}\Delta NFA_{t-i} + \sum_{i=1}^{k} \Phi_{12,i}\Delta NDA_{t-i} + \sum_{i=1}^{k} \Phi_{13,i}\Delta CPI_{t-i} + \varepsilon_{1t}$$

$$\Delta NDA_t = \Phi_2 + \sum_{i=1}^{k} \Phi_{21,i}\Delta NFA_{t-i} + \sum_{i=1}^{k} \Phi_{22,i}\Delta NDA_{t-i} + \sum_{i=1}^{k} \Phi_{23,i}\Delta CPI_{t-i} + \varepsilon_{2t}$$

$$\Delta CPI_t = \Phi_3 + \sum_{i=1}^{k} \Phi_{31,i}\Delta NFA_{t-i} + \sum_{i=1}^{k} \Phi_{32,i}\Delta NDA_{t-i} + \sum_{i=1}^{k} \Phi_{33,i}\Delta CPI_{t-i} + \varepsilon_{3t}$$

where NFA, NDA and CPI are defined as before. The VAR measures the transmission of an impulse from net foreign assets to net domestic assets, as well as to the price levels. If the result from the section above is true, the change in NFA should have limited effects on CPI.

This is a very simple VAR with only 3 variables. It is appropriate in this setting because I want to focus on the effect of net foreign assets on the price levels. Moreover, it is well known that the Cholesky decomposition used to orthogonalize the variance-covariance matrix of the VAR residuals imposes a recursive causal structure from the top variables to the bottom variables. Including too many control variables makes it harder to decide on a sensible order of all those variables. Here it is assumed that NFA affects the other two variables

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contemporaneously but not vice versa. This ordering is based on the previous 2SLS result, which

shows that an increase in NFA triggers the change in NDA in the opposite direction. On the other

hand, the inflow of foreign capital is not so much induced by a change in domestic assets. Both

the foreign assets and domestic assets are assumed to affect price levels contemporaneously.
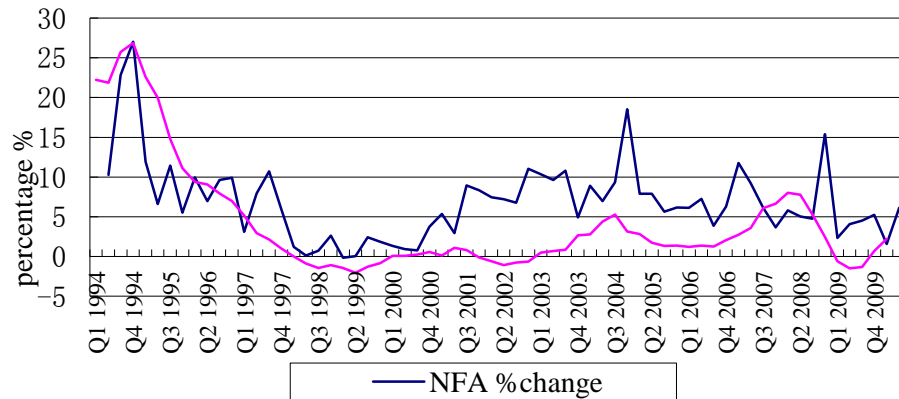
Source: IFS, author's calculation

Figure 12 Change in NFA VS. CPI

Based on the Akaike Information Criterion, 4 is selected as the optimum lag number.

Figure 13 shows the orthogonalized impulse response function. From the graph, NDA responds

significantly to a change in NFA. Namely NDA drops when NFA increases and most of the

changes are completed within the first two following quarters. Shocks to net foreign assets have

little influence on price levels. The responses of NDA and CPI can be interpreted as the impact of

changes in net foreign assets has been effectively neutralized, which restates the previous result

that the PBC's sterilization operations have been successful.

A Granger causality test indicates that ΔNFA_t Granger causes ΔNDA_t, not the other way

around. ΔNFA_t does not Granger cause ΔCPI_t. This suggests that the sterilization is effective in

the sense that change in NFA does not have a positive effect on the price levels. The magnitude of ΔCPI_t response to changes in lagged ΔNFA_t is also at the minimum as Figure 13 shows. Over all, the VAR results support my conclusion from the previous section that the PBC is carrying out a high degree of sterilization.
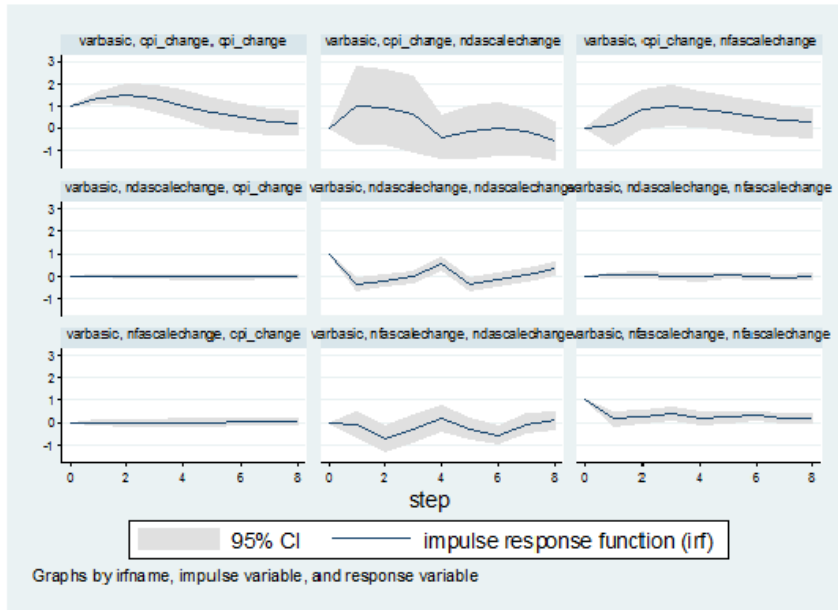
Figure 13 VAR: Impulse Response Function

2.4 The Sterilization cost born by the PBC

The aforementioned section concludes that China has been capable of carrying out an almost complete sterilization. In spite of a rapid increase in foreign reserves, China is able to maintain a relatively independent monetary policy.

However, the sterilization comes at a cost. As the foreign reserves keep accumulating,

the PBC has to issue more debt for sterilization purpose, which may drive up the interest rates on the PBC bills. Eventually the cost may become too high for the central bank. The appreciation of the RMB against the US dollar can also contribute to a net capital loss in domestic currency terms, since the PBC bills are denominated in RMB and the foreign reserves are denominated in US dollars and other foreign currencies. On the other hand, the foreign reserves have been increasing consistently. The growing investment return from the foreign reserves helps to offset the cost and sustain the sterilization operation.

In the following section I estimate the PBC's cost of sterilization and compare it with its income from the foreign reserves investment from the period 2003 to 2010, taking exchange rate fluctuation into consideration. A back-of-the-envelope calculation indicates that at the current interest and exchange rate, China's foreign exchange reserves have to drop around 36% (or to put it in another way, the RMB has to appreciate by more than 50% against the US dollar) before it fails to cover the sterilization cost of the PBC. A projection of the sterilization cost and the income from foreign reserves investment also indicates no sign of unsustainability in the near future.

2.4.1 Comparison of the sterilization cost and the PBC's investment income

The cost of sterilization is generated from two categories on the liability side on the PBC's balance sheet: the interest payments on the outstanding PBC bonds and on the total (required and excess) reserves. Since repos usually have terms of less than 91 days and are of a much smaller scale compared to PBC bonds, the interest payments on them are small and thus are ignored here.

The volume, term and final price of each bond issuance are published by the PBC

every week. From this data, the interest expenses associated with each issuance can be calculated. The expense is then distributed evenly into each month until the bond reaches maturity (the same concept as amortization in accounting). The total cost of PBC bills in a certain month can be calculated by summing up the interest expenses associated with all of the currently outstanding bonds. Figure 14 plots the weighted monthly interest rate of the PBC bills with different terms. Contrary to popular belief, though the interest rate peaked in 2008 there is no obvious trend of a continuous increase in the interest rates over the years.
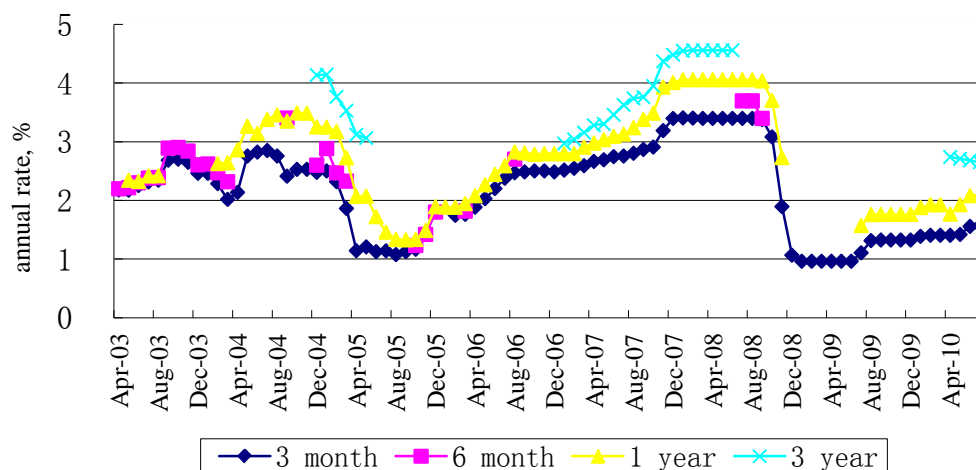
Source: PBC, author's calculation

Figure 14 PBC bill: weighted monthly average

Unlike many other countries, China pays interest on both required reserves and excess reserves. The current annual interest rate is 1.62% for required reserves and 0.72% for excess reserves. Historically the interest rates have been higher. Table 18 shows the historical adjustments of reserve interest rates.

Table 18 Interest rate of required and excess reserves

time of adjustment	required reserve	excess reserve
1996.05.01	8.82	8.82
1996.08.23	8.28	7.92
1997.10.23	7.56	7.02
1998.03.21	5.22	
1998.07.01	3.51	
1998.12.07	3.24	
1999.06.10	2.07	
2002.02.21	1.89	
2003.12.21		1.62
2005.03.17		0.99
2008.11.27	1.62	0.72

Month-end data of total reserve amount can be found on the PBC's balance sheet, starting from 2000. Since the bond interest payment is calculated as an average amount over the month, I also replaced the month-end reserve data by the month-average reserve amount (calculated by taking the average of previous and this month-end data). However the PBC's balance sheet does not distinguish between required reserves and excess reserves, which makes the precise calculation of interest payment on reserves impossible. To deal with the problem, I calculate the upper (and lower) bound of the monthly interest payments, corresponding to the extreme cases where all reserves are required reserves (or excess reserves). The actual interest payments on reserves must lie somewhere in between. The total cost of sterilization is calculated by adding up the interest payments on both the PBC bonds and the total reserves.

There is one caveat in the method mentioned above. Not all the interest paid on reserves by the PBC can be categorized as sterilization cost, since the commercial banks are

always required to hold some reserves. Strictly speaking, the lower bound calculated here should be higher than the "true" lower bound if we assume the repo costs are negligible. This wouldn't hurt my result though, since this overestimated lower bound is exceeded by the income from foreign reserves investment as a result.

The estimation of the PBC's income from foreign reserves investment is less straightforward. China has been very cautious in revealing information on the compositions of its international reserves and no public information is available. It is widely believed, however, that China's foreign reserves mainly consist of US dollars, Japanese Yen and Euros. To get a rough approximation of the composition of China's foreign reserves, I use quarterly international reserves composition of emerging markets from IMF Currency Composition of Official Foreign Exchange Reserves (COFER) database, only taking into account assets denominated in US dollars, Euros and Japanese Yen. This approximation is consistent with the conventional belief that around 70% of China's foreign reserves are in US dollars (Morrison, Wayne M. and Labonte, Marc. 2008). The composition is expressed in percentage terms and has already taken into consideration of the exchange rate between Yen/Euro and dollar. Thus even though foreign reserves in China are expressed in dollars, there is no need to worry about the exchange rate change between Yen/Euro and dollar when calculating the average yields.

Yields on these assets are approximated by five-year government bonds issued by the corresponding national governments (for Euro assets, it's an average of the bonds of several national governments in the Euro area). Those data are published by the respective central banks and are the average values over the month. Long-term bonds are used in the approximation because according to the data published by the Federal Reserve, only 6.7% of

China's holding of US Treasury securities (official and unofficial combined) are short term Treasury bills during the period from 2003 to 2009. The rest are all some forms of long term securities. The Fed's data does not distinguish between private or institutional investors and the monetary authorities. However, foreign reserves account for a majority of China's US Treasury holdings. It is safe to conclude that the PBC holds mostly long term bonds as its investment. The Treasury securities alone, long term and short term combined, account for 36% of China's foreign reserves[35]. The monthly yield on foreign reserves is then calculated as the average of yields on assets denominated in those three currencies, weighted by the percentage composition implied by COFER. In addition, the gain/loss caused by monthly exchange rate changes is taken into account when converting dollar income to RMB.

The approximation results in an average annual return of 3.39% for the period from April 2003 to June 2010, which is used to further calculate PBC's total income from foreign reserves. Liu, Liya (2008) estimated the annual yield on China's foreign reserves to be between 3.6% and 4.3%, for the period from 2000 and 2007. My estimation is lower than that in Liu (2008), most likely due to a drop in the US treasury rate after 2007. Using yields on two-year and ten-year government bonds as a benchmark would result in an average annual yield of 2.74% and 4.03% respectively.

The total income from the foreign reserves investment is calculated as $Income_t=(Average\ Foreign\ Reserve_t\times Average[e_t]-Income_{t-1})\times yield_t$, where the subscript t stands for the values at time t. Since the foreign reserves and exchange rates data from IFS are at the

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[35] According to the statistics on foreign net purchase of US securities published by Fed, China's total purchase includes U.S government bonds, some cooperate bonds and very little U.S. cooperate stocks. However the term structure of the bonds or the exact break down of China's holding of US assets are not available. Here I use the long term government bond as a proxy.

end of month, average monthly values are calculated using data from this and the previous month. Income from the previous month is deducted from this month's average foreign reserves stocks to get the principle amount for this month. I here make the simple assumption that the income earned from foreign reserves each month is not re-invested and can indeed be used to cover the sterilization cost. In this way, there is no double counting the interest earned.

Figure 15 plots the PBC's estimated monthly income from foreign reserves investment using ten-year and five-year bonds respectively and its cost of sterilization, starting from April 2003, when the first new PBC bill was issued. From the graph one can see that the positive gap between income and cost has been growing since 2005, but has recently taken a downturn at the end of 2008 and widened again afterwards, mainly due to a drop in long term foreign interest rates. Due to a combination of rapid increases in foreign reserves and high yields on reserves investment, the PBC's income from foreign reserves investment calculated from both types of bonds have been exceeding the upper bound of sterilization cost consistently, with the only exception in December 2008, where the income from five-year yields falls below the upper bound on cost but still stays above the lower bound. At the current exchange rate and keeping the PBC's cost constant, China's foreign reserves will have to drop 36% before the income from five-year bonds hits the lower bound. Another way to look at it is that the RMB would have to appreciate by more than 50% against the US dollar before the income from five-year bonds fails to cover the lower bound, assuming the exchange rates stay constant.

If foreign interest rates keep dropping, China will suffer a more drastic decrease in its income from foreign reserves, especially if its investment is of a shorter term than that estimated. Figure 16 plots the same graph as before but with five-year and two-year bond yields

as proxies instead. Since the short/medium term foreign interest rate has dropped sharply, investment yields from two-year government bonds cannot cover PBC's interest expenses after late 2008. Moreover, China holds some of the US ABS (Asset-Backed Securities). Though the exact amount is unknown, the ABS may be another source for the losses in foreign reserves.
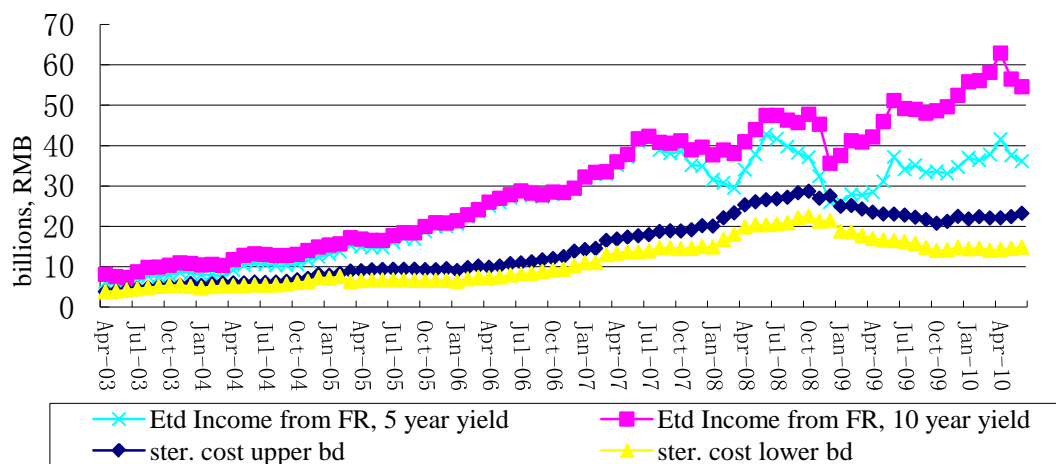
Source: cofer, European Central Bank, Fed, Japan Ministry of Finance, PBC, author"s calculation

Figure 15 PBC's income VS. Sterilization Cost, long term bonds
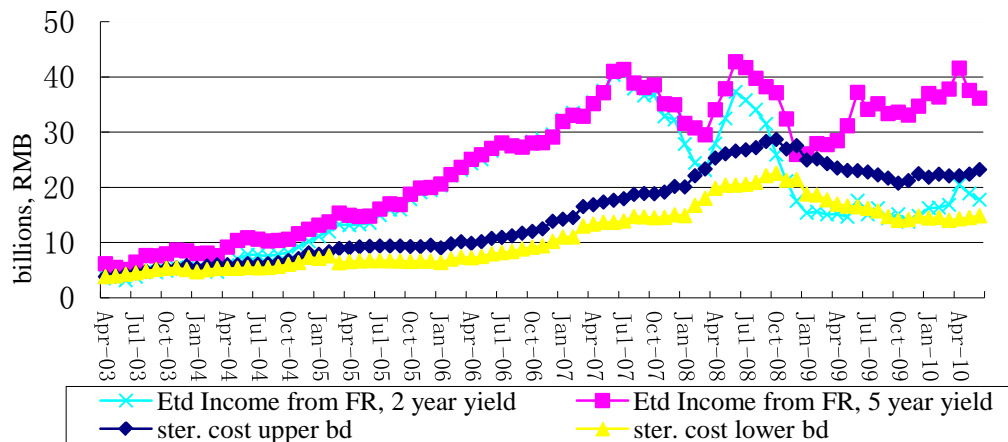
Source: cofer, European Central Bank, Fed, Japan Ministry of Finance, PBC, author"s calculation

Figure 16 PBC's income VS. Sterilization Cost, medium term bonds

Using different foreign exchange compositions leaves the conclusion largely unchanged. Especially, in one experiment all the Euros are replaced with Japanese Yen, leaving the proportion of US dollars unchanged. Since Japanese government bonds have much lower yields than their US and European counterparts, this experiment leads to a lower value of the investment income from foreign reserves. In this case, the income from the 10-year bond still exceeds both the upper and lower bounds on sterilization cost in every month except for December 2008. The yields from 5-year bonds exceeds the cost lower bound except for December 2008.

2.4.2 Linear Projections

As a thought experiment, I also performed simple linear projections of the sterilization cost and the income from foreign reserves investment. Figure 17 shows the projected values from July 2010 through June 2015 using COFER compositions. The projected values and standard errors of the upper/lower bound on sterilization costs are calculated using OLS based on the data from July 2005 to June 2010. Foreign reserves denominated in dollars are projected under a linear regression based on the values from the same period and the investment yield is assumed to stay constant at the June 2010 level. Future exchange rates of RMB against US$ are also projected linearly, based on the values between July 2005 and June 2010. The projected income from foreign reserves investment is calculated as $Income_{proj,t+j}$=(Average Foreign Reserve$_{proj,j}$×Average[$e_{proj,j}$]-Income$_{proj,j-1}$)×yield$_{June2010}$, where the subscript stands the projected value at time j after June 2010. Standard errors of the income from foreign reserves investment are calculated using delta methods assuming the covariance matrix of foreign reserves and

exchange rates is diagonal. As before, I convert the month-end data of foreign reserves and exchange rates to month-average. Those data are then used in the projection.

We can see that even with RMB appreciating, according to Figure 17 the ten-year bond income still stays well above the upper cost bound. The upper cost bound only start to catch up with the 5 year bond income in the end of 2012. I also did a similar experiment with the exchange rate fixed at the June 2010 level. Without the appreciation, even the five-year bond income stays above the upper cost bound. Using two-year bond income produces a drastically different picture in the projection, of course. As the previous section indicates, the foreign exchange investment income estimated from two-year government bond always stays below the lower cost bound (graph is not shown here). However it is quite unlikely that China will switch massively to a shorter term investment in the near future, since the SAFE has never expressed any concern on the liquidity of its current foreign exchange investment.
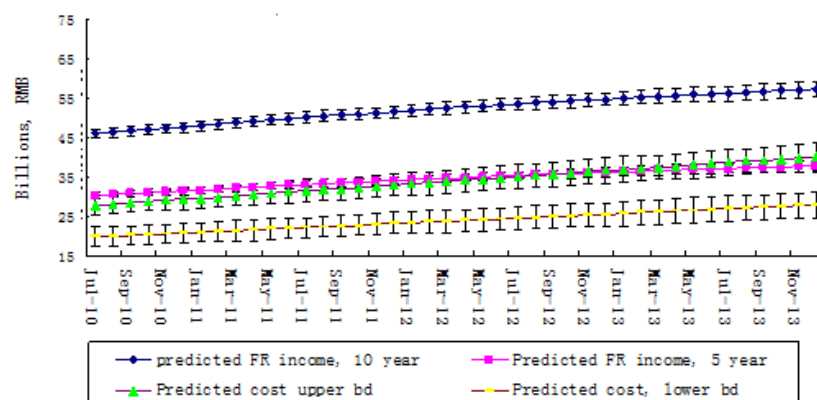
Figure 17 Linear projection (projected exchange rate)

Admittedly this projection is very parsimonious. Nevertheless it sends an important message that among all the things, the appreciation of the RMB and the terms of the invested

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Treasuries have profound impacts on the PBC's income from foreign reserves. This does not mean that the PBC's sterilization is not sustainable, though. Firstly, there is no reason why China would want to switch to a short investment horizon in terms of foreign reserves. Secondly, as the RMB appreciates, the speculative capital inflow into the country will be reduced. In that case, the PBC will no longer need to engage in such massive sterilizations. I thus conclude that as long as China is able to keep a stable interest rate paid on the PBC bills and experiences no sudden drop in foreign reserves, there is no obvious reason why the PBC will lose its capacity of extensive sterilizations in the near future.

Having said that, I recognize that sterilization might have other unobserved costs besides interest payments. For example, it was argued that domestic interest rates on the PBC bills were artificially kept low by the central bank, in order to sustain low interest payments on bonds. This so-called financial repression environment hinders the financial market from working efficiently. Furthermore, raising the required reserve ratio posts a cost on domestic commercial banks by lowering their profit margin. The cost of those is, however, hard to quantify. Moreover, there is little definite evidence showing that the PBC bond is indeed overpriced. It is obvious that the PBC bills should have a lower rate than other corporate bonds since the bills are implicitly backed by the Chinese government and thus are considered to be default free. The only comparable security here is probably the Treasury bond of similar terms issued by the Ministry of Finance, which is also auctioned off and is traded in the interbank markets and at the exchanges. The average annual yields of China's one year government bond traded at the exchanges are 2.84% and 3.13% in 2007 and 2008 respectively[36], which are actually lower than the PBC bill rates in the same period. Since the Treasury bonds are traded at

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[36] Data from Bloomberg, index GCNY1YR

the exchanges and thus are accessible by the general public, their yields should better reflect the market expectations. The fact that the PBC bills have a higher rate sheds some doubts on the claim that the PBC bills rates are intentionally suppressed. Of course one can always argue that the PBC suppresses the domestic rates on RMB denominated assets in general. The validation of this claim is beyond the scope of this paper.

2.5 Conclusion

This paper studies the degree of sterilization and capital mobility in China in the recent episode of a crawling peg exchange rate and rapid foreign reserve accumulation. The results suggest a sterilization coefficient between -0.8 and -0.9, and an offset coefficient of around -0.6. This implies that the PBC has been carrying out a almost full sterilization, and the capital controls in China are somewhat porous but still effective. In spite of a continuous inflow of foreign exchange, China seems to be able to maintain a steadily increasing monetary base and a stable price level. A reduced form VAR confirms the result that the impact of changes in net foreign assets has been effectively neutralized. The sterilization coefficients in this paper lie within the wide range offered by Aizenman and Glick (2008). They are smaller than those obtained by He et al. (2005) and greater than those of Wu (2006) and Ouyang, Rajan and Willett (2007a). The offset coefficients in the paper are comparable to those of Ouyang, Rajan and Willett (2007a). Unlike in Aizenman and Glick (2008), rolling regressions show that there is no obvious increasing trend in sterilization coefficients from 2004 to 2008. A small sample size in this paper and a different time frame and method may have contributed to the differences.

Secondly, I estimate the lower and upper bounds on PBC's cost of sterilization and compare them with the income the PBC earns from investing foreign exchange reserves in long

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term foreign government bonds. Calculation shows that so far the PBC's sterilization cost can be fully covered by its income from foreign reserves, which provides support to Prasad and Wei (2005)'s claim that there are in fact net marginal benefits to a combination of large reserves holding and continuous sterilization in China's case. Projections of future sterilization cost and foreign reserves investment income also show no sign that sterilization will become unsustainable in the near future. However further appreciation of RMB and a switch to short term bond may have a profound negative impact on the PBC's income from foreign reserves investment in domestic currency terms. As China is moving towards a more liberal exchange rate policy, it will probably suffer a capital loss on its foreign exchange reserves in RMB terms. Nevertheless, in this case the resulting decrease in the speculative capital inflows will mitigate the need for sterilization.

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CHAPTER 3

CHINA'S FINANCIAL SYSTEM: OPPORTUNITIES AND CHALLENGES

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3.1 Introduction

In this paper we provide a comprehensive review of China's financial system and extensive comparisons with other countries. Almost every functioning financial system includes financial markets and intermediaries (e.g., a banking sector), but how these two standard financial sectors contribute to the entire financial system and economy differs significantly across different countries. In this regard, we discuss what has worked and what has not within the two sectors, and consider the effects of further development on the entire economy. We also examine a non-standard financial sector, which operates outside the markets and banking sectors and consists of alternative financing channels, governance mechanisms, and institutions. Finally, we provide guidelines for future research on several unresolved issues, including how China's financial system can integrate into the world's markets and economy without being interrupted by damaging financial crises. Although there is no consensus regarding the

prospects for China's future economic growth, a prevailing view on China's financial system speculates that it is one of the weakest links in the economy and it will hamper future economic growth.

We draw four main conclusions about China's financial system and its future development.

First, when we examine and compare China's banking system and financial markets with those of both developed and emerging countries, we find China's financial system has been dominated by a large banking system. Even with the entrance and growth of many domestic and foreign banks and financial institutions in recent years, China's banking system is still mainly controlled by the four largest state-owned banks. All of these 'Big Four' banks have become publicly listed and traded companies in recent years, with the government being the largest shareholder and retaining control. This ownership structure has served these banks well in terms of avoiding major problems encountered by major financial institutions in developed countries that are at the center of the 2007-2009 global financial crisis. Moreover, the level of non-performing loans (NPLs) over GDP has been steadily decreasing after reaching its peak during 2000- 2001. Continuing improvement of the banking system, including further development of financial institutions outside the Big Four banks and extending more credit to productive firms and projects, can help stabilize China's financial system in the short run, given the uncertainties in the Chinese and global economies.

Our second conclusion concerns China's financial markets. Two domestic stock exchanges, the Shanghai Stock Exchange (SHSE hereafter) and Shenzhen Stock Exchange (SZSE) were established in 1990. Their scale and importance are not comparable to the banking sector;

and they have not been effective in allocating resources in the economy, in that they remain speculative and driven by insider trading.   In recent years the stock market has witnessed significant development. Going forward, financial markets are likely to play an increasingly significant role in the economy.   We discuss several issues and potential problems related to increasing the size and scope and improving the efficiency of the stock and other financial markets.

Third, in an earlier paper, Allen, Qian and Qian (2005, AQQ hereafter) find that the most successful part of the financial system, in terms of supporting the growth of the overall economy, is not the banking sector or financial markets, but rather a sector of alternative financing channels, such as informal financial intermediaries, internal financing and trade credits, and coalitions of various forms among firms, investors, and local governments.   Many of these financing channels rely on alternative governance mechanisms, such as competition in product and input markets, and trust, reputation and relationships.   Together this alternative financial sector has supported the growth of a "Hybrid Sector" with various types of ownership structures. Our definition of the Hybrid Sector includes all non-state, non-listed firms, including privately or individually owned firms, and firms that are partially owned by local governments (e.g., Township Village Enterprises or TVEs).[37] The growth of the Hybrid Sector has been much higher than that of the State Sector (state-owned enterprises or SOEs, and all firms where the central government has ultimate control) and the Listed Sector (publicly listed and traded firms with most of them converted from the State Sector). The Hybrid Sector contributes most of China's

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[37] We include firms partially owned by local governments in the Hybrid Sector for two reasons. First, despite the ownership stake of local governments and the sometimes ambiguous ownership structure and property rights, the operation of these firms resembles more closely that of a for-profit, privately-owned firm than that of a state-owned firm. Second, the ownership stake of local governments in many of these firms has been privatized.

economic growth, and employs the majority of the labor force. The co-existence of the alternative financial sector with banks and markets can continue to fuel the growth of the Hybrid Sector.

Finally, a significant challenge for China's financial system is to avoid damaging financial crises that can severely disrupt the economy and social stability. These crises include traditional financial crises: a banking sector crisis stemming from an accumulation of NPLs and a sudden drop in banks' profits; or a crisis/crash resulting from speculative asset bubbles in the real estate market or stock market. There are also other types of financial crises, such as a "twin crisis" (simultaneous foreign exchange and banking/stock market crises) that struck many Asian economies in the late 1990s. Since its entrance to the World Trade Organization (WTO) in 2001, the integration of China's financial system and overall economy with the rest of the world has significantly sped up. This process introduces cheap foreign capital and technology, but large scale and sudden capital flows and foreign speculation increase the likelihood of a twin crisis. At the end of 2007, China's foreign currency reserves surpassed US$1.5 trillion, overtaking Japan to become the largest in the world; they increased to about US$3.2 trillion as of June 2011 with a large fraction invested in U.S. dollar denominated assets such as T-bills and notes.[38] The rapid increase in China's foreign exchange reserves suggests that there is a large amount of speculative, "hot" money in China in anticipation of a continuing appreciation of the RMB, China's currency, relative to all other major currencies, especially the US dollar. Depending on how the government and the central bank handle the process of revaluation, especially when there is a large amount of capital outflow, there could be a classic currency crisis as the

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[38] According to the U.S. Treasury Department, China's holding of U.S. treasury securities reached $ 1.17 trillion in July 2011. Morrison and Labonte (2008) estimate that around 70% of China's foreign reserves are invested in dollar denominated assets.

government and central bank try to defend the partial currency peg, which in turn may trigger a banking crisis if there are large withdrawals from banks.

The remaining sections are organized as follows. In Section 3.2, we briefly review the history of China's financial system development, present aggregate evidence on China's financial system, and compare them to those of developed and other developing countries. In Section 3.3, we examine China's banking system and changes over time. In Section 3.4, we briefly examine the growth and irregularities of financial markets, including the stock market, real estate market, and listed firms, and consider the effects of several initiatives to develop new markets and further develop existing markets, as well as changes in corporate governance among listed firms. In Section 3.5, we examine the non-standard financial sector, including alternative financial channels and governance mechanisms. Motivated by the success of this financial sector and firms in the Hybrid Sector, we also compare the advantages and disadvantages of using the law as the basis of finance and commerce. We then examine different types of financial crises and their potential effects on China's financial system in Section 3.6. Finally, Section 3.7 concludes the paper. In terms of converting RMB into US dollar, we use the exchange rate of US$1 = RMB 8.28 (yuan) for transactions and events occurring before 2005, and the spot rate at the end of each year for those activities during and after 2005 (Figure 25-A provides a graph of the exchange rates between the US dollar and the RMB).

3.2 Overview of China's Financial System

3.2.1 A Brief Review of the History of China's Financial System

China's financial system was well developed before 1949.[39] One key finding in reviewing

the history of this period, including the rise of Shanghai as one of the financial centers of Asia

during the first half of the 20th Century, is that the development of China's commerce and

financial system as a whole was by and large outside the formal legal system. For example,

despite the entrance of Western-style courts in Shanghai and other major coastal cities in the

early 1900s, most business-related disputes were resolved through mechanisms outside courts,

including guilds (merchant coalitions), families and local notables.[40] In Section 3.5.3 below, we

argue that modern equivalents of these nonlegal dispute-resolution and corporate governance

mechanisms are behind the success of Hybrid Sector firms in the same areas in the 1980s and

1990s, and that these alternative mechanisms may be more responsive in adapting to changes

in a fast-growing economy like China than the law and legal institutions.

After the foundation of the People's Republic of China in 1949, all of the pre-1949

capitalist companies and institutions were nationalized by 1950. Between 1950 and 1978,

China's financial system consisted of a single bank – the People's Bank of China (PBOC), a central

government owned and controlled bank under the Ministry of Finance, which served as both the

central bank and a commercial bank, controlling about 93% of the total financial assets of the

country and handling almost all financial transactions. With its main role to finance the physical

production plans, the PBOC used both a "cash-plan" and a "credit-plan" to control the cash

flows in consumer markets and transfer flows between branches.

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[39] For more descriptions of the pre-1949 history of China's financial system, see AQQ (2008); for more anecdotal evidence on China's financial system in the same period, see, for example, Kirby (1995) and Lee (1993).

[40] See, e.g., Chung (2005), for descriptions on family- and community-based mechanisms for contract enforcement. Looking at how disputes were resolved in and outside courts, Goetzmann and Köll (2005) conclude that the passing of China's first Company law in 1904, which was intended to provide a better legal environment for business and commerce, did not lead to actual changes in corporate governance and better protection of (minority) shareholder rights.

The first main structural change began in 1978 and ended in 1984. By the end of 1979, the PBOC departed the Ministry and became a separate entity, while three state-owned banks took over some of its commercial banking businesses: The Bank of China[41] (BOC) was given the mandate to specialize in transactions related to foreign trade and investment; the People's Construction Bank of China (PCBC), originally formed in 1954, was set up to handle transactions related to fixed investment (especially in manufacturing); the Agriculture Bank of China (ABC) was set up (in 1979) to deal with all banking business in rural areas; and, the PBOC was formally established as China's central bank and a two-tier banking system was formed. Finally, the fourth state-owned commercial bank, the Industrial and Commercial Bank of China (ICBC) was formed in 1984, and took over the rest of the commercial transactions of the PBOC.

For most of the 1980s, the development of the financial system can be characterized by the fast growth of financial intermediaries outside of the "Big Four" banks. Regional banks (partially owned by local governments) were formed in the Special Economic Zones in the coastal areas; in rural areas, a network of Rural Credit Cooperatives (RCCs; similar to credit unions in the U.S.) was set up under the supervision of the ABC, while Urban Credit Cooperatives (UCCs), counterparts of the RCCs in the urban areas, were also founded. Non-bank financial intermediaries, such as the Trust and Investment Corporations (TICs; operating in selected banking and non-banking services with restrictions on both deposits and loans), emerged and proliferated in this period.

The most significant event for China's financial system in the 1990s was the inception and growth of China's stock market. Two domestic stock exchanges (SHSE and SZSE) were

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[41] BOC, among the oldest banks currently in operation, was originally established in 1912 as a private bank, and specialized in foreign currency related transactions.

established in 1990 and grew very fast during most of the 1990s and in recent years in terms of the total market capitalization and trading volume. In parallel with the development of the stock market, the real estate market also went from nonexistent in the early 1990s to one that is currently comparable in size with the stock market.[42] Both the stock and real estate markets have experienced major corrections during the past decade, and are characterized by high volatilities and speculative short-term behaviors by many investors.

These patterns are in part due to the fact that the development of a supportive legal framework and institutions has been lagging behind that of the markets. For example, China's first bankruptcy law (governing SOEs) was passed in 1986 on a trial basis, but the formal Company Law did not become effective until the end of 1999. This version of the Company Law governs all corporations with limited liability, publicly listed and traded companies, and branches or divisions of foreign companies, as well as their organization structure, securities issuance and trading, accounting, bankruptcy, mergers and acquisitions (for details see the website of China Securities Regulatory Commission (CSRC), http://www.csrc.gov.cn/). In August 2006, a new bankruptcy law was enacted, and it became effective June 1, 2007. We provide a brief analysis of the status and problems of the stock market and real estate market in Section 3.5 below.

Following the Asian Financial Crisis in 1997, financial sector reform has focused on state-owned banks and especially the problem of NPLs (the China Banking Regulation Committee (CBRC) was also established to oversee the banking industry). We will further discuss this issue in Section 3.3. China's entry into the WTO in December 2001 marked the beginning of a new era,

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[42] At the end of 2007, the total market capitalization of the two domestic exchanges (SHSE and SZSE) was around $1.8 trillion, whereas total investment in the real estate market was around $3.12 trillion.

as we continue to observe increasing competition from foreign financial institutions and more frequent and larger scale capital flows. While increasingly larger inflows of foreign capital and the presence of foreign institutions may continue to drive further growth of the financial system and economy, larger scale capital flows can also increase the likelihood of damaging financial crises. We will discuss these issues in Sections 3.4 and 3.6.

A developed financial system is characterized by, among other factors, the substantial role played by institutional investors. In China, institutional investors began to emerge in the late 1990s: the first closed-end fund, in which investors cannot withdraw capital after initial investment, was set up in 1997, and the first open-end fund, in which investors can freely withdraw capital (subject to share redemption restrictions), was established in 2001. By November 2009, there were 65 fund companies managing 551 funds with 520 open-ended funds and the rest close-ended. The total net assets value (NAV) increased from RMB11 billion (or US$ 1.3 Billion) in 1998 to RMB 2.26 trillion (or $328 billion) in November 2009, which is still small compared to the assets within the banking sector. In 2003, a few Qualified Foreign Institutional Investors (QFII) entered China's asset management industry, and they have been operating through forming joint ventures with Chinese companies. On the other hand, China allowed Qualified Domestic Institutional Investors (QDII) to invest in overseas markets beginning in July 2006. At the end of 2008, the ten QDII funds had a total of $109.4 billion assets under management.

At the national level, the China Investment Corporation (CIC) was established in September 2007 with the intent of utilizing the accumulated foreign reserves for the benefit of the state and $207.91 billion foreign reserves were placed under management at the

establishment. CIC makes occasional announcements about its investment, but the overall transparency of its investment strategy is low. Since inception, CIC has made some aggressive investment decisions, including the well publicized $3 billion (pre-IPO) investment in private equity group Blackstone, and the $5 billion investment in Morgan Stanley (this took the form of mandatory convertible bonds that can be converted into almost 10% of the firm's equity).

Endowed with limited capital and given problems with the administration of the pension system, pension funds have not played a significant role in the stock or bond market.[43] With a fast aging population and the growth of households' disposable income, further development of a multi-pillar pension system, including individual accounts with employees' self-contributed (tax exempt) funds that can be directly invested in the financial markets, can lead to the development of both the financial system and the fiscal system as well as social stability. At the top of the pension fund system, China's National Social Security Fund (NSSF) was established in August 2002 and is administered by the National Council for Social Security Fund. This (sovereign) fund is mainly financed by capital and equity assets derived from the listing of state-owned companies, fiscal allocations from the central government, and other investment proceeds. It has recently shifted its core investment strategy of focusing on the domestic A-share and bond markets to a more diversified basket of assets, including investments in emerging markets and Europe. At the end of 2008, the fund had a total of $89.2 billion in assets; it grew to RMB856.7 billion ($142.8 billion) at the end of 2010 according to the annual report of NSSF. Finally, there are very few hedge funds that implement "long-short"

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[43] While there is a nationwide, government run pension system (financed mainly through taxes on employers and employees), the coverage ratio of the pension system varies significantly across regions and is particularly low in rural areas. Moreover, there is a very limited amount of capital in individual accounts and most of the capital has been invested in banks and government projects with low returns. See, for example, Feldstein (1999, 2003) and Feldstein and Liebman (2006), for more details on China's pension system.

strategies, as short selling has been prohibited until recently.[44]
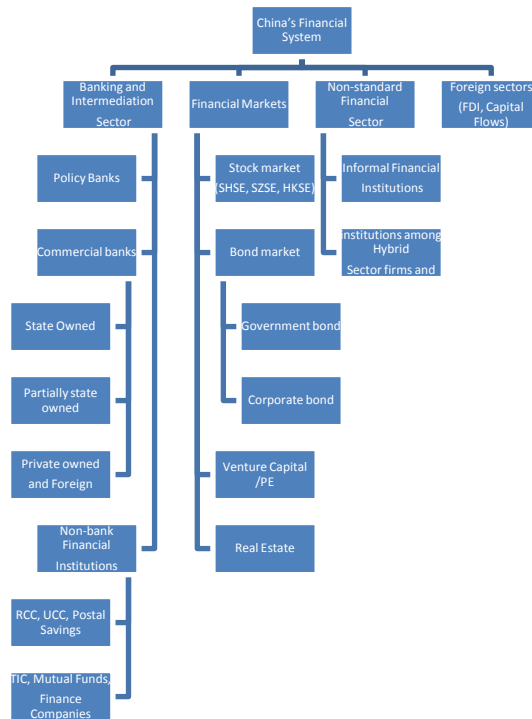
Figure 18 Overview of China's Financial System

Figure 18 depicts the current structure of the entire financial system. In what follows we will describe and examine each of the major sectors of the financial system. In addition to the standard sectors of banking and intermediation and financial markets, we will document the importance of the non-standard financial sector. Due to space limitation, we do not cover China's "foreign sectors" in this chapter; for discussions on the history and the role of these sectors in supporting the growth of the economy, see, for example, Prasad and Wei (2007) for a review.

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[44] Along with the introduction of an index future (for A shares) in April 2010, a trial program on short selling began for selected institutional investors (security companies; see, e.g., www.wsj.com, 3/31/2010). The impact of introducing these new programs and products on the financial market is yet to be seen.

3.2.2 Size and Efficiency of the Financial System: Banks, Markets, and Alternative Finance

In Table 19, we compare China's financial system to those of other major emerging economies, with measures for the size and efficiency of banks and markets taken from Levine (2002) and Demirgüç-Kunt and Levine (2001) and data from the World Bank Financial Database. We present average figures over the period 2001-2007 for each country as well as the average of all the other emerging economies (excluding China). We first compare the size of a country's banks and equity markets relative to that country's gross domestic product (GDP). In terms of total market capitalization, China's stock market, at 64% of its GDP over the period 2001-2007, is slightly larger than the 58% of GDP average of the other major emerging economies. "Value Traded" is perhaps a better measure of the actual size of the market than "market capitalization," because the latter includes non-tradable shares or tradable shares that are rarely traded. In this regard, the size of China's stock market (62% of GDP) is significantly larger than the average of other emerging economies (with an average of 37% of GDP). Similarly, the size of China's banking system, in terms of total bank credit to non-state sectors, is 116% of its GDP over 2001-2007, and considerably larger than the average of other major emerging economies (with an average of 65% of GDP). However, the majority of the bank credit goes to state-owned firms in China and only a small fraction goes to firms in the Hybrid Sector (more evidence of this is given below). In addition, NPLs account for a larger fraction of all the loans in China than the average of other emerging economies (16% vs. 10%), indicating that its banking sector still has scope to improve its efficiency.[45]

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[45] Levine (2002) uses bank overhead cost/total assets to measure banking sector efficiency, and used this measure to construct the "Structure Efficiency" and "Finance Efficiency" measures. However, the World Bank Financial Database no longer reports the overhead cost/assets ratio; we replace this with NPLs/loans

Table 19 Comparing financial systems: Banks and Markets (average 2001-2007)

This table compares financial markets and banking sector of China with those of other large emerging economies. All the measures on the size and efficiency of banks and markets are based on Levine (2002) and Demirgüç-Kunt and Levine (2001), and data is from the World Bank Financial Database. We present the 2001-2007 average figures for all countries (except for "Structure Regulatory," which are based on 2005 figures). Average of other emerging economies are (simple) averages across other emerging economies *excluding* China.

Measure	Size of Banks and Markets				Structure Indices: Markets vs. banks[*]				Financial Development[**] (banking and market sectors)		
	Bank credit/ GDP	NPL/ Total Loans	Value traded /GDP	Market cap./ GDP	Activity	Size	Effic-iency	Regul-atory	Activity	Size	Effici-ency
China	**1.16**	**0.16**	**0.62**	**0.64**	**-0.62**	**8.88**	**2.32**	**16**	**8.88**	**8.91**	**5.97**
Argentin	0.14	0.10	0.04	0.48	-1.32	3.93	1.59	7	3.93	6.50	3.60
Brazil	0.34	0.04	0.19	0.53	-0.61	6.45	0.72	10	6.45	7.49	6.17
Egypt	0.52	0.21	0.19	0.60	-1.02	6.88	2.54	13	6.88	8.04	4.48
India	0.37	0.07	0.57	0.64	0.44	7.65	1.50	10	7.65	7.76	6.71
Indonesia	0.24	0.12	0.12	0.28	-0.69	5.66	1.23	Na	5.66	6.51	4.60
Malaysia	1.15	0.12	0.43	1.45	-0.98	8.51	2.85	10	8.51	9.72	5.89
Mexico	0.18	0.03	0.06	0.26	-0.99	4.74	-0.26	12	4.74	6.11	5.38
Pakistan	0.26	0.14	0.72	0.28	1.01	7.55	1.36	10	7.55	6.61	6.26
Peru	0.21	0.08	0.03	0.44	-1.96	4.10	1.22	8	4.10	6.81	3.63
Philippin	0.34	0.15	0.07	0.47	-1.54	5.50	1.97	7	5.50	7.36	3.85
Russian	0.26	0.04	0.27	0.65	0.06	6.54	0.96	Na	6.54	7.41	6.52
S. Africa	1.38	0.02	0.88	2.06	-0.45	9.40	1.43	8	9.40	10.2	8.38
Sri Lanka	0.31	0.15	0.03	0.18	-2.33	4.52	1.00	7	4.52	6.31	2.97
Thailand	1.02	0.11	0.50	0.63	-0.72	8.52	1.95	9	8.52	8.77	6.10
Turkey	0.20	0.10	0.39	0.28	0.67	6.65	1.05	12	6.65	6.32	5.93
Ave. for EMs	0.46	0.10	0.30	0.62	-0.70	6.44	1.41	9.46	6.44	7.46	5.36

Notes: [*]: Structure indices measure whether a country's financial system is market- or bank-dominated; the higher the measure, the more the system is dominated by markets. Specifically, "structure activity" is equal to log(value traded/bank credit) and measures size of bank credit relative to trading volume of markets; "structure size" is equal to log(market cap/bank credit) and measures the size of markets relative to banks; "structure efficiency" is equal to log(market cap ratio×bank NPL ratio) and measures the relative efficiency of markets vs. banks; finally, "structure regulatory" is the sum of the four categories in regulatory restriction, or the degree to which commercial banks are allowed to engage in security, firm operation, insurance, and real estate: 1-unrestricted; 2-permit to conduct through subsidiary; 3-full range not permitted in subsidiaries; and 4-strictly prohibited.

[**]: Financial development variables measure the entire financial system (banking and market sectors combined), and the higher the measure, the larger or more efficient the financial system is. Specifically, "finance activity" is equal to log (total value traded ratio×private credit ratio), "finance size" is equal to log (market cap ratio×bank private credit ratio), and "finance efficiency" is equal to log (total value traded ratio/bank NPL ratio).

ratio as an alternative measure of efficiency and use this variable to define other efficiency measures in Table 19.

The next two columns of Table 19 ("Structure indices") compare the relative importance of financial markets vs. banks, with a lower score indicating that banks are more important relative to markets. China's score for "Structure size" (Log of the ratio of Market Capitalization/Total Bank Credit) is positive, suggesting that the size of total market capitalization is actually larger than that of bank credit, and the score is greater than the average of other emerging economies; its score for "Structure Activity" (Log of the ratio of Float supply of market cap/Total Bank Credit) is negative, indicating that float supply fraction of the market cap is still smaller than bank credit, and it is similar to the average of other emerging economies. Taken together these numbers suggest that the financial system of most emerging economies, including that of China, remains bank-dominated. In terms of "Structure efficiency" (Log of product (Market capitalization/GDP) × (bank NPLs/bank total loans)), which denotes the relative efficiency of markets vs. banks, China has a higher score than most other developing countries, suggesting that its banks are relatively less efficient than markets compared to other countries. "Structure regulatory" measures (based on 2005 data) the extent to which commercial banks are restricted to participate in activities outside commercial lending, and China's score of 16 is higher than most other countries, suggesting that by law commercial banks in China face tight restrictions in operating in other areas.

We also compare the development of the financial system ("Financial Development"), including both banks and markets (the last three columns of Table 19). China's overall financial market size, in terms of both "Finance Activity" (Log of product of (Float supply of market/GDP) × (Bank credit/GDP)) and "Finance Size" (Log of product of (Market capitalization/GDP) + (Bank credit/GDP)), are larger than the averages of other emerging countries. In terms of "Finance Efficiency" (Log of (Total floating supply/GDP)/Bank NPLs Ratio), China's measure is slightly

higher than the average of other emerging countries. Based on the evidence from the past decade, we can conclude that China's banks and markets, or the formal sectors of the financial system, are as large as or larger than other major emerging economies (relative to its size of the economy). However, the banking sector does not lend much to the Hybrid Sector, which as we will see in Section 3.5, is the dynamic part of the economy.

A related question to the size of banks and markets is where do most firms get the capital and funds? As shown in AQQ (2005, 2008), the four most important financing sources for all firms in China, in terms of firms' fixed asset investments, are, (domestic) bank loans, firms' self-fundraising, the state budget and FDI, with self-fundraising and bank loans carrying most of the weight. Self-fundraising, falling into the category of alternative finance (non-bank, non-market finance), includes proceeds from capital raised from local governments (beyond the state budget), communities and other investors, internal financing channels such as retained earnings and all other funds raised domestically by the firms. The size of total self-fundraising of all firms has been growing at an average annual rate of 23.6% over the period of 1994-2009, and reached $2,213.2 billion at the end of 2009, compared to a total of $565.7 billion for domestic bank loans for the same year. It is important to point out that equity and bond issuance, which are included in self-fundraising (but fall into the category of formal external finance), apply only to the Listed Sector, and account for a small fraction of this category.

While the Listed Sector has been growing fast, SOEs are on a downward trend, as privatization of these firms is still in progress. Around 30% of publicly traded companies' funding comes from bank loans, and this ratio has been very stable. Around 45% of the Listed Sector's total funding comes from self-fundraising, including internal financing and proceeds

from equity and bond issuance. Moreover, equity and bond sales, which rely on the use of external markets, only constitute a small fraction of total funds raised in comparison to internal financing and other forms of fundraising. Combined with the fact that self-fundraising is also the most important source of financing for the State Sector (45% to 65%), we can conclude that alternative channels of financing are important even for the State and Listed Sectors.

Not surprisingly, self-fundraising plays an even more important role for firms in the Hybrid Sector, accounting for close to 60% of total funds raised, while individually owned companies, a subset of the Hybrid Sector, rely on self-fundraising for 90% of total financing. Self-fundraising here includes all forms of internal finance, capital raised from family and friends of the founders and managers, and funds raised in the form of private equity and loans. Since firms in this sector operate in an environment with legal and financial mechanisms and regulations that are probably poorer than those available for firms in the State and Listed Sectors, financing sources may work differently from how they work in the State and Listed Sectors, and those in developed countries. In Allen, Chakrabarti, De, Qian, and Qian (ACDQQ, 2008), the authors argue that alternative finance channels, substitute for formal financing channels through banks and markets, and expand the capacity of financial systems in emerging countries such as China and India.

3.3 The Banking and Intermediation Sector

In this section, we examine the status of China's banking and intermediation sector. After reviewing aggregate evidence on bank deposits and loans, we analyze the size and time trend of NPLs. Finally, we review evidence on the growth of non-state banks and financial

intermediaries.

3.3.1 Aggregate Evidence on Bank Deposits and Loans

As in other Asian countries, China's household savings rates have been high throughout the reform era. Given the growth of the economy, the sharp increase in personal income, and limited investment opportunities, it is not surprising that total bank deposits from individuals have been growing fast since the mid-1980s. From Figure 19-A, residents in metropolitan areas contribute the most to total deposits beginning in the late 1980s (roughly 50%), while deposits from enterprises (including firms from all three sectors) provide the second most important source. The role of deposits from government agencies and organizations (including non-profit and for-profit organizations, not shown in the figure) has steadily decreased over time.

Components of Bank Deposits
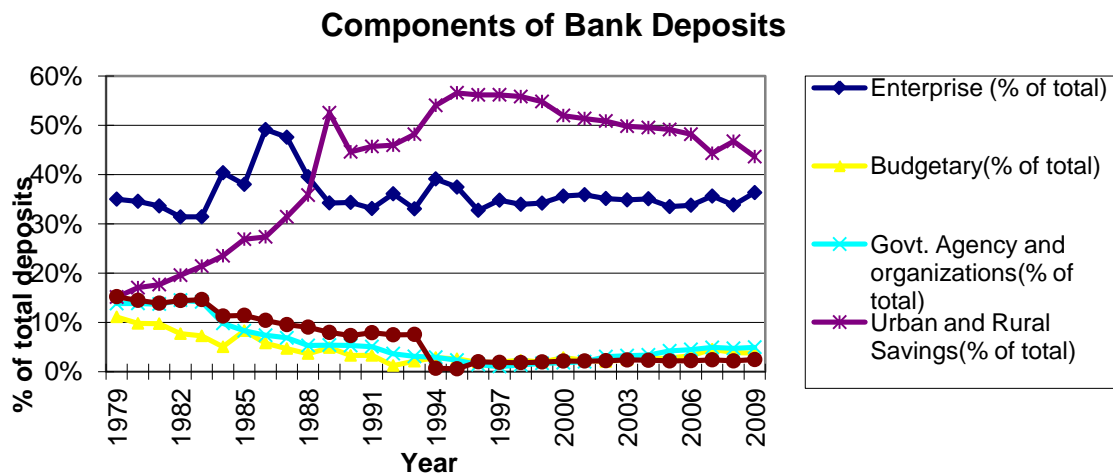
Figure 19-A Sources for Bank Deposits in China

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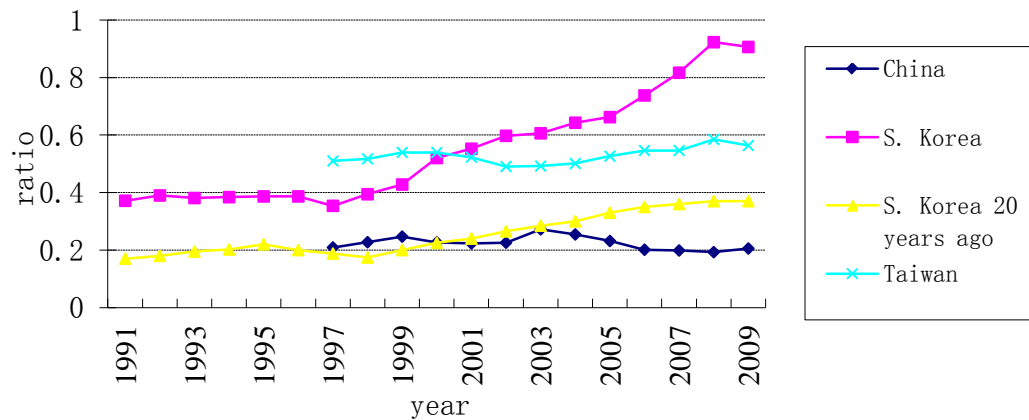
Figure 19-B Comparing Total Bank Credit extended to private/hybrid sectors

Table 20-A Comparisons of Total Savings and Deposits (in US$ billions)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
China												
Demand deposits[a]	320	391	465	533	647	777	899	1030	1265	1671	1931	2683
Savings deposits[b]	606	674	722	820	961	1143	1445	1748	2069	2363	3187	3811
Time deposits[c]	100	114	136	171	199	253	307	410	676	878	1205	1661
Time & Savings Dep/GDP	68%	73%	72%	75%	80%	85%	91%	95%	101%	92%	100%	114%
Japan												
Demand deposits[a]	1793	2259	2073	1838	2567	3523	3795	3541	3523	3683	4560	-
Time, savings & foreign currency deposits	7921	8997	8059	5351	5383	5416	5448	4642	4536	4778	6160	-
Time & Savings Dep/GDP	181%	185%	184%	142%	131%	118%	114%	109%	106%	106%	110%	-
South Korea												
Demand deposits[a]	18	22	23	27	36	38	46	54	67	66	50	63
Time, savings & foreign currency deposits	185	251	289	315	383	410	467	485	546	543	471	574
Time & Savings Dep/GDP	46%	54%	61%	64%	63%	64%	58%	57%	56%	52%	58%	63%
India												
Demand deposits[a]	24	28	31	32	35	44	60	71	89	114	96	119
Time, savings & foreign currency deposits	140	161	175	198	235	277	333	368	460	647	653	800
Time & Savings Dep/GDP	34%	36%	39%	42%	46%	46%	46%	46%	49%	54%	59%	60%

Source: IMF and CEIC database

Notes: [a]: Demand deposits, balance of the accounts can be withdrawn on demand of customers (e.g., check-writing); [b]: Savings deposits, interest-bearing accounts that can be withdrawn but cannot be used as Money (e.g., no checking writing); [c]: Time deposits, savings accounts or CD with a fixed term.

Table 20-B Breakdown of Bank Loans (end-of-year figures in RMB billions)

Year	Total Loans	Short-term Loans	Industrial Loans	Commercial Loans	Infrastructure Construction Loans	Agricultural Loans	Loans to TVEs	Privately Owned Firms	Joint Ventures, Cooperative Firms
1994	3,997.60	2,694.8	994.83	1,050.98	61.72	114.39	200.	15.59	79.23
1995	5,054.41	3,337.2	1,177.4	1,283.71	79.93	154.48	251.	19.62	99.91
1996	6,115.66	4,021.0	1,421.3	1,533.26	97.38	191.91	282.	27.98	134.63
1997	7,491.41	5,541.8	1,652.6	1,835.66	159.11	331.46	503.	38.67	189.10
1998	8,652.41	6,061.3	1,782.1	1,975.24	162.87	444.42	558.	47.16	248.75
1999	9,373.43	6,388.7	1,794.8	1,989.09	147.69	479.24	616.	57.91	298.58
2000	9,937.11	6,574.8	1,701.9	1,786.85	161.71	488.90	606.	65.46	304.98
2001	11,231.47	6,732.7	1,863.6	1,856.34	209.96	571.15	641.	91.80	326.35
2002	13,129.39	7,424.7	2,019.0	1,797.31	274.80	688.46	681.	105.88	269.74
2003	15,899.62	8,366.1	2,275.6	1,799.44	300.21	841.14	766.	146.16	256.94
2004	17,819.78	8,684.0	2,389.6	1,707.41	278.01	984.31	806.	208.16	219.84
2005	19,469.04	8,744.9	2,251.6	1,644.76	298.37	1,152.99	790.	218.08	197.53
2006	22,534,72	9,853.4	2,865.4	1,667.15	361.26	1,320.82	622.	266.76	183.27

Source: Statistical Yearbooks of China, CEIC database (1985 – 2009).

Table 20-A compares total savings and bank deposits in China, Japan, South Korea, and India during the period 1997-2009. In terms of the ratio of Time and Savings Deposits/GDP, China maintains the highest or second highest level (an average of over 90% in recent years), while Japan leads the group in terms of total amount. Looking at the breakdown of bank deposits, interest-bearing "savings deposits" are by far the most important form of deposits in China, providing a good source for bank loans and other forms of investment. Figure 19-B compares total (nonstate) bank credit (over GDP) extended to Hybrid Sector firms in China, and privately owned firms (including those publicly listed and traded) in Taiwan and South Korea. For South Korea, we also plot the bank credit ratios during its high economic growth period of the 1970s and 1980s (each year appearing on the horizontal axis indicates the time period for China, while a particular year minus 20 indicates the time period for South Korea). We can see that the scale and growth of China's 'hybrid' bank credit during 1991-2009 are far below those (of private bank credit) of Taiwan and South Korea in the same period, but are similar to those

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of South Korea twenty years ago.

Table 20-B breaks down China's bank loans by maturities, loan purposes, and borrower types during the period 1994-2009. While there has been a shift from short-term to long-term loans (first two columns), the majority of loans goes to SOEs in manufacturing industries ("Industrial Loans" and "Commercial Loans"). Most of the "Infrastructure/Construction Loans" (a small component of total loans) fund government sponsored projects, while the size of "Agricultural Loans" is much smaller. More importantly, the size of loans made to TVEs, privately- and collectively-owned firms, and joint ventures (last 3 columns), which all belong to the Hybrid Sector, is also much smaller. Consistent with the aggregate evidence from Section 3.2 above and our firm-level evidence below, we find that bank loans have been one of the important financing sources for Hybrid Sector firms, but the majority of the bank loans goes to the State and Listed Sectors. Researchers have argued that the imbalance between loans made to the State Sector and the Hybrid Sector reflects the government's policies of wealth transfer from the Hybrid Sector to the State Sector via state-owned banks (e.g., Brandt and Zhu, 2000).

3.3.2 An Analysis of NPLs and Further Reform of the Banking Sector

China's banking sector is dominated by large state-owned banks, namely, the "Big Four" banks of ICBC, BOC, PCBC, and ABC. The dominance of the Big Four banks also implies that the degree of competition within the banking sector has been low. For example, Demirgüç-Kunt and Levine (2001) compare the five-bank concentration (share of the assets of the five largest banks in total banking assets), and find that China's concentration ratio of 91% at the end of 1997 (and for much of 1990s) is one of the highest in the world. However, China's

concentration ratio has been falling sharply since 1997 with the entrance of many non-state banks and intermediaries.

The most significant problem for China's banking sector, and for the entire financial system during the last decade, was the amount of NPLs within state-owned banks, and in particular, among the Big Four banks. Reducing the amount of NPLs to normal levels was a high priority for China's financial system. We mainly rely on official sources for our analysis on NPLs, but we also speculate based on data from non-government sources, including case studies from particular regions or banks. Some of this data and speculations paint a much gloomier picture of the NPLs and China's state-owned banks than the official data suggests.

3.3.2.1 Comparing NPLs and Reducing NPLs in China

In Panel A of Table 21-A, we compare NPLs in China, the U.S., and other major Asian economies during 1998-2010 based on official figures. NPLs are measured by their size (in US$ billion) and as a percentage of GDP in the same year (shown in brackets). Notice that the official information on China's NPLs first became available in 1998, but the figures in 1998 and 1999 in Table 21-A probably significantly under-estimate the actual size of NPLs; this also explains the jump in the size of China's NPLs from 1999 to 2000. China's NPLs are the highest in the group from 2000 to 2007, and as high as 20% to 22.5% of GDP (in 2000 and 2001). The cross-country comparison includes the period during which Asian countries recovered from the 1997 financial crisis (e.g., the size of NPLs in South Korea exceeded 12% of GDP in 1999 but it was reduced to below 3% two years later), and the period during which the Japanese banking system was disturbed by the prolonged NPL problem (the size of Japan's NPLs is the second

largest of the group throughout the period). However, the level of NPLs (over GDP) in China has

shown a clear downward trend since the peak in 2000-2001, with the total amount of NPLs also

falling during 2004-2010. In fact, with the banking sector in most developed countries struggling

with the ongoing global financial crisis, China's banking sector has done quite well, with its total

NPLs in 2010 ($68.1 billion) only one seventh of that of the U.S. and the ratio of NPLs over GDP

falling below that of the U.S. as well.

As bad as some of the NPL numbers in early years in Panel A of Table 21-A appear, they

may still significantly underestimate the amount of NPLs within China's banking system

according to some critics. First, the official figures on outstanding NPLs (cumulated across all

commercial banks in China) do not include the bad loans that have been transferred from banks

to four state-owned asset management companies (AMCs)—with the purpose of liquidating

these bad loans. For example, if we add the NPLs held by the four AMCs (book value of RMB

866 billion, or $125.5 billion, shown in the last row of Table 21-B) in the first quarter of 2006 to

the mix of NPLs shown in Panel A of Table 21-A, the total amount of China's NPLs would increase

by two-thirds. Second, the classification of NPLs has been problematic in China. The Basle

Committee for Bank Supervision classifies a loan as "doubtful" or bad when any interest

payment is overdue by 180 days or more (in the U.S. it is 90 days); whereas in China, this step

has not typically been taken until the principal payment is delayed beyond the loan maturity

date or an extended due date, and in many cases, until the borrower has declared bankruptcy

and/or has gone through liquidation. Qiu et al. (2000) estimate that the ratio of loan interest

paid to state-owned banks over loan interest owed is on average less than 50% in 1999,

suggesting that the actual ratio of NPLs over total loans made can be higher than 50% in 1999.

This piece of evidence, along with others, suggests that the amount of NPLs (and as a

percentage of GDP) could be twice as large as the official figures reported in Panel A of Table 21-A.[46]

Since a large fraction of the NPLs among state-owned banks, and in particular, the Big Four banks, resulted from poor lending decisions made for SOEs, some of which were due to political or other non-economic reasons, it can be argued that the natural party to bear the burden of reducing the NPLs is the government. This view of essentially treating NPLs as a fiscal problem implies that the ultimate source of eliminating NPLs lies in China's overall economic growth.[47] As long as the economy maintains its strong growth momentum so that tax receipts also increase, the government can always assume the remaining (and new) NPLs without significantly affecting the economy. In this regard, Panel B of Table 21-A compares total outstanding government debt, and Panel C presents a comparison of the ratio of (NPLs + Government Debt)/GDP across countries, with the sum of NPLs and government debt indicating the total burden of the government. Depending on data availability, total government debt is either measured by the sum of all types of domestic and foreign debt (the U.S., Japan, and India), or by the level of outstanding government bonds (all other countries) in a given year.

Unlike the severity of its NPL problem in the early 2000s, the Chinese government has not issued a large amount of debt, with total outstanding government bonds growing from only 9% of GDP in 1998 to around 20% of GDP in 2010. By contrast, countries such as the U.S. and India have a large amount of government debt. Japan is the only country in the group that has a large amount of NPLs *and* government debt for most of the period. When we combine the

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[46] Consistent with this view, Lardy (1998) argues that, if using international standards on bad loans, the existing NPLs within China's state-owned banks as of the mid-1990s would make these banks' total net worth negative, so that the entire network of state banks would have been insolvent.

[47] See, for example, Perkins and Rawski (2008) for a review and projections on the prospects of long-run economic growth and statistics in China.

results from Panels A and B and compare the total government burden in Panel C, we use two sets of ratios for U.S. and Japan. In addition to using total outstanding government debt, we use ratios (in the brackets) based on the sum of *net* government debt and NPLs, where net government debt is the difference between government borrowing (a 'stock' measure) and government lending (also a stock measure); not surprisingly, these ratios are much lower than using the gross figures.

From Panel C, China's total government burden is in the middle of the pack: the ratios of total government burden over GDP (using the official NPL figures) are significantly lower than those in Japan, the U.S., and India, are comparable with those of Taiwan and Korea, and are higher than Indonesia only. In recent years, even if we double the size of the official NPL figures, China's total government burden would not increase much as the total amount of NPLs is small relative to the size of GDPs. Based on these crude comparisons, going forward it seems that the NPLs should not be an arduous burden for the Chinese government (or the banking sector), while the same cannot be said for Japan and the U.S. Caution is needed for this conclusion: first, new NPLs in China may grow much faster than other countries as the government's recent massive economic stimulus plan led to a significant increase in new loans made during 2008-2009, including many questionable loans to local governments[48]; and second, China's currently small government debt may experience a sharp increase in the near future given the need for higher fiscal spending in areas such as pension plans and other social welfare programs.

Recognizing the importance of and its responsibility in reducing NPLs in the Big Four

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[48] According to senior officials from the CBRC, Chinese banks are facing default risks on more than one-fifth of the RMB7,700bn ($1,135bn) loans they have made to local governments across the country; most of these loans were used to fund regional infrastructure projects (*Financial Times*, 08/01/2010). In July 2011, Moody estimated that local government loans can be as high as RMB14.2 trillion, and the NPL ratio for Chinese banks could be 8-12% (*Reuters*, 07/05/2011).

banks, the Chinese government injected large amounts of foreign currency reserves (mostly in

the form of US dollars, T-bills, Euros and Yen) into these banks to improve their balance sheets

in preparation for going public. This process began at the end of 2003, with the establishment

of the Central Huijin Investment Company, through which the PBOC injected US$45 billion of

reserves into the BOC and PCBC, while ICBC (the largest commercial bank in China and one of

the largest in the world in terms of assets) received US$15 billion during the first half of 2005. In

2008, ABC received US$19 billion from Huijin in spite of the global financial crisis. All Big Four

banks have since become publicly listed and traded on either the HKSE and/or the SHSE,

including ABC (the last of the Big Four), which completed its IPO on July 15, 2010 (SHSE) and July

16 (HKSE).

However, the injection plan will not prevent new NPLs from originating in the banking

system. In fact, it may create perverse "too big to fail" incentives for state-owned banks, in that

if these banks believe that there will be a 'bailout' whenever they run into future financial

distress, they have an incentive to take on risky, negative-NPV projects. This moral hazard

problem can thwart the government's efforts in keeping the NPLs in check, while similar

problems occurred during and after the government bailouts in the S&L crisis in the U.S. in the

1980s (e.g., Kane 1989, 2003) and are among the most significant factors that caused the

ongoing financial crisis. In this regard, a credible commitment from the government that the

capital injection plan is a one-time measure to boost the capital adequacy of these banks, and

that there will be no (similar) injection plans in the future can help alleviate the moral hazard

problem.

Another measure taken by the Chinese government to reduce the NPLs is the

establishment of four state-owned AMCs. As discussed earlier, the goal of the AMCs is to assume the NPLs (and offering debt-for-equity swaps to the banks[49]) accumulated in each of the Big Four banks and liquidate them. The liquidation process includes asset sales, tranching, securitization, and resale of loans to investors.[50] Table 21-B shows that *cash* recovery on the bad loans processed by the AMCs ranges from 6.9% to 35% between 2001 and 2006 (first quarter)[51], while the asset recovery rates are slightly higher. A critical issue that affects the effectiveness of the liquidation process is the relationship among AMCs, banks, and distressed or bankrupt firms. Since both the AMCs and the banks are state-owned, it is not likely that the AMCs would force the banks to cut off (credit) ties with defaulted borrowers (SOEs or former SOEs) as a privately owned bank would do. Thus, as the old NPLs are liquidated, new NPLs from the same borrowers continue to surface.

To summarize, NPLs have been considerably reduced in recent years. If the economy can maintain its current pace of growth, the government can always write off a large fraction of the rest (and newly accumulated) of the NPLs to avert any serious problems for China. Again, caution is in place for this optimistic outlook. One can argue that NPLs are bigger than the official statistics suggest to begin with, and that a substantial amount of new NPLs will continue to arise within state-owned banks. If the growth of the economy significantly slows down, while the accumulation of NPLs continues, the banking sector problems could lead to a financial crisis.

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[49] One example is Cinda Asset Management Corporation, which was set up in April, 1999, with a registered capital of RMB 10 billion provided by the Ministry of Finance. It took over RMB 220 billion NPLs from the China Construction Bank and funded its purchase via bond issues.

[50] The sale of tranches of securitized NPLs to foreign investors began in 2002. The deal was struck between Huarong , one of the four AMCs, and a consortium of U.S. investment banks led by Morgan Stanley (and including Lehman Brothers and Salomon Smith Barney) and was approved by the government in early 2003 (*Financial Times,* 05/2003).

[51] The China Banking Regulatory Commission (CBRC), from which we obtained data (for 2004-2009), stopped reporting data on NPLs from AMCs.

This could spill over into other sectors of the economy and cause a slowdown in growth or a

recession.

Table 21-A A Comparison of Non-performing Loans (NPLs) and Government Debt
This table compares total outstanding NPLs within the banking system, government debt, and the ratio of (NPLs + Government Debt)/GDP among China, the U.S., and other major Asian countries for the period 1997-2010. Panel A presents the size of the NPLs, as measured by US$ billion and as the percentage of GDPs in the same year. NPLs in the U.S. measure the outstanding "delinquency loan"; NPLs in Japan measure the "risk management loans" (or loans disclosed under the Financial Reconstructed Law and/or loans subject to self-assessment). In Panel B, outstanding government debt is measured at the end of each year; for the U.S. and Japan, total government debt includes domestic and foreign debt. In Panel C, the ratios for China include using the official NPL numbers and using doubled official NPLs (i.e., the ratios in the brackets are (doubled NPLs + government debt)/GDP); the ratios in the brackets for the U.S. and Japan are (net government debt + NPLs)/GDP, where net government debt is the difference between government borrowing (stock measure) and government lending (flow measure). All figures are converted into U.S. dollars using the average exchange rate within the observation year.

Year	China	U.S.	Japan	Korea	India	Indone	Taiwan
Panel A: Size of NPLs: In US$ billion and as percentage of GDPs in the same year (in brackets)							
	--	66.9 (0.8%)	217.4 (5.1%)	16.2 (3.1%)	--	0.2 (0.1%)	19.6 (6.5%)
1998	20.5 (2.0%)	71.3 (0.8%)	489.7(12.7%)	23.2 (6.7%)	12.7 (3.1%)	5.5 (5.2%)	21.8 (7.9%)
1999	105.1 (9.7%)	72.2 (0.8%)	547.6(12.6%)	54.4(12.2%)	14.0 (3.2%)	3.2 (3.8%)	27.2 (9.1%)
2000	269.3(22.5%)	90.1 (0.9%)	515.4(11.1%)	35.5 (6.9%)	12.9 (2.8%)	6.3 (2.7%)	33.2 (10.3%)
2001	265.3(20.0%)	108.4 (1.1%)	640.1(15.6%)	12.2 (2.5%)	13.2 (2.8%)	4.3 (1.7%)	37.9 (13.0%)
2002	188.4(13.0%)	107.8 (1.0%)	552.5(14.1%)	9.9 (1.8%)	14.8 (3.0%)	3.3 (2.0%)	30.7 (10.4%)
2003	181.2(11.0%)	95.9 (1.0%)	480.1(11.3%)	11.7 (1.9%)	14.6 (2.5%)	4.7 (1.5%)	23.1 (7.7%)
2004	207.4(10.7%)	81.3 (0.9%)	334.8 (7.3%)	10.0 (1.5%)	14.4 (2.2%)	3.8 (2.1%)	26.4 (5.1%)
2005	164.2 (7.3%)	84.6 (0.7%)	183.3 (4.0%)	7.6 (1.0%)	13.4 (1.7%)	6.0 (1.5%)	11.2 (3.2%)
2006	157.4 (5.9%)	103.8 (0.8%)	157.8 (3.6%)	8.2 (0.9%)	11.2 (1.3%)	5.2 (1.4%)	11.3 3.1%
2007	166.8 (5.1%)	168.1 (1.2%)	148.6 (3.4%)	8.3 (0.8%)	13.6 (1.2%)	4.5 (1.0%)	10.0 2.6%
2008	80.6 (1.9%)	328.7 (2.3%)	190.8 (3.7%)	13.0 (1.4%)	15.4 (1.3%)	4.3 (0.8%)	9.0 2.3%
2009	72.6 (1.5%)	477.5 (3.3%)	188.45(3.63%)	13.9 (1.5%)	18.2 (1.3%)	4.6 (1.0%)	6.7 (1.8%)
2010	68.1 (1.1%)	423.4 (2.9%)	208.70(3.82%)	26.8 (2.6%)	20.7 (1.2%)	4.3 (0.6%)	3.8 (0.9%)
Panel B: Outstanding Government Debt ($ billion)							
	Outstanding Government Bond	Total Government Debt	Total Government Debt	Outstanding Treasury Bonds	Total Public Debt	Outstanding Government Bond	Outstanding Government Bond
1997	66.5	5,802.8	4,254.0	5.3	--		
1998	93.8	5,788.8	4,858.0	14.4	178.4		
1999	127.3	5,822.7	6,053.1	28.5	260.2	34.1	46.5
2000	165.1	5,612.7	6,209.8	32.7	232.4	45.1	45.5
2001	188.6	5,734.4	6,036.0	39.8	225.4	43.5	58.7
2002	233.5	6,169.4	6,321.3	45.2	250.2	42.1	77.7
2003	273.0	6,789.7	6,852.9	67.9	259.7	48.0	75.7
2004	311.3	7,335.6	7,446.6	107.0	299.6	44.7	85.2
2005	350.0	7,809.5	8,299.5	165.5	347.1	39.9	86.7
2006	364.6	8,451.4	7,587.1	216.7	375.2	45.7	85.8
2007	599.8	8,950.7	7,707.7	245.0	472.0	51.8	94.5

Year							
2008	701.6	9,985.8	8,966.2	217.8	496.4	52.8	90.4
2009	753.6	12,867.	9,466.8	290.9	556.6	52.5	82.9
2010	805.3	14,551.	11,284.	364.0	643.6	68.4	102.0

Panel C: (NPLs + Outstanding Government Debt)/GDP

Year									
	--	0.71	(0.54)	1.05	(0.40)	0.04	--	--	--
1998	0.11	0.67	(0.50)	1.39	(0.63)	0.11	0.46	--	--
1999	0.21	0.64	(0.45)	1.51	(0.64)	0.19	0.62	0.24	0.25
2000	0.36	0.58	(0.40)	1.45	(0.65)	0.13	0.53	0.31	0.24
2001	0.34	0.58	(0.39)	1.63	(0.83)	0.11	0.50	0.30	0.33
2002	0.29	0.60	(0.42)	1.76	(0.90)	0.10	0.54	0.23	0.37
2003	0.28	0.63	(0.45)	1.73	(0.86)	0.13	0.48	0.22	0.33
2004	0.27	0.63	(0.46)	1.70	(0.81)	0.17	0.47	0.19	0.32
2005	0.23	0.63	(0.47)	1.86	(0.84)	0.22	0.47	0.16	0.27
2006	0.20	0.65	(0.44)	1.78	(0.88)	0.24	0.44	0.14	0.26
2007	0.23	0.66	(0.45)	1.79	(0.89)	0.24	0.44	0.13	0.27
2008	0.18	0.72	(0.50)	1.78	(0.88)	0.25	0.42	0.11	0.25
2009	0.17	0.94	(0.46)	1.55	(1.15)	0.24	0.58	0.11	0.24
2010	0.21	1.01	(0.70)	1.94	(1.20)	0.33	0.45	0.10	0.25

Sources: Statistical Bureau of China, the People's Bank of China, Chinese Banking Regulatory Commission; Board of Governors of the Federal Reserve Bank, Statistical Abstracts of the U.S., the Statistical Bureau of Japan; Ministry of Finance, Korea, the Bank of Korea, Korean Statistical Information System; IMF, World Bank; Bank Indonesia; Ministry of Finance, India; National Statistical Bureau of Taiwan, Bloomberg, Chinabond, and Taiwan financial supervisory commission.

Table 21-B Liquidation of NPLs by Four Asset Management Companies (RMB billion)

This table presents results on the liquidation of NPLs by four state-owned asset management companies in China during the period 2001 to the 1st quarter of 2006. These asset management companies were set up to specifically deal with NPLs accumulated in the 'Big Four' state-owned banks.

	Book value of Assets (Accumulated)	Assets Recovered	Cash Recovered	Asset Recovery Rate (%)	Cash Recovery Rate (%)
			2001		
Hua Rong	23.21	12.54	7.55	54.0	32.5
Great Wall	53.11	6.30	3.69	11.9	6.9
Oriental	18.29	8.51	4.42	46.5	24.2
Xin Da	29.90	22.50	10.49	75.3	35.1
Total	124.51	49.86	26.15	40.0	21.0
			2002		
Hua Rong	32.04	11.43	10.20	35.7	31.8
Great Wall	45.48	7.94	5.47	17.5	12.0
Oriental	22.10	10.60	5.57	47.9	25.2
Xin Da	33.10	17.46	10.51	52.7	31.8
Total	132.73	47.43	31.75	35.7	23.9
			2004		
	Accumulated	Cash	Disposal Ratio	Asset Recovery	Cash
Hua Rong	209.54	41.34	59.77	25.29	19.73
Great Wall	209.91	21.57	61.91	14.43	10.27

Oriental	104.55	23.29	41.42	29.50	22.27
Xin Da	151.06	50.81	48.90	38.29	33.64
Total	675.06	137.00	53.96	25.48	20.29
2005					
Hua Rong	243.38	54.39	69.17	26.92	22.35
Great Wall	263.39	27.35	77.88	12.90	10.39
Oriental	131.76	32.01	52.08	28.73	24.30
Xin Da	201.21	62.84	63.82	34.30	31.23
Total	839.75	176.60	66.74	24.58	21.03
2006 (Q1)					
Hua Rong	246.80	54.66	70.11	26.50	22.15
Great Wall	270.78	27.83	80.11	12.70	10.28
Oriental	141.99	32.81	56.13	27.16	23.11
Xin Da	206.77	65.26	64.69	34.46	31.56
Total	866.34	180.56	68.61	24.20	20.84

Notes: 1. Accumulated Disposal refers to the accumulated amount of cash and non-cash assets recovered as well as loss incurred by the end of the reporting period.

2. Disposal Ratio = Accumulated Disposal / Total NPLs purchased .

3. Asset Recovery Ratio = Total Assets Recovered / Accumulated Disposal.

4. Cash Recovery Ratio = Cash Recovered / Accumulated Disposal.

Source: Almanac of China's Finance and Banking 2002-2005, and the reports of China Banking Regulatory Commission 2004-2009.

3.3.2.2 The Efficiency of State-owned Banks

As discussed above, the size of NPLs in the banking sector critically depends on the efficiency of banks. We briefly discuss measures that have been taken to improve the efficiency of state-owned banks. First, state-owned banks have diversified and improved their loan structure by increasing consumer-related loans while being more active in risk management and monitoring of loans made to SOEs. For example, the ratio of consumer lending to total loans outstanding made from all banks increased from 1% in 1998 to 12% in 2008; by the third quarter of 2009, RMB 4.99 trillion (or $730.4 billion) of outstanding bank loans were extended to consumers. The size of housing mortgages, now the largest component (87% as in the third quarter of 2009) of consumer credit, grew more than 200 times between 1997 and 2008, reaching a total of RMB 4.35 trillion ($637.2 billion), although the speed of growth has slowed

down in 2011, according to the China Quarterly Monetary Policy Report of the PBOC. One

problem with the massive expansion of consumer credit is that China lacks a national consumer-

credit database to spot overstretching debtors, although a pilot system linking seven cities was

set up in late 2004. The deficiency in the knowledge and training of credit risk and diligence of

loan officers from state-owned banks is another significant factor in credit expansion, which can

lead to high default rates and a large amount of new NPLs if the growth of the economy and

personal income slows down.

Accompanying the rapidly expanding automobile industry, the other fast growing

category of individual-based loans is automobile loans, most of which are made by state-owned

banks. The total balance of all China's individual auto loans increased from RMB 400 million

($50 million) in 1998 to RMB 200 billion ($25 billion) at the end of 2003, and as much as 30% of

all auto sales were financed by loans during this period (Financial Times, 05/25/2005). The

growth in both auto sales and loans slowed down significantly since 2004 in part due to the high

default rates. In 2008, outstanding auto loans decreased to RMB 158.3 billion ($23 billion). Only

8% of the auto sales were financed by loans during that year. Shanghai and Beijing have the

largest number of car sales and loans. As many as 50% of debtors defaulted on their car loans in

these cities. There are examples in which loan applications were approved based solely on the

applicants' description of their personal income without any auditing (Barron's, 12/06/2004).

However, the slowdown of the auto loan market was temporary and it quickly resumed its fast

pace of growth, mainly driven by tremendous demand—China has recently overtaken the U.S.

to become the largest auto market in the world. In aggregate auto loans amount to 10%-20% of

the total amount spent on autos. Most loans mature in three to five years.[52]

Second, the ongoing privatization process, including the listing of state-owned banks, is also an effective channel for enhancing efficiency. As state ownerships stakes shrink, these banks can focus more on for-profit goals, and, with more non-state owners entering the mix the strengthening of corporate governance to ensure profit-maximizing is the next step. Panel A of Table 22-A presents the performance of IPOs of the Big Four banks (ABC remains in the State Sector) and that of the Bank of Communications (BComm). A notable case is the IPO of ICBC (see Allen, Qian, Shan and Zhao, 2012 for more details). Simultaneously carried out in the HKSE and SHSE on October 27, 2006, ICBC raised US$21.9 billion, making it the largest IPO (up to that date). The first day (and first week cumulative) return, measured by the net percentage return of the closing price on the first (fifth) trading day over offer price, was almost 15%, suggesting high demand for ICBC's H shares among (foreign) investors. In terms of ownership structure, the state, through various agencies, is by far the largest shareholder, with only 22% of the market cap is 'free float' or tradable. The largest foreign shareholder is Goldman Sachs with its 5.8% ownership stake negotiated before the IPO. The recent IPO of ABC also attracted a lot of attention. The total proceeds from its IPO from HKSE (July 16, 2010) and SHSE (July 15, 2010) reached $22.1 billion, overtaking the ICBC IPO as the world's largest IPO (*Associated Press*, 08/16/2010).[53] In particular, foreign investors, including institutional investors and wealthy families, contributed over 40% of the $12 billion raised from H shares (in the HKSE).[54] While the

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[52] A few foreign lenders (e.g., GM and Ford) were approved to enter China's auto loan market by forming joint ventures with Chinese automakers (*Financial Times*, 05/27/2005).

[53] From Panel A, Table 4A, the total proceeds (in HK$ and RMB) of the ICBC IPO are actually larger than that of ABC's IPO, but given the appreciation of RMB over the period 2006-2010, the proceeds of the ABC IPO are slightly larger measured in US$.

[54] Foreign institutional investors include Qatar Investment Authority ($2.8 billion), Kuwait Investment Authority ($800 million), Britain's Standard Chartered Bank ($500 million), Dutch bank Radobank

first-week stock performance in the two markets was not as impressive as that of ICBC, the fact

that the IPO was carried out successfully during the recovery period following one of the worst

global financial crises is evidence that investors from around the globe have confidence in ABC's

role as a leading institution in the world.

The IPOs of the other three large state-owned banks were also successful in terms of

total proceeds raised, and they all attracted significant foreign ownership at the IPO date as well.

In fact, as shown in Panel B of Table 22-A, four of the 10 largest banks in the world, measured in

market capitalization as of July 2010, are Chinese banks, with ICBC leading the chart and the

newly listed ABC making it into the chart too. In terms of (book) assets, ICBC is the eleventh

largest bank in the world (Panel C); however, given the accounting problems of evaluating

troubled assets related to subprime loans and sovereign debt in troubled Euro Zone countries, it

is possible that ICBC's assets, with virtually no exposure to the U.S. housing markets or European

sovereign debt, could be one of the largest and highest quality in the world. Finally, Moody's

current ratings on these publicly listed banks (on both deposits and loans) range from A to Baa

(highest rating is Aaa); while S&P rates these banks' outstanding bonds between A and BBB

(highest rating is AAA).

There are two imminent issues with the privatization process. The first is related to the

structure of the banking sector, and in particular, whether more competition, including the

entrance of more non-state (domestic and foreign) banks and intermediaries, is good for

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Nederland ($250 million), Australia's Seven Group Holdings Ltd ($250 million) and Singapore's Temasek
Holdings ($200 million); source: ABC's post-IPO news report. However, on a global basis, including
shares that are distributed to various government agencies prior to the IPO, foreign investors only hold 4%
of all of ABC's shares.

improving the efficiency of both the Big Four banks and the entire sector.[55] Another issue is the

government's dual role as regulator and as majority owner. These potentially conflicting roles

can diminish the effectiveness of each of the two roles that the government intends to carry out.

In Section 3.4 below, we consider whether the ongoing process of floating non-tradable

government shares in many listed companies can be applied to the privatization process of

many state-owned banks/institutions. Only after these banks are (majority) owned by non-

government entities and individuals can they unconditionally implement all profit- and

efficiency-enhancing measures. However, in light of what occurred in the developed countries,

where excessive risk-taking and poor risk management and governance in a few large

institutions essentially brought down the entire financial system, the current ownership

structure of the largest Chinese banks, in which the government retains the majority control,

can enhance the regulation of large financial institutions and help to prevent banking and

financial crisis in China and other emerging economies.

Third, reforming the organization structure of banks and providing more incentives to

banks and their employees can improve efficiency. For example, reforms taking place in the

mid-1990s provided local banks with more autonomous power, and after the 1994 reforms,

approved credit volume for specialized banks was based on a maximum ratio between loans and

deposits instead of administrative quota, which provided those banks with greater flexibility to

use within-bank transfers to adjust fund allocation.[56] The reforms also provide more profit

incentives for managers. The evaluation criteria changed from adherence to the national credit

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[55] For example, with a sample of both state- and non-state owned banks, Berger et al. (2009) show that the addition of foreign ownership stakes into banks' ownership structure is associated with a significant improvement of bank efficiency.
[56] These reforms did not liberalize interest rates; the PBOC continues to set the range (upper and lower bounds, or base rate and floating range) within which interest rates can be set; relending was also centralized by the PBOC.

plan to "a combination of profits made by the bank branch, attention to cost control, investment in fixed capital of the branch, deposit increases, and reduction of overdue loans" (Park and Sehrt, 2001, p619).

A critical aspect of the decentralization process is to provide individuals with more authority and responsibilities. According to a number of theories (e.g., Stein, 2002), these changes improve the quality of 'soft' information produced by banks, an essential part of the lending process. Under the old regime, decision making of the entire lending process was group-based and no individual loan officers were held responsible for poor decisions. Facing imminent pressure from competitors (including foreign banks) following China's entrance to WTO in 2001, many state-owned banks began implementing new lending policies in 2002. These new policies grant more authority to individuals in charge of different steps of making loans and monitoring borrowers and hold them responsible (ex post) for poor performance; decisions such as the final approval of loan contracts are left to a group of senior employees (through voting). Using detailed loan-level data from a large state-owned bank with branches throughout the country, Qian, Strahan and Yang (2011) find that an internal risk assessment measure has a more pronounced effect, relative to publicly available information ('hard' information), on both pricing (interest rates) and nonpricing terms (loan size) of loan contracts after the reform and becomes a better predictor of loan outcomes. They also show that when the loan officer and the branch president who approves the loan contract work together for a longer period of time, the rating has an incrementally stronger effect on loan contracts. These results highlight how organizational structure and incentives can affect the production and quality of soft information. Better information, in turn, expands the supply of credit and improves (lending) outcomes.

One problem that hinders banks' efforts in improving efficiency is poor and inconsistent enforcement of bankruptcy laws and creditor protection. China's first bankruptcy law, passed in 1986, governed only SOEs and had little impact in practice. The new bankruptcy law, enacted in August 2006 and effective on June 1, 2007, applies to all enterprises except partnerships and sole proprietorships. In many aspects the new law resembles bankruptcy laws in developed countries. For example, it introduces the bankruptcy administrator, who manages the assets of the debtor after the court has accepted the bankruptcy filing. Moreover, the law states that these administrators should be independent professionals, such as those working for law or accounting firms. Despite all the legal procedures specified by the law, enforcement of the law remains weak and inconsistent. Many distressed and insolvent firms are kept afloat, and almost all the listed firms that file for bankruptcy end up with restructuring plans and these firms are rarely delisted.[57]

A number of reasons can explain the weak enforcement of the bankruptcy law. There are regulations and circulars issued by the central government applicable to SOE bankruptcies that are *de facto* in priority over the Law. A good example is Doctrine #10 of the State Council, which governs the bankruptcy process of SOEs in 111 pilot cities. This doctrine requires approval from secured/senior creditors (e.g., banks) before an enterprise can go through bankruptcy proceedings. In reality, however, the bankruptcy court also requires the consent of local government (Fan et al., 2008). Since local governments are usually responsible for the settlement of workers displaced by bankrupt firms, it is in their best interest to halt the

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[57] According to the National Development and Reform Commission, 67,000 small and mid-sized enterprises were shut down in the first half of 2008, but only 2,955 bankruptcy cases were filed nationwide for the same year. When a listed firm is in distress (with the "ST" flag), typically other (nonlisted) firms will invest in and restructure the ST firm to avoid delisting, since the 'shell' of the distressed firm is valuable given the difficult and costly process of IPOs.

bankruptcy filing until a satisfactory settlement plan is reached. As a result, mergers and acquisitions with other firms are preferred to bankruptcy, and it has been documented that M&As have been indeed used extensively to resolve firms' distress (e.g., Kam et al., 2008), and many bankruptcies cases are postponed or avoided. In fact, when in distress, both the SOEs and local government give the greatest priority to employees; local government favors SOEs over banks since SOEs provide more employment opportunities. Furthermore, banks are often reluctant to push for bankruptcy since most of the distressed debt would be written off; the recovery rate for most bank loans is less than 10% (World Bank, 2001). Taking the defaulted firm to court to recover loans or seize the firm's assets is a lengthy process and the chances of winning are slim; as a result, only a small number of lawsuits involving bankrupt firms reach the courts.

For insolvent SOEs, what triggers the bankruptcy procedure is not their financial status *per se*, but whether they can get preferential treatment from the government. The average number of bankruptcy cases placed on file (by courts) was 277 per year during 1989-1993. This then jumped to 5,900 per year between 1994 and 2003, after the Capital Structure Optimization Program for industrial SOEs was implemented in several pilot cities.[58] The number of cases fell after 2003 partly due to the central government's intention to maintain social stability by controlling the number of bankruptcies; the Supreme People's Court also ruled in 2002 that the courts would not process bankruptcy cases if the main intention were to escape debts. According to the surveys presented by Garnaut, Song and Yao (2004), 90% of CEOs of the surveyed SOEs believe that bankruptcy is actually a feasible channel to evade bank debts. Since

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[58] In China, a court must accept a case petition before deciding whether it should be declined or placed on file for investigation/prosecution; thus the number of cases accepted is always greater than the number of cases placed on file.

the government's program provides preferential treatments including debt write-offs, many SOEs would wait until they are covered by the program before filing for bankruptcy.

As the most senior creditors (secured debt), banks' willingness to lend depends on their bargaining power and ability to seize collateralized assets upon default, and hence ineffective creditor protection not only increases potential losses from bad loans, it also reduces banks' incentive to investigate and monitor borrowers.[59] The favorable treatment SOEs enjoy during distress adversely change their incentives in investment and corporate governance, these effects can also spill over into banks' decisions to lend to non-state firms and reduce the credit access of these firms. Therefore, *consistent* regulation guidelines in dealing with distress and bankruptcy by different types of firms, along with the government's commitment to leave the decision process to professionals and courts, can benefit the development of credit markets. On the other hand, we discuss evidence below that informal dispute resolution mechanisms outside the legal system based on reputation and relationships has been an effective substitute for Chinese firms and investors.

Table 22-A Chinese Banks' IPOs and Comparison with Other Banks

This table presents information on the IPOs of the Big Four banks and that of Bank of Communications (BComm). BOC, ICBC and ABC were listed in both the HKSE (HK dollar) and SHSE (RMB), while PCBC and BComm only listed shares on the HKSE. First day (first week) return is percentage return of closing price of first day (fifth trading day) over offer price. Foreign ownership indicates size of ownership stakes of foreign institutions and investors at the date of IPOs.

Panel A Performance of Chinese Banks' IPOs

	ICBC		BOC		PCBC	BComm	ABC*	
	HKSE (HK$)	SHSE (RMB)	HKSE (HK$)	SHSE (RMB	HKSE (HK$)	HKSE (HK$)	HKSE (HK$)	SHSE (RMB

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[59] With a large sample of syndicated loans around the globe, Qian and Strahan (2007) show that strong creditor protection (in borrower countries) enhances loan availability as lenders are more willing to provide credit on favorable terms (e.g., longer maturities and lower interest rates).

IPO Date	10/27/2006	10/27/2006	6/01/2006	7/05/2006	10/27/2005	6/23/2005	7/15/2010	7/16/2010
Offer Price	3.07	3.12	2.95	3.08	2.35	2.5	3.2	2.68
Proceeds	124.95	46.64	82.86	20.00	59.94	14.64B	93.8B	68.5B
1st Day	14.66%	5.13%	14.41	22.73	0.00%	13.00%	2.2%	1%
1st Week	16.94%	4.81%	19.49	19.16	-	13.00%	9.1%	1.9%
Foreign Ownership	7.28%	--	14.40%	--	14.39%	18.33%	40.8%	--

Source: IPO prospectuses submitted to SHSE and HKSE; SHSE and HKSE.

*: In USD, ABC raised $22.1 billion from its IPO, beating the record of $21.9 billion from ICBC's IPO. However in terms of RMB, ICBC still holds the record of largest IPO since RMB has appreciated significantly since 2006.

Panel B Top 10 Banks Measured by Market Capitalization ($billion)

Rank	Bank Name	HQ Country	Market Cap. $B(July. 16th, 2010)	Total Return (%) YTD
1	IND & COMM BK	China	214.51	-20.14
2	CHINA CONST BANK	China	189.04	-1.99
3	HSBC HLDGS PLC	U.K.	166.51	-15.40
4	JPMORGAN CHASE	U.S.	155.17	-6.06
5	BANK OF AMERICA	U.S.	140.26	-7.06
6	WELLS FARGO & CO	U.S.	136.71	-2.46
7	BANK OF CHINA	China	130.29	1.71
8	AGRICULTURAL BANK	China	128.60	0.4
9	CITIGROUP INC	US	113.00	17.82
10	BANCO SANTANDER	Spain	102.77	-21.87

Source: *Bloomberg*.

Panel C Top 20 Banks Measured by Total Assets (July 2010; $trillion)

Rank	Bank Name (HQ Country)	HQ Country	Total Assets ($trillion)
1	BNP PARIBAS	France	2.95
2	ROYAL BANK SCOTLAN	UK	2.68
3	HSBC HLDGS PLC	UK	2.36
4	BANK OF AMERICA	U.S	2.36
5	DEUTSCHE BANK-RG	Germany	2.26
6	CREDIT AGRICOLE	France	2.23
7	BARCLAYS PLC	U.K.	2.23
8	MITSUBISHI UFJ F	Japan	2.18
9	JPMORGAN CHASE	U.S.	2.01
10	CITIGROUP INC	U.S.	1.94
11	**IND & COMM BANK**	**China**	**1.73**
12	MIZUHO FINANCIAL	Japan	1.67
13	LLOYDS BANKING	U.K.	1.66

14	BANCO SANTANDER	Spain	1.55
15	**CHINA CONST BA-H**	**China**	**1.48**
16	SOC GENERALE	France	1.47
17	SUMITOMO MITSUI	Japan	1.32
18	**AGRICULTURAL BANK**	**China**	**1.30**
19	UBS AG-REG	Switzerland	1.29
20	UNICREDIT SPA	Italy	1.28

Source: Bloomberg (based on latest filings), July 15th, 2010.

3.3.3 Growth of Non-state Financial Intermediaries

The development of both non-state banks and other (state and non-state) financial institutions will allow China to have a stable and functioning banking system in the future. In addition to boosting the overall efficiency of the banking system, these financial institutions provide funding to support the growth of the Hybrid Sector.

First, we examine and compare China's insurance market to other Asian economies (South Korea, Taiwan, and Singapore). In terms of the ratio of total assets managed by insurance companies over GDP (Figure 19-C), China's insurance market is significantly smaller than that of other economies. At the end of 2009 total assets managed are only about 10% of GDP, while this ratio for the other three economies is over 30%. It is clear that the insurance industry is also significantly smaller compared to China's banking industry, and property insurance is particularly underdeveloped due to the fact that the private real estate market was only recently established (in the past most housing was allocated by employers or the government). Despite the fast growth of insurance coverage and premium income, only 4% of the total population was covered by life insurance. Insurance premiums were only 3.2% of GDP in 2008, standing far behind the global average figure of over 7%; coverage ratios for property insurance are even lower (according to the reports by KPMG LLP). However, coverage ratios

have been growing steadily at an average annual rate of 6% between 1998 and 2005 (XinHua News). In 2008 the insurance industry in China grew at the fastest pace (40%) since 2002. In the first quarter of 2010, China Insurance Regulatory Committee announced that China's insurance premiums totaled RMB 454.14 billion, representing an increase of 38.6 percent year on year.

Assets Managed by Insurance Companies
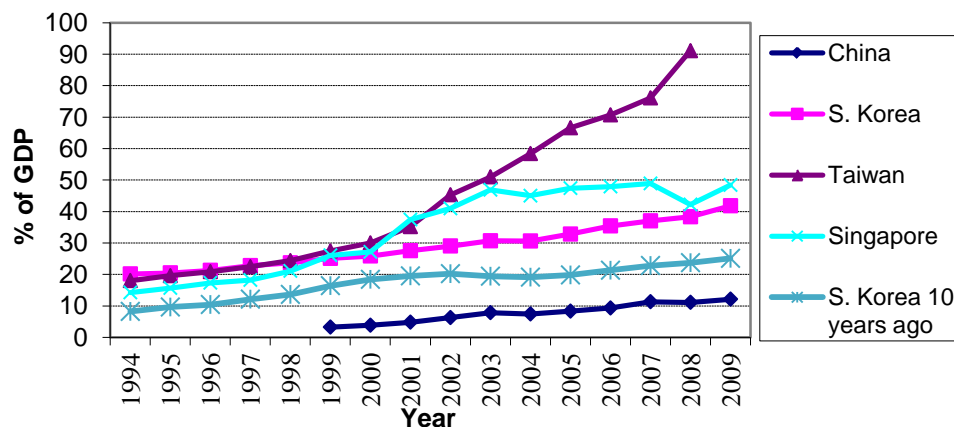
Figure 19-C A Comparison of Assets Under Management of Insurance Companies

Table 22-B State-owned and Private Banks in China (RMB billion)

Types of Banks	Total Assets	Total Deposits	Outstanding Loans	Profit[1]	NPL rate (%)
			2009		
Big Five Banks	40,089.0	29,506.5	20,151.7	400.1	1.8
Other Commercial Banks	17,465.0	15,041.5	9,606.6		
1) Joint Equity	11,785.0	10,548.7	6,707.4	92.5	1.0
2) City Commercial Banks	5,680.0	4,492.8	2,899.2	49.7	1.3
Foreign Banks	1,349.2	668.8	727.1	6.5	0.9
Urban Credit Cooperatives	27.2	39.5		0.2	
Rural Credit Cooperatives	5,492.5	4,742.1	5,421.3	22.8	
			2008		
Big Five Banks	31,836.0	23,696.1	15,029.3	354.2	2.8
Other Commercial Banks	12,941.2	11,072.2	7,162.4		
1) Joint Equity	8,809.2	7,801.8	5,054.5	84.1	1.3
2) City Commercial Banks	4,132.0	3,270.4	2,107.9	40.8	2.3
Foreign Banks	1,344.8	533.5	762.1	11.9	0.8

Urban Credit Cooperatives	80.4	76.2		0.62	
Rural Credit Cooperatives	5,211.3	4,173.6	3,753.2	21.9	
2007					
Big Five Banks	28,007.0	20,067.7	13,850.9	246.6	8.05
Other Commercial Banks	10,589.9	9,023.3	5,684.4		
1) Joint Equity	7,249.4	6,432.0	4,001.9	56.4	2.15
2) City Commercial Banks	3,340.5	2,591.4	1,682.6	24.8	3.04
Foreign Banks	1,252.5	390.0	700.0	6.1	0.46
Urban Credit Cooperatives	131.2	134.1	84.7	0.77	
Rural Credit Cooperatives	4,343.4	3,534.9	3,256.1	19.3	
2006					
Big Five Banks	24,236	18,285.1	11,426.2	197.5	9.22
Other Commercial Banks	8,038.4	7512.8	5526.6		
1) Joint Equity	5,444.6	5,396.5	4,156.9	43.4	2.81
2) City Commercial Banks	2,593.8	2,116.2	1,369.7	18.1	4.78
Foreign Banks	927.9	244.0	485.9	5.8	0.78
Urban Credit Cooperatives	183.1	157.9		1.0	
Rural Credit Cooperatives	3,450.3	3,040.2	2,747.6	18.6	
2005					
Big Five Banks[2]	21,005.0	16,283.8	10,224.0	156.1	10.49
Other Commercial Banks	6,502.2	6,261.1	4,576.6		
1) Joint Equity	4,465.5	4,570.0	3,487.7	28.9	4.22
2) City Commercial Banks	2,036.7	16,91.2	1,088.9	12.1	7.73
Foreign Banks	715.5	179.3	363.8	3.7	1.05
Urban Credit Cooperatives	203.3	181.3	113.1	0.9	
Rural Credit Cooperatives	3,142.7	2,767.4	2,319.9	12.0	
2004					
Big Four Banks	16,932.1	14,412.3	10,086.1	45.9	15.57
Other Commercial Banks	4,697.2	4,059.9	2,885.9	50.7	4.93
1) Joint Equity				17.6	5.01
2) City Commercial Banks	1,693.8	1,434.1	904.5	8.5	11.73
Foreign Banks	515.9	126.4	255.8	18.8	1.34
Urban Credit Cooperatives	171.5	154.9	97.9	0.4	
Rural Credit Cooperatives	3,101.3	2,734.8	1,974.8	9.65	
2003					
Big Four Banks	16,275.1	13,071.9	9,950.1	196.5	19.74
Other Commercial Banks	3,816.8	3,286.5	2,368.2		7.92
2) City Commercial Banks	1,465.4	1,174.7	774.4	5.4	14.94
Foreign Banks	333.1	90.7	147.6	18.1	2.87
Urban Credit Cooperatives	148.7	127.1	85.6	0.01	
Rural Credit Cooperatives	2,674.6	2,376.5	1,775.9	4.4	
2002					
Big Four Banks	14,450.0	11,840.0	8,460.0	71.0	26.1
Other Commercial Banks	4,160.0	3,390.0	2,290.0	--	--
1) Joint Equity	2,990.0	--	--	--	9.5
2) City Commercial Banks	1,170.0	--	--	--	17.7
Foreign Banks	324.2	--	154.0	15.2	--
Urban Credit Cooperatives	119.0	101.0	66.4	--	
Rural Credit Cooperatives	--	1,987.0	1,393.0	--	--
2001					
Big Four Banks	13,000.0	10,770.0	7,400.0	23.0	25.37
Other Commercial Banks	3,259.0	2,530.7	1,649.8	12.9	--

1) Joint Equity	2,386.0	1,849.0	1,224.0	10.5	12.94
2) City Commercial Banks	873.0	681.7	425.8	2.4	--
Foreign Banks	373.4	--	153.2	1.7	--
Urban Credit Cooperatives	128.7	107.1	72.5	2.6	--
Rural Credit Cooperatives	--	1,729.8	1,197.0	--	--

Notes: 1. It is before tax profit up to 2006, and after tax profit from 2006-2009.

2. Big four (stated owned) banks refer to Bank of China, China Construction Bank, Industrial and   Commercial Bank of China, and Agricultural Bank of China. Big five banks are the Big four Banks and Bank of Communications.

Source: Almanac of China's Finance and Banking 2000-2008, CEIC data base, Quarterly Monetary Report of PBC.

Table 22-C Comparison of Assets Held by China's Non-Bank Intermediaries (RMB billion)

This table compares total assets held by banks and non-bank intermediaries during the period 1995-2009.

Year	State-owned Banks	RCCs	UCCs	Insurance Companies	TICs	Non-deposit Intermed-iaries	Other Commer-cial Banks	Foreign Banks
1995	5,373.3	679.10	303.92	--	458.60	48.97	536.91	42.90
1996	6,582.7	870.66	374.78	--	563.70	82.02	769.98	55.30
1997	7,914.4	1,012.	498.94	--	636.40	100.42	948.61	75.80
1998	8,860.9	1,143.	560.63	--	802.50	120.97	1,128.18	118.40
1999	9,970.6	1,239.	630.15	260.4	907.50	137.08	1,376.89	191.40
2000	10,793.	1,393.	678.49	337.4	975.90	160.82	1,828.26	379.20
2001	11,188.	1,610.	780.02	459.1	1,088.3	223.67	2,255.70	341.80
2002	13,549.	2,205.	119.23	649.4	1,544.1	408.10	2,997.72	317.90
2003	16,275.	2,674.	148.72	912.3	--	495.58	3,816.80	331.10
2004	16,932.	3,103.	171.50	1185.4	--	--	4,697.20	515.90
2005	21,005.	3,142.	203.3	1529.6	--	--	6,502.2	715.5
2006	24,23.0	3,450.	183.1	1973.1	--	--	8,038.4	927.9
2007	28,007.	4,343.	131.2	2900.4	--	--	10,589.9	1,252.5
2008	31,836.	5,211.	80.4	3341.8	--	--	12,941.2	1,344.8
2009	40,089.	5,492.	27.2	4063.5			17,465.0	1,349.2

Source: Aggregate Statistics from the People's Bank of China (China's Central Bank) and CEIC, 2000 – 2009.

Table 22-B provides a (partial) breakdown of the different types of banks. During the period of 2001-2009, although the largest four or five banks (the fifth largest bank is Bank of Communications, also state owned) dominate in every aspect of the banking sector, the role of other banks in the entire banking sector cannot be ignored. As of 2009, other banks (including

foreign banks) and credit cooperatives' total assets compose over 70% of the largest five banks (the actual fraction is likely to be higher due to incomplete information on all types of deposit-taking institutions); similar comparisons can be made for total deposits and outstanding loans. In addition, these banks and institutions appear to have less NPLs than the largest state-owned banks. Table 22-C provides evidence on the growth of non-bank intermediaries. Overall, the growth of these non-bank intermediaries has been impressive since the late 1990s. Among them, "other commercial banks" (many of them are state-owned), RCCs, and TICs hold the largest amount of assets; the size of foreign banks and mutual funds (not listed in the table) is minuscule, but these are likely to be the focus of development in the near future.[60] Finally, our coverage of non-bank financial institutions excludes various forms of informal financial intermediaries, some of which are deemed illegal but overall provide a considerable amount of financing to firms in the Hybrid Sector.

3.4 Financial Markets

In this section, we examine China's financial markets, including both the stock and real estate markets, and the recent addition of venture capital and private equity markets as well as asset management industries. We also compare, at the aggregate level, how firms raise funds in China and in other emerging economies through external markets in order to determine if China's experience is unique. We then briefly review publicly traded companies' financing and investment decisions. Finally, we discuss the further development of financial markets as well

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[60] Postal savings (deposit-taking institutions affiliated with local post offices) is another form of non-bank intermediation that is not reported in Table 4-B due to a lack of time series data. However, at the end of 2008, total deposits within the postal savings system exceeded RMB 2079 billion, or 9.5% of all deposits in China.

as corporate governance and the performance of listed firms.

3.4.1 Overview of Stock Markets

After the inception of China's domestic stock exchanges, the SHSE and SZSE, in 1990, they initially grew quickly. The high growth rates continued through most of the 1990s, and the market reached a peak by the end of 2000. As shown in Figure 20, the momentum of the market, indicated by the SSE Index, then reversed during the next five years as it went through a major correction with half of the market capitalization lost. Most of the losses were recovered by the end of 2006, and the market reached new heights during 2007. However, following a string of negative news worldwide (culminating with the subprime loans-led global crisis) and domestically (including high levels of inflation) the market lost three quarters of its value by the end of 2008. During the first half of 2009, with the impact of the massive stimulus package and rebounding from a trough, China's stock market bounced back and recovered about one third of the losses in 2008. However the stock market dipped again in the first half of 2010, partly due to the concern that the government is taking measures to cool down the fast growing housing market. Figure 20 compares the performance of some of the major stock exchanges around the world, as measured by the 'buy-and-hold' return in the period December 1992 and December 2010 (gross return at December 2010 with $1 invested in each of the valued-weighted stock indexes at the end of 1992). We plot inflation-adjusted real returns. Over this period, the performance of the value-weighted SHSE index (the calculation for the SZSE is very similar) is below that of the SENSEX (India), which has the best performance among the group, and that of S&P (U.S.), but better than FTSE (London) and the Nikkei Index, the worst among the group.

Table 23- A Comparison of the Largest Stock Markets in the World (01/01-12/31, 2010)

Rank	Stock Exchange	Total Market Cap	Concentration (%)	Turnover Velocity (%)
1	NYSE Euronext (US)	13,394,081.8	57.0%	130.2%
2	NASDAQ OMX	3,889,369.9	71.9%	340.4%
3	Tokyo SE Group	3,827,774.2	60.1%	109.6%
4	London SE Group	3,613,064.0	82.3%	76.1%
5	NYSE Euronext (Europe)	2,930,072.4	68.9%	76.5%
6	**Shanghai SE**	**2,716,470.2**	**55.8%**	**178.5%**
7	**Hong Kong Exchanges**	**2,711,316.2**	**69.4%**	**62.2%**
8	TSX Group	2,170,432.7	79.5%	74.1%
9	Bombay SE	1,631,829.5	87.7%	18.1%
10	National Stock Exchange India	1,596,625.3	69.6%	57.3%
11	BM&FBOVESPA	1,545,565.7	64.2%	64.7%
12	Australian Securities Exchange	1,454,490.6	79.4%	82.3%
13	Deutsche Börse	1,429,719.1	78.4%	119.3%
14	**Shenzhen SE**	**1,311,370.1**	**31.2%**	**344.3%**
15	SIX Swiss Exchange	1,229,356.5	65.6%	73.5%
16	BME Spanish Exchanges	1,171,625.0	NA	117.2%
17	Korea Exchange	1,091,911.5	75.7%	176.3%
18	NASDAQ OMX Nordic Exchange	1,042,153.7	69.7%	79.7%
19	MICEX	949,148.9	64.3%	52.8%
20	Johannesburg SE	925,007.2	35.0%	33.3%

Notes: All figures are from http//:www.world-exchanges.org, the web site of the international organization of stock exchanges. Concentration is the fraction of total turnover of an exchange within a year coming from the turnover of the companies with the largest market cap (top 5%). Turnover velocity is the total turnover of domestic stocks for the year expressed as a percentage of the total market capitalization.

Table 23-B China's Bond Markets: 1990 – 2009 (Amount in RMB billion)

This table presents the development of China's bond markets. "Policy Financial Bonds" are issued by "policy banks," which belong to the Treasury Department, and the proceeds of bond issuance are invested in government run projects and industries such as infrastructure construction (similar to municipal bonds in the U.S.) "Redem." here stands for Redemption

	Treasury Bonds			Policy Financial Bonds			Corporate Bonds		
Year	Amount Issued	Redem. Amount	Balance	Amount Issued	Amounts Redem.	Balance	Amounts issued	Amounts Redem.	Balance
1990	19.72	7.62	89.03	6.44	5.01	8.49	12.4	7.73	19.54
1991	28.13	11.16	106.00	6.69	3.37	11.81	24.9	11.43	33.11
1992	46.08	23.81	128.27	5.50	3.00	14.31	68.37	19.28	82.20
1993	38.13	12.33	154.07	0.00	3.43	10.88	23.58	25.55	80.24
1994	113.76	39.19	228.64	0.00	1.35	9.53	16.18	28.20	68.21
1995	151.09	49.70	330.03	--	--	170.85	30.08	33.63	64.66
1996	184.78	78.66	436.14	105.56	25.45	250.96	26.89	31.78	59.77
1997	241.18	126.43	550.89	143.15	31.23	362.88	25.52	21.98	52.10
1998	380.88	206.09	776.57	195.02	32.04	512.11	15.00	10.53	67.69

1999	401.50	123.87	1,054.20	180.09	47.32	644.75	15.82	5.65	77.86
2000	465.70	152.50	1,367.40	164.50	70.92	738.33	8.30	0.00	86.16
2001	488.40	228.60	1,561.80	259.00	143.88	853.45	14.70	0.00	100.86
2002	593.43	226.12	1,933.60	307.50	155.57	1,005.41	32.50	0.00	133.36
2003	628.01	275.58	2,260.36	456.14	250.53	1,165.00	35.80	0.00	169.16
2004	692.39	374.99	2,577.76	414.80	177.87	1,401.93	32.70	0.00	201.86
2005	704.20	404.55	2,877.40	585.17	205.30	1,781.80	204.65	3.70	401.81
2006	888.33	620.86	3144.87	898.00	379.0	2,300.80	393.83	167.24	553.29
2007	2313.91	584.68	4874.10	1109.02	413.36	2992.68	505.85	288.09	768.33
2008	855.82	753.14	4976.78	1082.30	406.38	3668.6	843.54	327.78	1285.06
2009	1792.7	707.15	--	1167.8	--	--	1662.9	440.0	--
Yearly Growth	25.3%	24.4%	25.0%	29.7%	27.7%	40.1%	25.5%	22.3%	26.2%

Source: Aggregate Statistics from the People's Bank of China (China's Central Bank) 2000 – 2009 and the Statistical Yearbook of China 2000-2009.
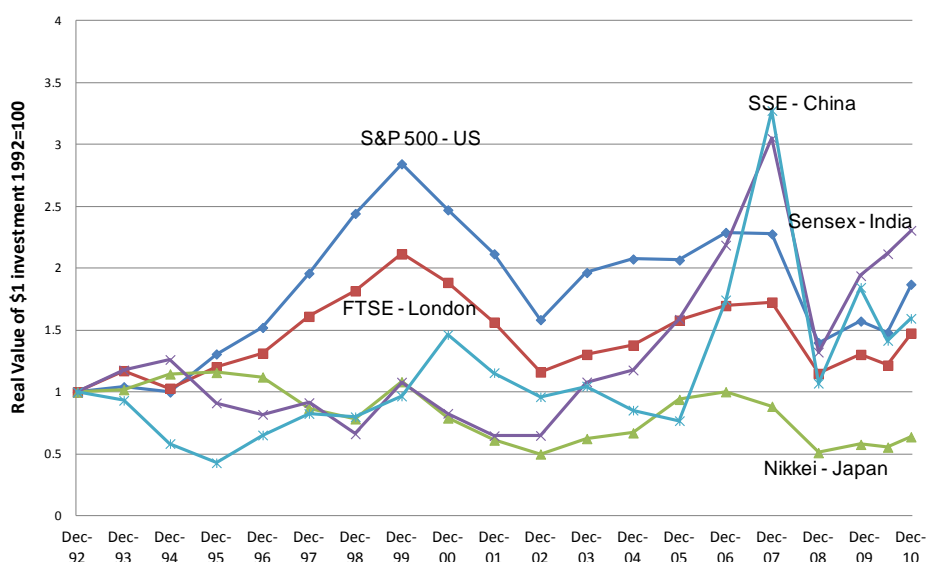
Figure 20 A Comparison of Performance of Major Stock Indexes
(Buy-and-hold returns of $1 between Dec. 1992 and Dec. 2010)

As Table 23-A indicated, at the end of 2010, the SHSE was ranked the sixth largest market in the world in term of market capitalization, while the SZSE was ranked the fourteenth. The Hong Kong Stock Exchange (HKSE), where selected firms from Mainland China have been listed and traded, is ranked the seventh largest in the world. Needless to say, the Chinese

financial markets will play an increasingly important role in world financial markets. Also from Table 23-A, "Concentration" is the fraction of total turnover of an exchange within a year coming from the turnover of the companies with the largest market cap (top 5%), and SHSE (55.8%) is in line with that of other large exchanges, indicating that trading is concentrated among large-cap stocks. "Turnover velocity" is the (annual) total turnover for all the listed firms expressed as a percentage of the total market capitalization, and the figures for SZSE and SHSZ are the highest among the largest exchanges, suggesting that there is a large amount of speculative trading especially among small- and medium-cap stocks (as these are more easily manipulated than large cap stocks) in the Chinese markets.

There are two other markets established to complement the two main exchanges. First, a fully electronically operated market ("Er Ban Shi Chang" or "Second-tier Market," similar to the NASDAQ) for Small and Medium Enterprises (SMEs) was opened in June 2004. It was designed to lower the entry barriers for SME firms, especially newly established firms in the high-tech industries. By the end of February 2007, there are 119 firms listed in this market. Second, a "third-tier market" ("San Ban Shi Chang," or "Third-tier Market,") was established to deal primarily with de-listing firms and other over-the-Counter (OTC) transactions. Since 2001, some publicly listed firms on both SHSE and SZSE that do not meet the listing standards have been delisted and the trading of their shares shifted to this market. On October 23, 2009, China launched a Nasdaq-style Growth Enterprises Market (GEM, or "Chuang Ye Ban") with 28 companies, mainly from hi-tech, electronic and pharmaceutical industries. The main purpose of GEM is to provide financing for small and medium sized private enterprises. The first 10 firms seeking to list on the GEM drew a combined RMB 784 billion in subscriptions in September 2009, while the second and third sets had 18 firms, including Huayi Brothers Media, China's largest

privately owned film company. As of October 2011, no index is available for the GEM but most

of the listed stocks have outperformed the indexes of the two main exchanges. By April 2010,

the number of listed firms on the GEM reached 200.

There is abundant evidence showing that China's stock markets are not efficient in that

prices and investors' behavior are not necessarily driven by fundamental values of listed firms.

For example, Morck et al. (2000) find that stock prices are more 'synchronous" (stock prices

move up and down together) in emerging countries including China than in developed countries.

They attribute this phenomenon to poor minority investor protection and imperfect regulation

of markets in emerging markets. In addition, there have been numerous lawsuits against insider

trading and manipulation (see, e.g., AQQ (2008), for more details). In many cases, unlike Enron

and other well known companies in developed markets stricken by corporate scandals,

managers and other insiders from the Chinese companies did not use any sophisticated

accounting and finance maneuvers to hide their losses (even by China's standards). These cases

reveal that the inefficiencies in the Chinese stock markets can be (partially) attributed to poor

and ineffective regulation. We discuss below issues related to regulation, market efficiency, and

the further development of China's financial markets.

3.4.2 Overview of Bond Markets

Table 23-B provides information on China's bond markets. The government bond

market had an annual growth rate of 25.3% during the period 1990-2009 in terms of newly

issued bonds, while total outstanding bonds reached RMB 4,976.8 billion (or $721.3 billion) at

the end of 2008.[61] The second largest component of the bond market is called "policy financial

bonds" (total outstanding amount RMB 3,668.6 billion (or $531.7 billion) at the end of 2008.

These bonds are issued by "policy banks," which operate under the supervision of the Ministry

of Finance, and the proceeds of bond issuance are invested in government run projects and

industries such as infrastructure construction (similar to municipal bonds in the U.S.). Compared

to government-issued bonds, the size of the corporate bond market is small. In terms of the

amount of outstanding bonds at the end of 2008, the corporate bond market is less than one-

fourth of the size of the government bond market. However, the growth of the corporate bond

market has picked up pace in the past few years and this trend is likely to continue in the near

future.

The small size of the bond market, especially the corporate bond market, relative to the

stock market, is common among Asian countries. AQQ (2008) compares different components

(bank loans to the private sectors or the Hybrid Sector of China; stock market capitalization;

public/government and private/corporate bond markets) of the financial markets around the

world at the end of 2003. Compared to Europe and the U.S., they find that the size of both the

government (public) and corporate (private) bond markets is smaller in Asia excluding Japan

(Hong Kong, South Korea, Malaysia, Taiwan, Singapore, Indonesia, Philippines, and Thailand);

even in Japan, the size of the corporate bond market is much smaller compared with its

government bond market. They also find that the size of all four components of China's

financial markets are small relative to that of other regions and countries, including bank loans

made to the Hybrid Sector (private sector) in China (other countries). Moreover, the most

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[61] On July 26, 2007, Moody's raised the rating on China's government bonds to A1 from A2 and kept it unchanged up to now. In November 2009 it raised China's sovereign rating outlook from stable to positive. These ratings are better or comparable than Moody's ratings on government bonds from most emerging economies.

under-developed component of China's financial markets is the corporate bond market (labeled "private" bond market).

There are a number of reasons for the underdevelopment in bond markets in China and other parts of Asia (see, e.g., Herring and Chatusripitak 2000). Lack of sound accounting/auditing systems and high-quality bond-rating agencies is a factor.[62] Given low creditor protection and court inefficiency (in China and most other emerging economies) the recovery rates for bondholders during default are low, which in turn leads to underinvestment in the market (by domestic and foreign investors). Lack of a well constructed yield curve is another factor in China, given the small size of the publicly traded Treasury bond market and lack of historical prices. The situation is improving however, as the terms of China's Treasury bonds now ranges from one month to 30 years. In December 2009, China's first 50-year government bond made its trading debut simultaneously in the interbank market and the stock exchange bond market, extending the bond yield curve even further. The deficiencies in the term structure of interest rates have hampered the development of derivatives markets that enable firms and investors to manage risk, as well as the effectiveness of the government's macroeconomic policies. Therefore, further development of China's bond markets, along with its legal system and related institutions, can help the advancement of other markets and the overall financial system.

3.4.3 Evidence on the Listed Sector

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[62] *Dagong Global Credit Ratings*, a leading Chinese credit ratings agency, recently released its first sovereign ratings report, in which the Chinese and German sovereign debt received higher ratings (AA+ and a stable outlook) than those of US, the UK and Japan (AA or lower ratings and a negative outlook; *Bloomberg*, 7/14/2010).

In this section, we briefly examine publicly listed and traded companies in China. It is worthwhile to first clarify whether firms from the Hybrid Sector can become listed and publicly traded. Regulations and laws (the 1986 trial version of the bankruptcy law and the 1999 version of the Company Law) did not prohibit the listing of Hybrid Sector firms; and selected firms from the Hybrid Sector did enter the Listed Sector through an IPO or acquisition of a listed firm from the inception of SHSE and SZSE. However, the accessibility of equity markets for these firms has been much lower than for former SOEs in practice due to the enforcement of the listing standards and process. As a result, AQQ (2005) find that 80% of their sample of more than 1,100 listed firms are converted from former SOEs. In recent years, the government has attempted to change the composition of listed firms by relaxing regulations toward Hybrid Sector firms, including the establishment of the recently opened GEM.

Until the recent share reform, which is discussed further below, listed firms in China issued both tradable and nontradable shares (Table 24-A). The nontradable shares were either held by the government or by other state-owned legal entities (i.e., other listed or non-listed firms or organizations). Table 24-B shows that, as of the end of 2009, nontradable shares constituted around half of all shares (53%, column 2) and the majority of tradable shares were A shares. Among the tradable shares, Class A and B shares are listed and traded in either the SHSE or SZSE, while Class A (B) shares are issued to and traded by Chinese investors (foreign investors including those from Taiwan and Hong Kong and QFIIs). While the two share classes issued by the same firm are identical in terms of shareholder rights (e.g., voting and dividend), B shares were traded at a significant discount relative to A shares and are traded less frequently than A

shares.[63] The "B share discount" has been reduced significantly since the CSRC allowed Chinese

citizens to invest and trade B shares (with foreign currency accounts) in 2001. In addition, Class

H shares, issued by selected "Red Chip" Chinese companies, are listed and traded on the HKSE.

Finally, there are N shares and S shares for firms listed in the U.S. and Singapore but operate in

China (we omit discussions on these shares since they are not listed on the domestic exchanges).

After the share reforms discussed below in Section 3.4.7, government shares became G shares

and are tradable.

Table 24-A Types of Common Stock Issued in China

Tradable?		Definition
No (Private block transfer possible)	**State-owned shares*** **(G shares after recent reform and tradable)**	Shares that are controlled by the central government during the process when firms are converted into a limited liability corporation but before listing. These shares are either managed and represented by the Bureau of National Assets Management or held by other state-owned companies, both of which also appoint firms' board members. After reforms announced in 2005 and implemented in 2006-7 state shares became G shares and are tradable.
	Entrepreneur's shares	Shares reserved for firms' founders during the same process described above; different from shares that founders can purchase and sell in the markets.
	Foreign owners	Shares owned by foreign industrial investors during the same process
	Legal entity holders	Shares sold to legal identities (such as other companies, listed or non-listed) during the same process.
	Employee shares	Shares sold to firm's employees during the same process.
Yes (Newly issued shares)	**A Shares**	Shares issued by Chinese companies that are listed and traded in the Shanghai or Shenzhen Stock Exchange; most of these shares are sold to and held by Chinese (citizen) investors.
	B Shares	Shares issued by Chinese companies that are listed and traded in the Shanghai or Shenzhen Stock Exchange; these shares are sold to and held by foreign investors; starting in 2001 Chinese investors can also trade these shares.
	H Shares	Shares issued by selected Chinese companies listed and traded in the Hong Kong Stock Exchange; these shares can only be traded on the HK Exchange but can be held by anyone.

*: There are sub-categories under this definition

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[63] Explanations of the B share discount include: 1) Foreign investors face higher information asymmetry than domestic investors, 2) lower B share prices compensate for the lack of liquidity (due to low trading volume), and 3) the A share premium reflects a speculative bubble component among domestic investors. See, e.g., Chan, Menkveld, and Yang (2008) and Mei, Scheinkman, and Xiong (2003) for more details.

Table 24-B   Tradable vs. Non-tradable Shares for China's Listed Companies

Year	Shanghai SE: State/total shares	^Non-tradable/total shares	*Tradable/total shares	A/total shares	A/Tradable shares[*]
1992	0.41	0.69	0.31	0.16	0.52
1993	0.49	0.72	0.28	0.16	0.57
1994	0.43	0.67	0.33	0.21	0.64
1995	0.39	0.64	0.36	0.21	0.60
1996	0.35	0.65	0.35	0.22	0.62
1997	0.32	0.65	0.35	0.23	0.66
1998	0.34	0.66	0.34	0.24	0.71
1999	0.43	0.65	0.35	0.26	0.75
2000	0.44	0.64	0.36	0.28	0.80
2001	0.50	0.64	0.36	0.29	0.80
2002	0.52	0.65	0.35	0.26	0.74
2003	0.57	0.64	0.35	0.27	0.76
2004	0.58	0.64	0.36	0.28	0.77
2005	0.57	0.62	0.38	0.30	0.78
2006	0.36	0.65	0.35	0.27	0.81
2007	0.37	0.69	0.31	0.28	0.90
2008	0.47	0.58	0.42	0.37	0.91
2009	0.49	0.53	0.47	0.50	0.98

^: Non-tradable shares include "state-owned" and "shares owned by legal entities";
     This column is calculated as "(Non-tradable in Shanghai SE+ Non-tradable in Shenzhen SE)/(Market cap in Shanghai SE + Market cap in Shenzhen SE)"
  *: tradable shares include   A, B, and H shares;
   Source: China Security Regulation Committee Reports (2000-2006), CEIC database and
http://www.csrc.gov.cn

We next describe standard corporate governance mechanisms in the Listed Sector. First, according to the (2005) Company Law, listed firms in China have a two-tier board structure: the Board of Directors (five to nineteen members) and the Board of Supervisors (at least three members), with supervisors ranking above directors. The main duty of the Board of Supervisors is to monitor firms' operations as well as top managers and directors; it consists of representatives of shareholders and employees, with the rest either officials chosen from government branches or executives from the parent companies; directors and top managers of

the firms cannot hold positions as supervisors. The company has the discretion to decide the number of representatives of employees on the Board of Supervisors, but representatives of employees must account for at least one third of the board. The Board of Directors serves similar duties as their counterparts in the U.S., including appointing and firing CEOs. According to the "one-share, one-vote" scheme adopted by firms in the Listed Sector, shareholders including the state and legal person shareholders (that typically own the majority of shares) appoint the board members. Specifically, the Chairman (one person) and Vice Chairman (one or two) of the Board are elected by all directors (majority votes); at the approval of the Board, the CEO and other top managers can become members of the Board. The CSRC requires at least one third (and a minimum of two people) of the Board to be independent.

Since the Law does not specify that every member of the Board must be elected by shareholders during general shareholder meetings, in practice some directors are nominated and appointed by the firms' parent companies and the nomination process is usually kept secret, in particular for former SOEs. Since not all members of either board are elected by shareholders, a major problem with the board structure is the appointment of and contracting with the CEOs. Based on firm-level compensation data (available since 1998 due to disclosure requirements), Fung et al. (2003) and Kato and Long (2004) find that no listed firms grant stock options to CEOs or board members. The situation is somewhat different now. Among overseas listed SOEs, barriers to exercising stock options have been overcome, and some senior executives have been granted stock options (examples include the former chairman of CNOOC Wei Liucheng and Bank of China-Hong Kong former chairman Liu Mingkang) and received substantial rewards (Caijing Magazine, 2008). However, the cash-based compensation level for CEOs is still much lower than their counterparts in developed countries, and the consumption of perks, such as company cars,

is prevalent.

Second, the existing ownership structure, characterized by the large amount of non-tradable shares including cross-holdings of shares among listed companies and institutions, makes it difficult for value-increasing M&As. According to the China Venture Source, there were 2,656 M&A deals involving listed firms in 2010 totaling US$169.6 billion, a small fraction of the total market capitalization. In many deals, a Hybrid Sector firm (non-listed) acquires a listed firm that is converted from an SOE, but the large amount of non-tradable shares held by the state remain intact after the transaction.[64] Such an acquisition can be the means through which low quality, non-listed companies bypass listing standards and access financial markets (e.g., Du et al., 2008).

Third, one factor contributing to the occurrence of corporate scandals is the lack of institutional investors (including non-depository financial intermediaries) as they are a very recent addition to the set of financial institutions in China. Professional investors would perhaps not be so easily taken in by simple deceptions. Another factor is that the enforcement of laws is questionable due to the lack of legal professionals and institutions.

Fourth, the government plays the dual roles of regulator and blockholder for many listed firms, including banks and financial services companies. The main role of the CSRC (counterpart of the SEC in the U.S.) is to monitor and regulate stock exchanges and listed companies. The government exercises its shareholder control rights in listed firms through the

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[64] If we include the cross-border M&As and transactions between parent companies and subsidiaries, the total amount increases to US $47 billion in 2000, $14 billion in 2001, $29 billion in 2002, and $24 billion in the first three quarters of 2003. 68% of all M&A deals (66% in terms of dollar deal amount) are initiated by Hybrid Sector firms, while former SOEs and foreign firms initiate 29% and 3% of the rest, respectively (27% and 7% in deal amount). M&As are most active in coastal regions, and in industries such as machinery, information technology, retail, and gas and oil.

Bureau of National Assets Management, which holds large fractions of nontradable shares, or other SOEs (with their holdings of nontradable shares). However, since the senior managers of the Bureau are government officials, it is doubtful that they will pursue their fiduciary role as controlling shareholders diligently, since their compensation is probably not incentive-based; even if their compensation was tied to performance, they may lack the expertise to make the correct strategic decisions. Moreover, the government's dual roles can lead to conflicting goals (maximizing profits as shareholder vs. maximizing social welfare as regulator or social planner) in dealing with listed firms, which in turn weaken the effectiveness of both of its roles.[65] There are cases in which the government, aiming to achieve certain social goals, influenced the markets through state-owned institutional investors (e.g., asset management companies) but created unintended adverse effects. Based on a sample of 625 firms with 28% of the CEOs being ex- or current government bureaucrats, Fan et al. (2007) find that the three-year post-IPO average stock returns of the sample underperform the market by 20%, and the underperformance of firms with such politically-connected CEOs exceeds those without politically-connected CEOs by almost 30%. Firms with politically-connected CEOs are also more likely to appoint other bureaucrats but not personnel with relevant professional to boards of directors.

Overall, internal and external governance for the Listed Sector is weak, and further development of governance mechanisms is likely in this sector going forward. In Section 3.4.7 below we further discuss this issue..

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[65] See Pistor (2010) for a description of the complicated relationships among various regulatory agencies and the central government branches, and how these relationships affect the decision-making process of regulations and enforcement.

3.4.4 Real Estate Market

Like other economic sectors, China's real estate market has long been operating under the 'dual tracks' of both central planning and market-oriented systems. Prior to 1998, government control was dominant with the market only playing a secondary role, and mortgages were not designated for retail customers and households. Chinese citizens working for the government and government owned companies and organizations could purchase properties at prices significantly below market prices, with the subsidies coming from their employers. The reform policies introduced in 1998 aimed to end the distribution of properties by employers and establish new housing finance and market systems. Provinces and autonomous regions have established programs to sell properties (e.g., apartments in urban areas) to individuals instead of allocating residency as part of the employment benefits.

Since 1998 the residential housing reform and the development of individual mortgages, along with rising household income and demand for quality housing, had stimulated the fast growth of the real estate market. Figure 21-A shows the total real estate investments and their funding sources over time. Total investment increased from RMB 321 billion in 1996, 12% of the national fixed assets investments, to RMB 4.8 trillion in 2010 and 20% of the national fixed assets investment. Most of the investment funds have come from domestic sources. Not surprisingly, bank loans are the most important source of real estate financing. China's continuing economic growth especially in private sectors, urbanization and industrialization, limited land supply, increasing foreign direct investments and institutional investments, will further enhance the liquidity and long-term prospects of China's real estate assets.

As the real estate sector gained more weight in the economy, its impact on other

industries, especially the financial and banking industries, increased considerably. With the expansion of the real estate market, banks and other financial institutions lent more to keep up with the demand for financing. When the fast expansion, in part fueled by the inflows of speculative capital and agency problems in investment, could not be sustained, increased demand led to hikes in property prices and real estate bubbles surfaced. The bursting of such bubbles can lead to painful consequences in the entire economy.

Real Estate Investment (1996-2009)

bottom part of the graph (same colors)
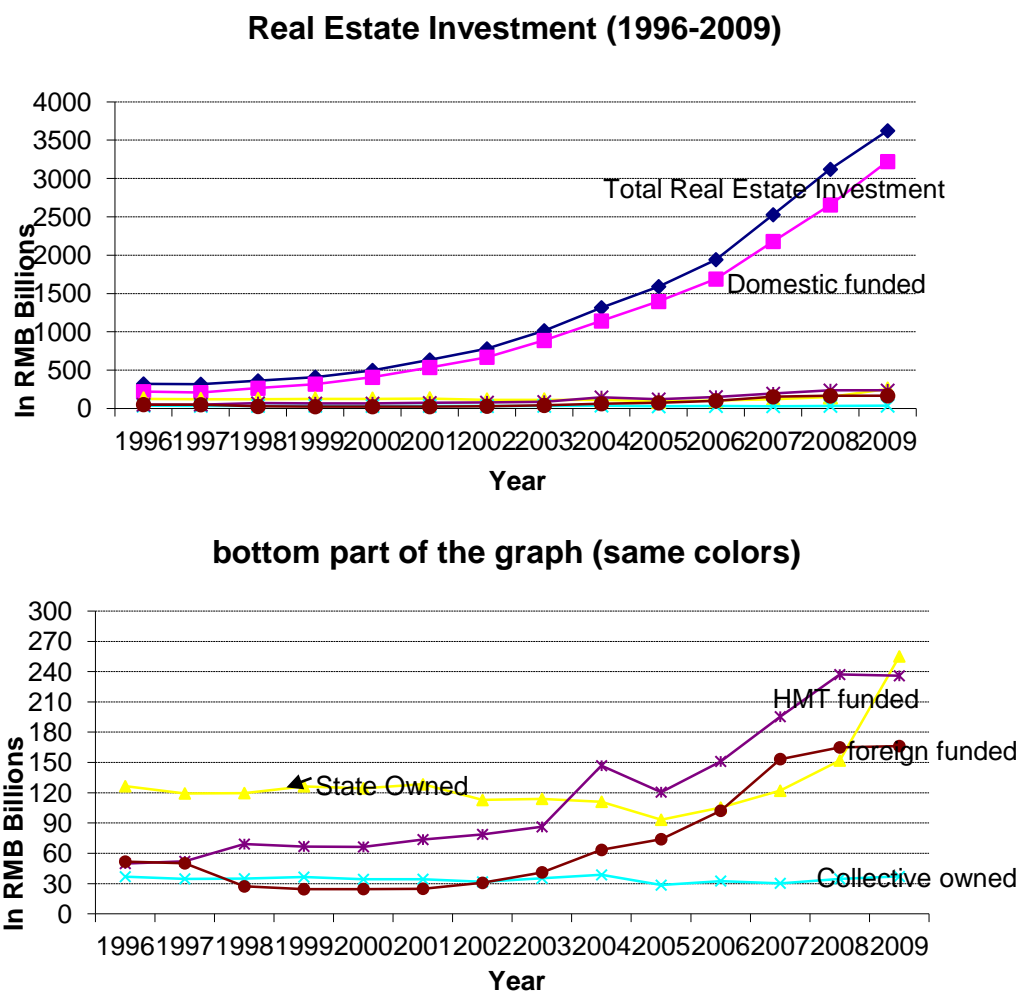
Figure 21-A Total Real Estate Investments and their sources (1996-2009)
Bottom part of the figure in the top panel is enlarged and plotted in the bottom panel, which presents the funding sources of real estate investment over the period of 1996-2009.
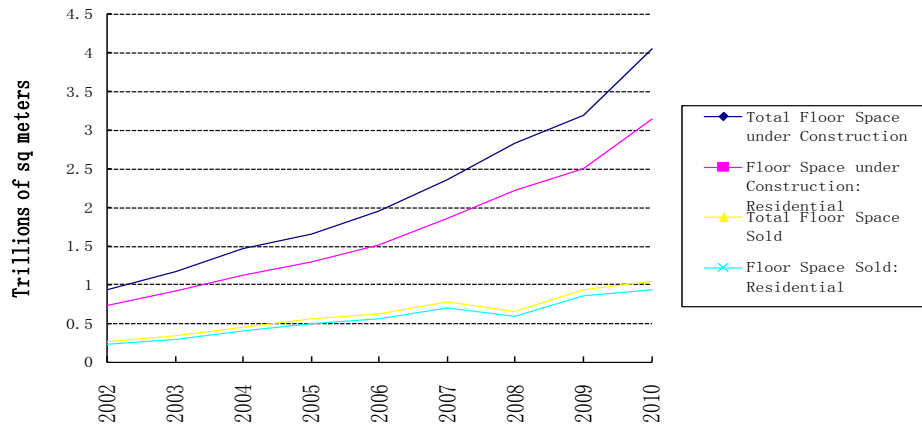
Figure 21-B Total Floor Space (developed vs. sold) in China

Normalized chart, 2002=100
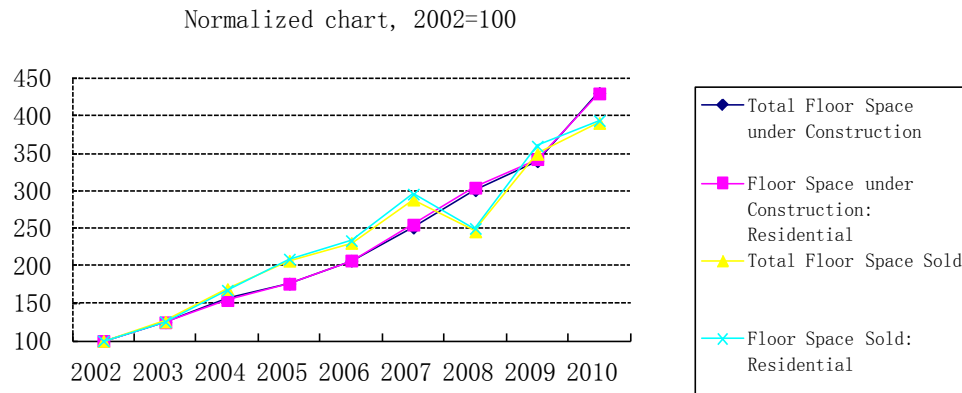
Figure 21-C Growth Rats in Total Floor Space (developed vs. sold) in China

(data source for Figures 21-B and 21-C: CEIC)

The real estate prices in major cities have risen sharply in recent years, and whether these fast growing prices are 'bubbles' and how to cool down the markets are among the most closely watched and hotly debated issues in China. We provide some simple analysis here; for a more thorough and careful analysis see, e.g., Wu, Gyourko, and Deng (2011). Figure 21-B shows the trends of total housing space developed vs. total space sold over the period 2002-2009 for

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the entire nation, and Figure 21-C compares the growth rates of total housing space developed vs. total space sold; actual space is normalized so that both charts begin at 100 in 2002; hence the vertical axis measures growth rates. We can see that while total space developed and total space sold (for both residential and nonresidential properties) grew at similar rates over the period (Figure 21-C), the gap between total space developed and sold—a proxy for the inventory of housing supply in the markets—widened from around 0.6 billion square meters in 2002 to 2.2 billion square meters in 2009.

In Figures 22-A through 22-E we plot and compare growth rates of average housing prices and disposable household income, over the period 2002-2009, for the nation and the four major cities: Beijing, Shanghai, Shenzhen and Guangzhou. Once again, actual housing prices (RMB per square meter) and disposable income are normalized so that both charts begin at 100 in 2002; hence the vertical axis measures growth rates and all the figures for prices and income are inflation adjusted. Steady growth of disposable income in line with rising housing prices can help sustain the growth of the housing markets, and hence considerable and increasing gaps in the growth rates reflect potential bubbles in the housing markets. Based on the figures it appears that while at the national level and in the city of Guangzhou there are no signs of bubbles, the opposite can be said for the large regional markets in Beijing, Shanghai and Shenzhen, where housing prices are rising at much higher paces than those of real disposable income in recent years. Shenzhen presents the most worrisome case, where despite fast-rising housing prices fueled by the inflow of speculative capital, real household income actually declined in 2008 and 2009 (from 2007 levels), perhaps (partially) due to the adverse effects of the global financial crisis on the exporting sectors, which rely mainly on migrant workers from other regions.

National Housing Price vs Disposable Annual Income
Normalized, base year=2002
adjusted by CPI, 2002=100

housing price, RMB/sqr
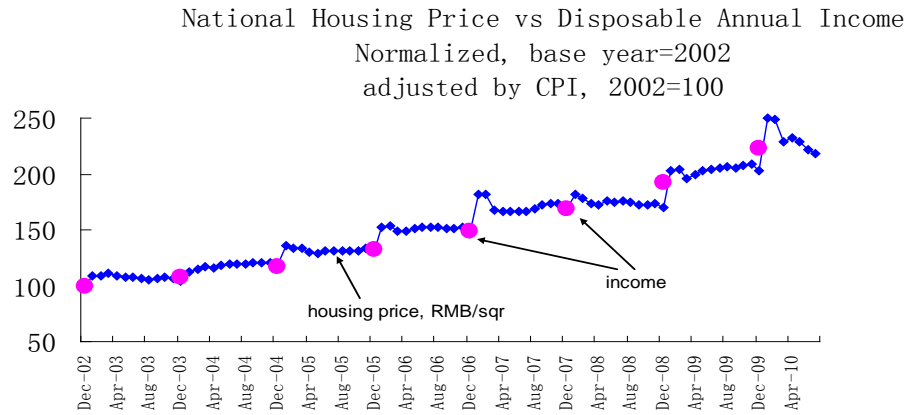
income

Figure 22-A: Comparing the growth of National Housing Prices and Disposable Household Income
(data source for Figures 5-A through 5-E: CEIC)

Beijing Housing Price vs Disposable Annual Income
Normalized, base year=2002
adjusted by CPI, 2002=100

housing price, RMB/sqm
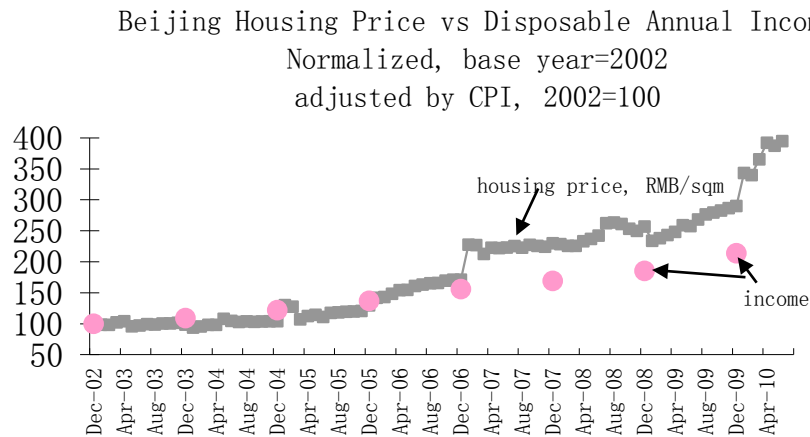
income

Figure 22-B: Growth of Housing Prices and Disposable Household Income in Beijing

Shanghai Housing Price vs Disposable Annual Income per capita
adjusted by CPI, 2002=100
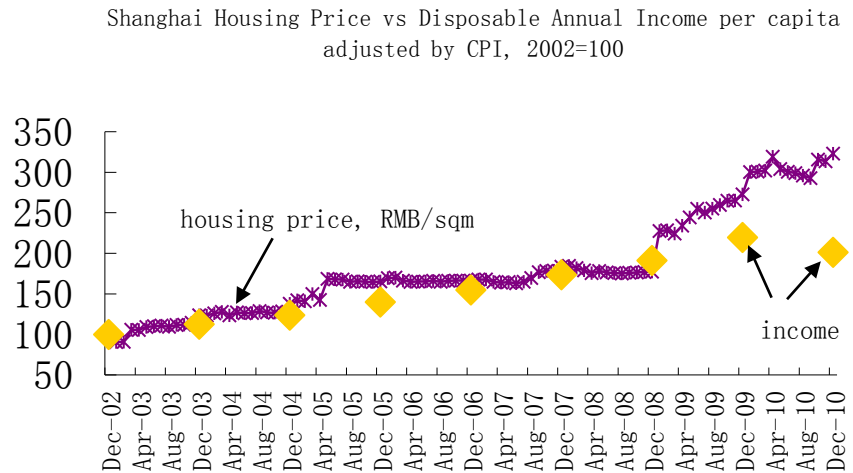
Figure 22-C: Growth of Housing Prices and Disposable Household Income in Shanghai

Shenzhen Housing Price vs Disposable Annual Income per capita
adjusted by CPI, 2002=100
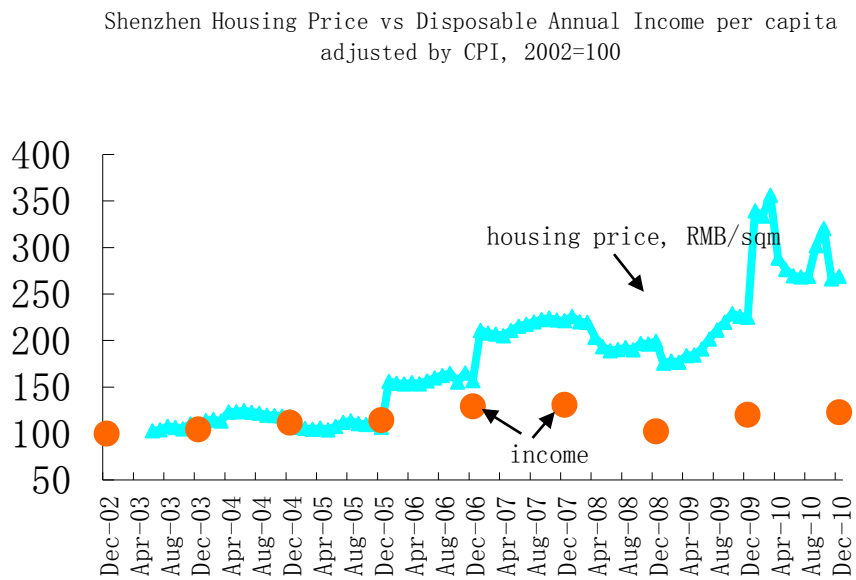
Figure 22-D: Growth of Housing Prices and Disposable Household Income in Shenzhen

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Guanzhou Housing Price vs Disposable Annual Income
Normalized, base year=2002
adjusted by CPI, 2002=100

income

housing price, RMB/sqm
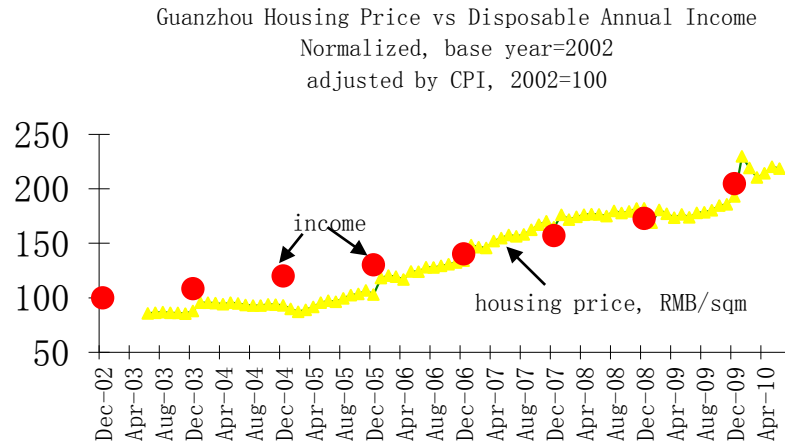
Figure 22-E: Growth of Housing Prices and Disposable Household Income in Guangzhou

We would like to emphasize again that our results are based on simple measures; however, analyses from Wu et al. (2011), who use more sophisticated metrics and regressions controlling for other factors that may affect housing prices, yield similar results that there may well be bubbles in the regional markets of Beijing, Shanghai and Shenzhen. There is some evidence that speculative foreign capital (the "hot money") flowing into China is partially responsible for the accelerated rise in real estate markets (e.g., Chu and Sing, 2004; Guo and Huang, 2010). Given the rising status of the Chinese economy and its currency, coupled with the weakening of the U.S. economy (and other developed countries), the dollar and near-zero interest rates in most developed countries, the inflow of 'hot money' into China's real estate markets (and other sectors) may continue.

The government has been taking aggressive measures to control property prices. Since 2004, it has issued new policies in order to suppress speculative activities; another policy measure to control the growth of the real estate market is through the PBOC's required reserve

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deposit ratio. In 2010 and 2011, in response to the fast rising housing prices, the government

has announced a series of interventions including: (a) increased equity down payment shares

from 20% to 30% for first homes of more than 90 square meters in size; (b) increased equity

down payment shares from 40% to 50% for second homes; (c) general discouragement of the

use of any leverage on third homes or by external buyers (i.e., those not living in the market of

the intended purchase); (d) new rules to prevent developers from hoarding housing units; (e)

preparation of the introduction of a local property tax, with possible pilot implementations in

Chongqing, a large city in the southwestern region that is under direct control of the central

government, within the next one to two years; and (f) direct administrative orders on how much

land and units of buildings can be developed.[66] Among these measures, the proposed property

tax may play a significant role in cooling down the markets, because it would raise the cost of

carry on speculative investments in owner-occupied housing.

Despite the government's macroprudential policies in recent years and the newly

announced measures and strong signals in recent months, the impact of these measures on the

housing markets seems to be limited. One reason, as stipulated by many observers, is that since

various government agencies and officials have played a major role in developing 'commercial

properties' it is not in their best interest to see major market corrections. The evidence in Wu et

al. (2011) provides some support of this view. They find that much of the increase in housing

prices is occurring in land values. Using land auctions data from Beijing, they also find SOEs

controlled by the central government paid 27% more than other bidders for an otherwise

equivalent land parcel. Since many vested government officials have a lot to lose following a

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[66] For more details, see "Gazette of Executive Meeting of the State Council," December 14th, 2009; and "Circular of the State Council on Resolutely Containing the Precipitous Rise of Housing Prices in Some Cities" (Decree No. [2010] 10), April 17th, 2010, and Wu et al. (2011).

crash in the real estate markets, it is argued that the new measures, including the proposed property taxes, will not be effectively enforced; such a belief can also explain why speculative capital continues to enter the housing markets.

Given the experiences of many other countries in the recent and previous financial crises, the government's efforts in controlling the rise of housing markets in the aforementioned regions, and preventing this spreading to other regions of the country can augment its other efforts in stabilizing the economy and alleviating social tensions. In Section 3.4 below we further examine how the inflow of speculative capital and subsequent outflow can create bubbles in the markets and then the bursting of the bubbles can spread to other sectors of the economy.

3.4.5 Private Equity/Venture Capital and the Funding of New Industries

Allen and Gale (1999, 2000a) have suggested that stock market-based economies, such as the U.K. in the 19th century and the U.S. in the 20th century, have been more successful in developing new industries than intermediary-based economies such as Germany and Japan. They argue that markets are better than banks for funding new industries, because evaluation of these industries based on experience is difficult, and there is wide diversity of opinion. Stock market-based economies such as the U.S. and U.K. also tend to have well-developed systems for the acquisition and distribution of information, so the cost of information to investors is low. Markets then work well because investors can gather information at low costs and those that anticipate high profits can provide the finance to the firms operating in the new industries.

A key part of this process is the private equity/venture capital sector (see, e.g., Kortum and Lerner 2000). Venture capitalists are able to raise large amounts of funds in the U.S. because of the prospect that successful firms will be able to undertake an IPO. With data from 21 countries, Jeng and Wells (2000) find that venture capital is less important in other countries, while the existence of an active IPO market is the critical determinant of the importance of venture capital in a country. This is consistent with the finding of Black and Gilson (1998) in a comparison of the U.S. and Germany, that the primary reason venture capital is relatively successful in the U.S. is the active IPO market that exists there.

These facts imply that the development of active venture capital and private equity markets can increase the financing for China's new industries. What is unusual about China (perhaps along with India) is that it currently has the ability to develop both traditional industries, such as manufacturing, and in the near future new, high-tech industries, such as aerospace, computer software, semiconductors, and bio-genetics. This is different from the experience of South Korea and Taiwan in the 1970s and that of most other emerging economies in the 1990s, as all these other countries focused on developing manufacturing industries first. In terms of developing traditional industries (e.g., Korea and Taiwan in the 1970s), China has already followed suit in first introducing advanced (relative to domestic companies) but not the most advanced technologies from developed countries; and "nationalizing" these technologies within designated companies before moving toward the more advanced technologies. Allen and Gale (1999, 2000a) argue that banks are better than financial markets for funding mature industries because there is wide agreement on how they are best managed, so the delegation of the investment decision to a bank works well. This delegation process, and the economies of scale in information acquisition through delegation, makes bank-based systems more efficient in

terms of financing the growth in these industries. Therefore, the banking system can contribute more in supporting the growth and development of these industries than markets.

3.4.6 Asset Management Industries

The mutual fund industry in China has gone through three stages of development. The first stage is between 1992, when China's first fund (LiuBo) was established, and 1997, when the first version of the mutual fund regulation was drafted and passed by the CSRC. The LiuBo Fund was a closed-end fund with NAV RMB100 million RMB ($12.5 million) and began to trade on the SHSE in 1993. While the industry experienced fast growth in the few years after 1992, lack of regulation and problems associated with fund trading hampered the further development of the industry. The first open-end fund was established in September, 2001 (Hua An Chuangxin), following the announcement of the proposal for open-end fund investment by the CSRC, a milestone for China's mutual fund industry.

Figure 23 shows the development of the mutual fund industry in China. With only a handful of funds in 1998, China now has sixty-five fund companies managing 551 different funds as of November 2009. The total net assets value increased from RMB11 billion (or $1.3 Billion) in 1998 to about RMB 2.26 trillion (or $328 billion) in November 2009 (this figure was much higher in the second half of 2007 before the markets went south). In 2001, the NAV of all funds was about 0.8% of GDP and 1.19% of total national savings; these figures rose to 6.16% of GDP and 8.58% of total savings in 2008. The growth of open-end funds contributed to most of the growth in the industry. As of November 2009, 520 funds are open-ended and 31 are close-ended, with 96% of the total fund value managed by open-end funds. The most popular

investment style is actively managed (domestic) equity, with only a few index funds and ETFs

(exchange traded funds).
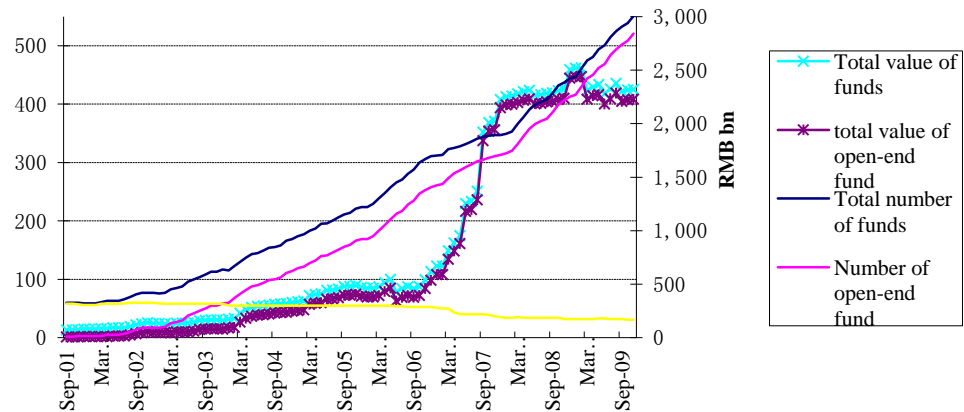
Figure 23 Growth in China's Mutual Fund Industry (1998-2009)

Many mutual fund companies are owned by securities and other financial services

companies. Like their counterparts in the U.S., management fees are the major source of

income for fund companies, accounting for about 80% of total income. Administration fees

account for 9% of total income, and the rest of the income comes from investment and other

incomes. More than half of the fund managers have a master-level or higher academic degree,

and the majority of them are 36 to 45 years old. Investment capital from institutional investors

is about the same as that from individual investors in 2005, but in 2006 individual investors

account for 70% of the total mutual fund investment. Among the 23 newly launched funds in

the first half of 2009, individual investors account for 75.8%.

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The first fund managed by a qualified foreign institutional investor (QFII) was set up in 2002. The State Administration of Foreign Exchange (SAFE) is the government agent that regulates the QFII funds. The QFII Act allows foreign investors to invest in Chinese securities, with the intention of introducing sophisticated foreign investors to the Chinese market with the hope that their presence would improve market efficiency. In addition, with the exercise of their shareholder rights, their presence can also help improve corporate governance of the Listed Sector. However, the original QFII rules imposed restrictions on foreign investors, such as a capital lock-up period of one to three years limiting capital withdrawal (and leaving China) and other operating restrictions. In August 2006, CSRC revised QFII rules to promote more participation from foreign investors. Under the new rules, there has been a significant increase in applications from foreign investors for QFII quotas.

Most of the institutions in the first group of QFII applicants were securities companies and investment banks, with other financial services companies such as insurance companies and pension fund companies also on the list. By the end of July 2006, China had approved a total of $7.495 billion foreign investment capital (quota) from 45 QFIIs, or three quarters of the then ceiling of $10 billion capital inflow through QFIIs. In December 2007, the investment quota/ceiling tripled, from $10 billion to $30 billion. In September 2009, draft rules were issued by SAFE to increase the upward limit of investment for an individual QFII institution to $1 billion from the previous $800 million. Some analysts believe that the move to increase the QFII quota was also intended to prepare for the large amount of floating of non-tradable shares. If the holders of the newly floated shares rush to sell, QFII funds can be a stabilizing source of the market. As of August 2011, there were a total of 116 approved QFIIs operating in China, of which 103 were investment funds. The approved investment quotas reached $20.69 billion.

The approval of qualified domestic institutional investors (QDII) to invest in overseas markets came after QFII, in July 2006. The QDII funds invest in stocks, bonds, real estate investment trusts and other mainstream financial products in markets such as New York, London, Tokyo and Hong Kong. Similarly to the QFII scheme, it is a transitional arrangement that provides limited opportunities for domestic investors to access foreign markets at a stage in which a country/territory's currency is not freely convertible and capital flows are restricted. As of early 2008, ten fund companies had obtained the approval to launch QDII. The total number of QDII funds reached 75 in July 2009. By April 2011, QDIIs had approved investment quotas of $72.67 billion. Given the recent turmoil in the global financial markets, the performance of the QDII funds has been less than stellar. Going forward, the probable continuing appreciation of the RMB against major international currencies including the dollar is a major concern for QDII investors.

China's asset management industry is expected to continue its growth in the near future. In the U.S., mutual funds became the largest group of financial intermediaries in financial markets in 1999, holding 29% of all financial assets. By contrast, mutual funds in China only held around 8.1% of all financial assets as at the end of 2009. The further growth of the economy and continuing reform of the pension system will generate both demand and supply of capital for the industry. If the trend of opening up domestic markets to foreign investors continues, there will be a greater inflow of QFIIs.

3.4.7 Further Changes in Financial Markets

As we have documented, the financial markets in China do not currently play nearly as

important a role as banks. Going forward, further improvements in the operation of China's financial markets can help to promote the development of high-technology industries as discussed in Section 3.4.5. In addition, developing new financial products and markets can enhance the risk management capabilities of China's financial institutions and firms. Finally, deep and efficient markets can provide an alternative to banks for raising large amounts of capital.

In recent years the performance of the stock markets has been volatile. This is somewhat surprising given the robust performance of the real economy. We attribute this (relatively) poor performance to a number of factors including the following:

Limited self-regulation and formal regulation.

The large overhang of shares owned by government entities.

The lack of listed firms originating in the Hybrid Sector.

The lack of trained professionals.

The lack of institutional investors.

Limited financial markets and products.

Efforts have been made to address some of these weaknesses. However, some of these are problems can only be tackled over the long run. We discuss each in turn.

3.4.7.1 Regulations

There are two ways in which markets are regulated in practice and each has advantages

and disadvantages: first, market forces and self-regulation, and second, government regulation.

A good example of regulation through market forces and self-regulation is provided by the capital markets in the UK in the nineteenth and early twentieth century (Michie, 1987). The role of government regulation and intervention was minimal. Despite this the markets did extremely well and London became the financial capital of the world. Many firms and countries from all over the world raised large amounts of funds. Reputation and trust were an important factor in the smooth operation of these markets. For example, Franks et al. (2003) compare the early twentieth century capital markets with those in the mid-twentieth century. Despite extensive changes in the laws protecting minority shareholders there was very little change in the ways in which the market operated. The authors attribute this to the importance of trust.

We argue below that China's Hybrid sector is another example of a situation where market forces are effective. Formal regulation and legal protections do not play much of a role and yet financing and governance mechanisms are quite effective. In this case, as we shall see, it appears that competition as well as reputation and trust work well.

In contrast, the examples of fraud and other problems of manipulation and the inefficiency of markets pointed to in Section 3.4.1 suggest that in China's formal financial markets these alternative mechanisms do not work well. Although such mechanisms may develop in the long run as in the nineteenth and early twentieth century U.K., in the short run formal government regulation of the type introduced in the U.S. in the 1930s and subsequently as a response to the stock market collapse that started in 1929 and the Great Depression may allow Chinese markets to function better. There is evidence from many countries that this type of formal regulation is effective. For example, based on a study of securities laws with the focus

on the public issuance of new equity in 49 countries (China is not included) LLS (2006) find that disclosure and liability rules help to promote stock market development.

3.4.7.2 Sale of Government Shares in Listed Firms

One of the major problems Chinese stock markets have faced in recent years has been caused by the large amount of shares in listed companies owned by the government and government entities shown in Table 24-B. The Chinese government attempted sales of state shares of selected firms in 1999 and 2001, but halted the process both times after share prices plunged and investors grew panicky about the value of the entire market. This overhang created great uncertainty about the quantity of shares that would come onto the market going forward. This uncertainty was probably in part responsible for the stagnation of share prices between 2002 and 2005 despite the very high levels of growth in the economy.

In 2005 the government announced a plan of "fully floating" state shares. Under the plan, the remaining state shares among listed firms were converted to "G" shares. The CSRC outlined the format for compensating existing shareholders and also imposed lockups and restrictions on the amount of G shares that could be sold immediately after they became tradable. More specifically, the plan stipulated that G shares were not to be traded or transferred within 12 months after the implementation of the share structure reform. Shareholders owning more than 5% of the original non-tradable shares can only trade less than 5% of the total shares outstanding within one year and less than 10% within 2 years. These restrictions of G share sales were intended to reduce the downward pressure on the stock price, maintain market stability and protect the interests of public investors. The details of the "fully

floating plan" for a firm, including the number of G shares to be granted to each Class A shareholder and the time window (e.g., one to three years) of G shares become fully floating, had to be approved by two thirds of Class A shareholders of the firm.

Share reforms began with a pilot program with only four companies participating in April 2005. By the end of 2006, 96% of all the listed companies had completed share reforms; by the end of 2007, there were only a few companies that had not reached an agreement with their shareholders on the terms of the reform.[67] As documented in Table 24-B above, as of September 2009, for the first time tradable shares accounted for more than half of the stock market, suggesting that the floating of nontradable shares is progressing.

Another fact worth mentioning is that for the firms that go public (IPOs) after the share reform, not all of their stocks are immediately floated to the market. Lock-up periods may still apply to large shareholders who obtained the shares before the IPO. For example, in the case of ABC's recent IPO, the majority of A shares (87.6%) have already been distributed to various agencies of the government before the IPO. In fact, only 25.5 billions A shares (8.6% of total outstanding A shares) were issued in the IPO. Those shares held by the government have a lock-up for 3 years. However, they are technically A (not G) shares. Thus no compensation will be paid when those shares become freely tradable.

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[67] Hwang et al. (2006) document that share reform increases turnover, especially for firms with low liquidity prior to the reform, and reduces speculative trading. Although share prices drop significantly on the day of share supply increases, shareholder wealth increases by 15% overall. Beltratti and Bortolotti (2006) document an 8% abnormal return around the date of share reform announcement. Liao and Liu (2008) show that market reactions to share reforms are positively associated with the quality of the listed firms (as measured by firm disclosure), providing evidence of improved market efficiency.

3.4.7.3 The Listing of Firms from the Hybrid Sector

One of the major problems of the stock exchanges is that most of the firms listed are former SOEs. Relatively few are firms from the more dynamic Hybrid Sector. Reforming listing requirements and procedures to make it advantageous for dynamic and successful companies to become listed on the exchanges can enhance the overall quality of the Listed Sector. The establishment of the recently opened "GEM" provides an example in this regard.

3.4.7.4 The Training of More Professionals

This step will allowan improvement in the enforcement of laws and contracts. An independent and efficient judicial system requires a sufficient supply of qualified legal professionals. The Ministry of Justice of China states that there are 143,000 lawyers and 12,428 law firms as of 2007. Two hundred and six out of China's 2,000 counties still do not have lawyers. Lawyers represent only 10% to 25% of all clients in civil and business cases, and even in criminal prosecutions, lawyers represent defendants in only half of the cases. Among the approximately five million business enterprises in China, only 4% of them currently have regular legal advisers. Moreover, only one-fifth of all lawyers in China have law degrees, and even a lower fraction of judges have formally studied law at a university or college. As mentioned before, a similar situation exists for auditors and accounting professionals.

3.4.7.5 Institutional Investors

In most developed stock markets institutional investors, such as insurance companies, pension funds, mutual funds, and hedge funds, play an important role. They employ well-

trained professionals who are able to evaluate companies well. This causes markets to have a higher degree of efficiency than if they are dominated by individual investors. In addition, there can be advantages in terms of corporate governance if institutional investors actively participate in the monitoring of firms' managers and are directly involved in firms' decision-making process as blockholders of stocks. For example, in the U.S., pension funds such as CALPERS have become the symbol of shareholder activism that strengthens corporate governance, while in Japan and Germany, financial intermediaries serve similar purposes. For China, the efficiency of China's stock markets as well as corporate governance of listed firms can be improved by further entry of domestic financial intermediaries that can act as institutional investors. With their large-scale capital and expertise in all relevant areas of business, financial intermediaries can provide a level of stability and professionalism that is sorely lacking in China's financial markets.

Currently institutional investors such as insurance companies, mutual funds and pension funds are relatively small in terms of assets held given their early stage of development. However, they are expanding dramatically. Among policies that can further encourage the development of such intermediaries are those that provide tax advantages to various types of products such as life insurance and pension related savings and investments.

3.4.7.6 A Greater Range of Financial Products and Markets

More financial products allow investors to form diversified portfolios with more than just stocks. As discussed above, corporate bond markets, along with better enforcement of bankruptcy laws and bond rating agencies, provide an alternative class of assets to stocks.

Second, the introduction of more derivative securities such as forwards, futures, and options on commodities (already in place and trading) as well as on other securities, enlarges the risk management toolbox of investors and firms. In fact, China has launched an index future on April 16th, 2010, tracking the Shanghai-based Hushen 300, the index of 300 Shanghai- and Shenzhen listed class A-shares. On the first day four contacts were traded. Of the 2,200 index future accounts opened as of May 4, 2010, 95% of them were individuals, and the rest were institutional investors. The proportion of institutional investors is expected to rise in the future, since the index future is targeted mainly toward more sophisticated investors for hedging purposes. The launch of this long awaited index future is a major step in the reform of capital markets in China and introduces a new tool for risk management. Along with the index future, margin trading and short selling of shares were also permitted in April.

Third, the expansion of their coverage and products (e.g., in property and auto insurance as well as life and medical insurance) by insurance companies, and the introduction and development of asset-backed securities and other structured finance products by financial services companies can further diversify the supply of financial products.

3.5 The Non-standard Financial Sector and Evidence on Hybrid Sector Firms

In this section we study how the non-standard financial sector supports firms in the Hybrid Sector to raise funds and to grow from start-ups to successful industry leaders. We also examine the alternative governance mechanisms employed by investors and firms that can substitute for formal corporate governance mechanisms. Due to data limitations, much of this

evidence is by necessity anecdotal or by survey.[68]

We first compare the Hybrid Sector with the State and Listed Sectors to highlight the importance of its status in the entire economy in Section 3.5.1. Second, we consider survey evidence in Section 3.5.2. Finally, Section 3.5.3 provides discussions and comparisons of alternative financing channels and governance mechanisms that support the growth of the Hybrid Sector versus formal financing channels (through banks and markets) and governance mechanisms (laws and courts).

3.5.1 Comparison of Hybrid Sector vs. State and Listed Sectors

Figure 24-A compares the level and growth of industrial output produced in the State and Listed Sectors combined vs. that of the Hybrid Sector from 1998 to 2009.[69] The output from the Hybrid Sector has been steadily increasing during this period and exceeded that of the other two sectors in 1998. The total output in 2009 is almost $5,700 billion for the Hybrid Sector, while it is around $2,500 billion in the State and Listed Sectors combined.[70] The Hybrid Sector grew at an annual rate of over 23% between 1998 and 2009, while the State and Listed Sectors

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[68] All firms including Hybrid Sector firms must disclose accounting and financial information to the local Bureau of Commerce and Industry, and most of the reports are audited. However, these data are then aggregated into the Statistical Yearbook without any firm-level publications.

[69] The National Bureau of Statistics (NBS) of China revised its total industrial output statistics in the 2000 year book without any explicit explanations. The outputs in previous years (i.e. 1997) were significantly revised down compared to the 1998 year book. To be consistent and avoid confusion, we only use data from the NBS after 1998.

[70] Due to data limitations, our calculations underestimate the output of the State and Listed Sectors. We use the output produced by SOEs and listed firms in which the state has at least a 50% ownership stake as the total output for these sectors, but this calculation excludes output from listed firms that are *not* majority owned by the state; the output for the Hybrid Sector is the difference between the total output and the total for the other two sectors. However, as mentioned above, only around 20% of all listed firms do not have the state as the largest owner, hence the total output of these firms is not likely to change our overall conclusion on the dominance of the Hybrid Sector over the other two sectors.

combined grew at around 15% during the same period.[71] In addition, the growth rates for investment in fixed assets of these sectors are comparable (China Statistics Yearbooks; and AQQ (2005)), which implies that the Hybrid Sector is more productive than the State and Listed Sectors. In fact, with large samples of firms (from sources) with various ownership structures, Liu (2007) and Dollar and Wei (2007) both find that the returns to capital is much higher in non-state sectors than the State Sector, and that a capital reallocation from state to private sectors will generate more growth in the economy. Fan et al. (2006) and Li et al. (2007) find that state-owned firms in China have a much easier access to the debt market and accordingly higher leverage than non-state firms. One reason for the differences is that due to government protection (for economic and social/political reasons) the costs for bankruptcy and financial distress are much lower for state-owned firms. These firms also have easier access to bank loans, especially credit extended by state-owned banks.

All of the above facts make the growth of the Hybrid Sector even more impressive. Not surprisingly, there has been a fundamental change among the State, Listed, and Hybrid Sectors in terms of their contribution to the entire economy: the State Sector contributed more than two thirds of China's GDP in 1980 and (non-agricultural) privately owned firms, a type of Hybrid Sector firm, were negligible, but in 2009 the State Sector only contributed 30% of the GDP (China Statistical Yearbook, 1998-2010). The above trend of the Hybrid Sector replacing the State Sector is likely to continue in the near future.

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[71] There is an ongoing process of privatizing SOEs. Potentially this may bias the growth rate of the Hybrid Sector higher, as there are firms shifting from the State Sector to the Hybrid Sector. However, the overwhelming majority of SOEs became Listed Sector firms (the main channel through which SOEs were partially privatized prior to 2004), thus this process is unlikely to change the validity of the results above.

Industrial Output by Sectors
（above Designated Size）
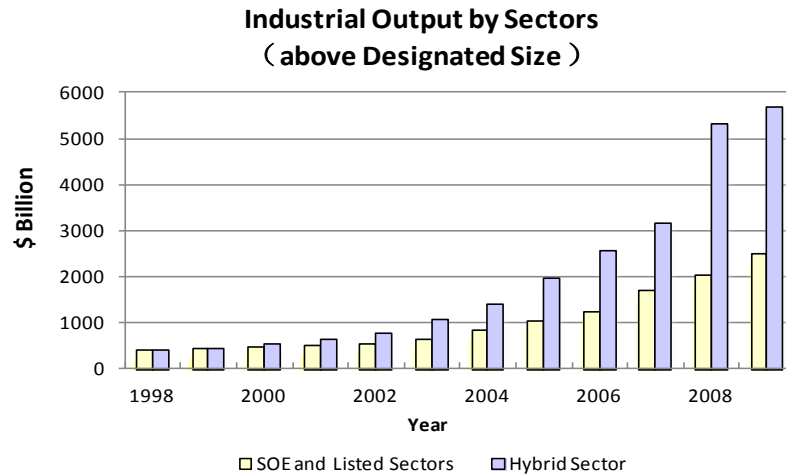
Figure 24-A Comparing the Sectors – Industrial Output
In this figure we plot total "industrial output" for State (SOEs) and Listed (publicly listed and traded firms) Sectors combined and for the Hybrid Sector (all the rest of the firms) during 2000 to 2008. Data source for this table is the Chinese Statistical Yearbook (2000 – 2009).

Employment by Sectors
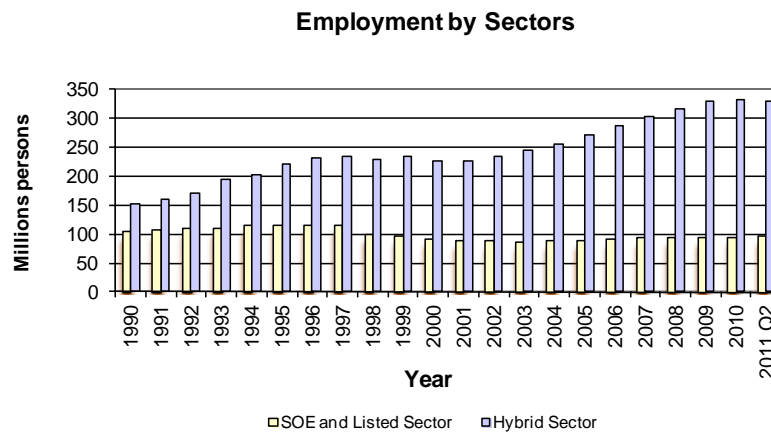
Figure 24-B Comparing the Sectors – Employment

In this figure we plot total number of workers employed by the State (SOEs) and Listed (publicly listed and traded firms) Sectors combined and by the Hybrid Sector (all the rest of the firms) during 1990 to 2008. Data source for this table is the Chinese Statistical Yearbook and CEIC database .

Figure 24-B presents the number and growth of non-agricultural employees in the three

sectors. The Hybrid Sector is a much more significant source for employment opportunities than the State and Listed Sectors. Over the period from 1990 to 2010, the Hybrid Sector employs an average of over 77% of all non-agricultural workers; the TVEs (part of the Hybrid Sector) have been the most important employers providing (non-agricultural) jobs for residents in the rural areas, while (non-agricultural) privately owned firms employ more than 40% of the workforce in the urban areas. Moreover, the number of employees working in the Hybrid Sector has been growing at 1.5% over this period, while the labor force in the State and Listed Sectors has been shrinking.[72] These patterns are particularly relevant for China, given its vast population and potential problem of unemployment.

3.5.2 Comparison of Hybrid Sector vs. State and Listed Sectors

Much of the information concerning the Hybrid Sector comes from surveys. We focus on evidence in AQQ (2005) and Cull and Xu (2005). The most significant findings of these surveys regarding financing channels are the following. First, during the startup stage, funds from founders' family and friends are an essential source of financing. Banks can also play an important role. Second, internal financing, in the form of retained earnings, is also important. During their growth period financing from private credit agencies (PCAs), instead of banks, as well as trade credits are key channels for firms in AQQ's sample. As documented by Tsai (2002), PCAs take on many forms, from shareholding cooperative enterprises run by professional money brokers, lenders and middlemen, to credit associations operated by a group of entrepreneurs (raising money from group members and from outsiders to fund firms; zijin huzushe), from pawnshops to underground private money houses.

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[72] Our calculations of the total number of workers employed by the Hybrid Sector actually underestimate the actual work force in the sector, because the *Chinese Statistics Yearbooks* do not provide employment data for all types of firms (by ownership structure), especially small firms, in the Hybrid Sector.

As far as corporate governance is concerned, when asked about what type of losses concern them the most if the firm failed, every firm's founders/executives (100%) included in the AQQ study said reputation loss is a major concern, while only 60% of them said economic losses are of major concern. Competition also appears to be an important factor ensuring firms are well run.

Cull and Xu (2005) find that firms in most regions and cities rely on courts to resolve less than 10% of business-related disputes (the highest percentage is 20%), with a higher reliance on courts in coastal and more developed areas. One reason that firms go to courts to resolve a dispute is because the courts are authoritative so that the dispute will be resolved even though the resolution may not be fair (e.g., Clarke et al. 2008).

3.5.3 Discussion on How the Non-standard Financial Sector Works

In this subsection we first discuss mechanisms within the non-standard financial sector in supporting the growth of the Hybrid Sector. We then compare these alternative institutions that operate outside the legal system with the law and legal institutions that have been widely regarded as the basis for conducting finance and commerce. There are two aspects to alternative financing channels in the Hybrid Sector. The first is the way in which investment is financed. The second is corporate governance. We consider each in turn.

Once a firm is established and doing well, internal finance can provide the funds necessary for growth. AQQ (2005) find that about 60 percent of the funds raised by the Hybrid Sector are generated internally. Of course, internal finance is fine once a firm is established but this raises the issue of how firms in the Hybrid Sector acquire their "seed" capital, perhaps the

most crucial financing during a firm's life cycle. AQQ present evidence on the importance of alternative and informal channels, including funds from family and friends and loans from private (unofficial) credit agencies (see also Tsai (2002)). There is also evidence that financing through illegal channels, such as smuggling, bribery, insider trading and speculations during early stages of the development of financial markets and real estate market, and other underground or unofficial businesses can also play a critical role in the accumulation of seed capital.

Perhaps the most significant corporate governance mechanism is competition in product and input markets, which has worked well in both developed and developing countries (e.g., McMillan 1995, 1997; Allen and Gale 2000b). What we see from the success of Hybrid Sector firms in WenZhou and other surveyed firms recounted in AQQ, suggest that it is only those firms that have the strongest comparative advantage in an industry (of the area) that survived and thrived. A relevant factor for competition in an industry is entry barriers for new firms, as lower entry barriers foster competition. Djankov, La Porta, Lopez-de-Silanes, and Shleifer (DLLS hereafter, 2002) examine entry barriers across 85 countries, and find that countries with heavier (lighter) regulation of entry have higher government corruption (more democratic and limited governments) and larger unofficial economies. With much lower barriers to entry compared to other countries with similar (low) per capita GDP, China is once again an "outlier" in the DLLS sample given that China is one of the least democratic countries, and such countries tend to have high barriers to entry. Survey evidence from AQQ (2005) reveals that there exist non-standard methods to remove entry barriers in China, which can reconcile these seemingly contradictory facts.

Another mechanism is reputation, trust, and relationships. Greif (1989, 1993) argues that certain traders' organizations in the 11th century were able to overcome problems of asymmetric information and the lack of legal and contract enforcement mechanisms, because they had developed institutions based on reputation, implicit contractual relations, and coalitions. Certain aspects of the growth of these institutions resemble what worked to promote commerce and the financial system in China prior to 1949 (e.g., Kirby (1995)) and the operation of the non-standard financial sector today (AQQ (2005)), in terms of how firms raise funds and contract with investors and business partners. In addition, Greif (1993) and Stulz and Williamson (2003) point out the importance of cultural and religious beliefs for the development of institutions, legal origins, and investor protections.

The above factors are of particular relevance and importance to China's development of institutions. Without a dominant religion, some argue that the most important force in shaping China's social values and institutions is the set of beliefs first developed and formalized by Kongzi (Confucius). This set of beliefs clearly defines family and social orders, which are very different from western beliefs on how legal codes are formulated. Using the World Values Survey conducted in the early 1990s, LLSV (1997b) find that China has one of the highest levels of social trust among a group of 40 developed and developing countries.[73] We interpret high social trust in China as being influenced by Confucian beliefs. Throughout this chapter and AQQ (2005; 2008) we have presented evidence that reputation and relationships make many financing channels and governance mechanisms work in China's Hybrid Sector.

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[73] Interestingly, the same survey, used in LLSV (1997b), finds that Chinese citizens have a low tendency to participate in civil activities. However, our evidence shows that, with effective alternative mechanisms in place citizens in the developed regions of China have a strong incentive to participate in business/economic activities.

There are other effective corporate governance mechanisms. First, Burkart et al. (2003) link the degree of separation of ownership and control to different legal environments, and show that family-run firms will emerge as the dominant form of ownership structure in countries with weak minority shareholder protections, whereas professionally managed firms are the optimal form in countries with strong protection. Survey evidence on the Hybrid Sector in AQQ and empirical results on the Listed Sector, along with evidence in Claessens et al. (2000, 2002) and ACDQQ (2008), suggests that family firms are a norm in China and other Asian countries, and these firms have performed well. Second, Allen and Gale (2000a) show that, if cooperation among different suppliers of inputs is necessary and all suppliers benefit from the firm doing well, then a good equilibrium with no external governance is possible, as internal, mutual monitoring can ensure the optimal outcome. AQQ (2005) and ACDQQ (2008) present evidence on the importance of trade credits as a form of financing for firms in the Hybrid Sector. Cooperation and mutual monitoring can ensure payments (as long as funds are available) among business partners despite the lack of external monitoring and contract enforcement. The importance of trade credits is also found in other emerging economies (e.g., ACDQQ (2012) on India) as well as in developed countries (Burkart et el. (2011) on the U.S.).

It is worth mentioning how entrepreneurs and investors alleviate and overcome problems associated with government corruption. According to proponents of institutional development (e.g., Rajan and Zingales 2003b; Acemoglu and Johnson 2005), poor institutions, weak government and powerful elites can severely hinder China's long-run economic growth. However, our evidence shows that corruption has not prevented a high rate of growth for China's firms, in particular, firms in the Hybrid Sector, where legal protection is perhaps weaker and problems of corruption worse compared to firms in the State and Listed sectors.

A potentially effective solution for corruption is competition among local governments/bureaucrats from different regions within the same country. Entrepreneurs can move from region to region to find the most supportive government officials for their private firms, which in turn motivates officials to lend "helping hands" rather than "grabbing hands" in the provision of public goods or services (e.g., granting of licenses to start-up firms), or else there will be an outflow of profitable private businesses from the region (Allen and Qian 2009). This remedy is typically available in a large country with diverse regions like China. Complementing this view, Xu (2011) reviews China's unique institutional foundation of "regionally decentralized authoritarian system," in which the sub-national governments have considerable autonomous power over regional economic decisions and at the same time remain under the control of the central government. Under this structure, local governments play a major role in supporting TVEs, allocating bank credits to firms, choosing good firms to get listed. This system alleviates the information problem that regulators face, and creates incentives for sub-national governors though personnel control and regional competition. Xu argues that this governance structure is responsible for the spectacular economic growth of China, despite weak enforcement of formal laws.

To summarize, the extraordinary economic performance of China in recent decades, especially that of the Hybrid Sector, raises questions about the conventional wisdom of using the legal system as the basis of commerce. Most observers would characterize the economic performance in China and India as 'successful despite the lack of western-style institutions,' and the failure to adopt western institutions will be one of the main factors to halt the long-run economic growth. By contrast, Allen and Qian (2010) argue that China's economy has been successful because of this lack of western-style institutions – in that conducting business outside

the legal system in fast-growing economies such as China can actually be superior to using the law as the basis for finance and commerce.

Focusing on dispute resolution and contract enforcement mechanisms based on the law and courts vs. alternative mechanisms operating outside the legal system, Allen and Qian (2010) argue that despite many well-known advantages, there are disadvantages in using legal institutions. First, recent research on political economy factors, and in particular, work by Rajan and Zingales (2003a,b) shows that rent-seeking behaviors by vested interest groups can turn legal institutions into barriers to changes. We expect these problems to be much more severe in developing countries and the costs of building good institutions can be enormous.[74] One way to solve this problem is not to use the law as the basis for commerce but instead to use alternative mechanisms outside the legal system. Evidence presented in this chapter and other related work on China and other emerging economies (e.g., ACDQQ (2012) on India) suggests that these alternative mechanisms can be quite effective.

Second, in democracies there can be a lengthy political process before significant changes can be approved (by the majority of the population and/or legislature), and the people in charge of revising the law (e.g., politicians and judges) may lack the expertise of business transactions and have limited capacity (time and effort) to examine the proposed changes.[75] In

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[74] A frequently talked about and controversial topic is intellectual property rights including patents and copyrights. The practice of enforcing intellectual property rights by courts is much more vigilant and prevalent in developed countries than in developing countries such as China. An extensive literature in economics has found mixed evidence on the relationship between patent/copyright protection and the pace of innovations. While exclusive property rights provide strong incentives for innovations and do lead to more innovations in a few industries such as chemicals and pharmaceuticals, excessive protection deters competition, which is another important factor in spurring innovations.

[75] A good example is the U.S. payment system. At the beginning of the 21st Century the U.S. had a 19th Century system: Checks had to be physically transported from where they were deposited to a central operations center, then to the clearer and then back to the banks they were drawn on. Despite repeated calls for changes from the banks and businesses, the U.S Congress did not act on this simple yet costly problem,

the context of a fast-growing economy with frequent changes such as China, Allen and Qian (2010) show that there is an additional advantage of using alternative institutions because this type of system can adapt and change much more quickly than when the law is used. In particular, competition can ensure the most efficient mechanism prevails and this process does not require persuading the legislature and the electorate to revise the law when circumstances change.

To conclude, we argue that while legal institutions along with formal financing channels are an integral part of developed economies' institutions, alternative mechanisms and financing channels play a much more prominent role in emerging economies, and can be superior to legal mechanisms in supporting business transactions in certain industries or entire economies. Therefore, the development of alternative dispute resolution and contract enforcement mechanisms alongside the development of legal and other formal institutions can promote a broader base of economic growth that is also more sustainable in emerging economies. The coexistence of and competition between alternative and legal mechanisms can also exert positive impact on the development of legal institutions, so that they are less likely to be captured by interest groups and become more efficient in adapting to changes.

3.6 Financial Crisis

Financial crises often accompany the development of a financial system. Conventional wisdom says that financial crises are bad. Often they are very bad, as they disrupt production

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until after September 11, 2001. After the terrorist attack all commercial flights were grounded for several days, completely halting the check clearing process. The Check Clearing for the 21st Century Act was signed in October 2003, allowing electronic images to be a substitute for the original checks, and thus the clearing process is no longer dependent on the mail and transportation system.

and lower social welfare as in the Great Depression in the U.S. Hoggarth et al. (2002) carefully measure the costs of a wide range of recent financial crises and find that these costs are on average roughly 15-20 percent of GDP. It is these large costs that make policymakers so averse to financial crises.

It is worthwhile to point out, however, that financial crises may be welfare improving for an economy. One possible example is the late nineteenth century U.S., which experienced many crises but at the same time had a high long run growth rate. In fact, Ranciere et al. (2003) report an empirical observation that countries which have experienced occasional crises have grown on average faster than countries without crises. They develop an endogenous growth model and show theoretically that an economy may be able to attain higher growth when firms are encouraged by a limited bailout policy to take more credit risk in the form of currency mismatch, even though the country may experience occasional crises (see Allen and Oura (2004) for a review of the growth and crises literature, Allen and Gale (2004a) who show that crises can be optimal and Allen and Gale (2007) for a review of the crises literature).

In this section, we consider financial crises in China. Given China's current situation with limited currency mismatches any crisis that occurs is likely to be a classic banking, currency or twin crisis. It is perhaps more likely to be of the damaging type that disrupts the economy and social stability than of the more benign type that aids growth. The desirability of preventing crises thus needs to be taken into account when considering reforms of China's financial system. First, we examine how China can prevent traditional financial crises, including a banking sector crisis and a stock market or real estate crisis/crash. We then discuss the impact of different types of financial crises, such as the "twin crises" (simultaneous foreign exchange and

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banking/stock market crises) that occurred in many Asian economies in the late 1990s, on China.

3.6.1 Banking Crises and Market Crashes

Among traditional financial crises, banking panics, arising from the banks' lack of liquid assets to meet total withdrawal demands (anticipated and unanticipated), were often particularly disruptive. Over time one of the most critical roles of central banks came to be the elimination of banking panics and the maintenance of financial stability. To a large degree central banks in different countries performed well in this regard in the period following the Second World War. However, in recent years, banking crises are often preceded by abnormal price rises ("bubbles") in the real estate and/or stock markets. At some point the bubble bursts and assets markets collapse. In many cases banks and other intermediaries are overexposed to the equity and real estate markets, and following the collapse of asset markets a banking crisis ensues. Allen and Gale (2000c) provide a theory of bubbles and crises based on the existence of an agency problem. Many investors in real estate and stock markets obtain their investment funds from external sources. If the providers of the funds are unable to observe the characteristics of the investment, and because of the investors' limited liability, there is a classic risk-shifting problem (Jensen and Meckling 1976). Risk shifting increases the return to risky assets and causes investors to bid up asset prices above their fundamental values. A crucial determinant for asset prices is the amount of credit that is provided for speculative investment. Financial liberalization, by expanding the volume of credit, can interact with the agency problem and lead to a bubble in asset prices.

As discussed above in Section 3.3, if NPLs continue to accumulate and/or if growth slows

significantly then there may be a banking crisis in China. This may involve withdrawal of funds from banks. However, given the government's strong position regarding the low level of debt (Table 21-A), it is feasible for the government to prevent this situation from getting out of control. Since the real estate markets in Shanghai and Shenzhen (largest volume and most developed) and other major cities have already experienced bubbles and crashes (see China Industry Report, http://www.cei.gov.cn, http://house.focus.cn and Cao and Liao (2008) for more details), it is quite possible that similar episodes in the future could cause a banking crisis that will be more damaging to the real economy. With booming real estate markets, there will be more speculative money poured into properties with a large amount coming from banks. The agency problem in real estate lending and investment mentioned above worsens this problem. If the real estate market falls significantly within a short period of time, defaults on bank loans could be large enough to trigger a banking panic and crisis. The size of the stock market during the first decade of its existence was small relative to the banking sector and the overall economy, and hence a crash in the market could hardly put a dent in the real economy. However, given the quick growth of the stock market (as shown in Table 23-A) and the fact large and small investors may borrow (from banks) to finance their investment, especially during a bubble period, a future market crash could have much more serious consequences. Overall, a banking crisis triggered by crashes in the real estate and/or stock markets represents the most serious risk of a financial crisis in China.

Having said that, we also want to point out that the Chinese government has maintained strong control over the big banks through their (nontradable) shareholdings. While government control may have a negative effect in more developed countries in terms of efficiency, it may be beneficial in countries with less developed financial markets. In particular,

the government can help to control the risk taking behaviors of the banks by regulations and direct interventions as a shareholder. Moreover, in the case of a crisis, the government has the ability to speed up the recovery and maintain the stability of the market by loan expansion if it has control over major banks. In fact, the Chinese banking sector and financial markets were not affected much by the 2007-2009 global financial crisis. Though we recognized earlier in the paper that government's dual roles as regulator and as majority owner can be problematic, this can also be beneficial both in terms of preventing and coping with a crisis.

3.6.2 Capital Account Liberalization, Sterilization, Twin Crises and Contagion

After the collapse of the Bretton Woods system in the early 1970s, a different breed of financial crisis emerged. Lindgren, Garcia, and Saal (1996) found that three quarters of the IMF's member countries suffered some form of banking crisis between 1980 and 1996, and their study did not include the subsequent Asian financial crisis in 1997. In many of these crises, banking panics in the traditional sense were avoided either by central bank intervention or by explicit or implicit government guarantees. But as Kaminsky and Reinhart (1999) find, the advent of financial liberalization in many economies in the 1980s, in which free capital in- and out-flows and the entrance and competition from foreign investors and financial institutions follow in the home country, has often led to "twin" banking and currency crises. A common precursor to these crises was financial liberalization and significant credit expansion and subsequent stock market crashes and banking crises. In emerging markets this is often then accompanied by an exchange rate crisis as governments choose between lowering interest rates to ease the banking crises or raising them to defend the home currency. Finally, a significant fall

in output occurs and the economies enter recessions.

3.6.2.1 Capital Account Liberalization, Sterilization, Twin Crises and Contagion

Capital account liberation can attract more foreign capital, but large scale and sudden capital flows and foreign speculation significantly increase the likelihood of a twin crisis. The first key question is, when and to what extent a country opens its capital account and financial sector to foreign capital and foreign financial institutions? With a model of endogenous financial intermediation, Alessandria and Qian (2005) demonstrate that an efficient financial sector prior to liberalization is neither necessary nor sufficient for a successful financial liberalization. Applying these ideas to China, even though the overall efficiency of China's banking sector (especially state-owned banks) is still low compared to international standards, banks can have a stronger incentive to limit the moral hazard concerning borrowers' choices of investment projects through monitoring and designing of loan contracts (e.g., adjusting interest rates and/or maturities) following a capital account liberalization. Therefore, the efficiency of the banking sector improves and the liberalization can generate a large welfare increase, since it leads to both a larger scale of investment *and* a better composition of investment projects. This is more likely to occur with low interest rates in international markets (so that cost of capital for domestic banks is also low). A financial sector liberalization, which allows foreign financial institutions to enter China's lending markets, can further improve welfare as more competition provides stronger incentives for all banks to further discourage moral hazard in investment.

3.6.2.2 Sterilization of Foreign Currency Reserves

China has experienced a large increase in its foreign exchange reserves since 2001, due

to a continuous inflow of capital and the commitment to maintain a fixed rate against the US

dollar initially and then a crawling peg exchange rate regime after 2005. Figure 25-A plots the

exchange rate of RMB against US dollar. The RMB kept appreciating against US dollar until mid

2008, when the exchange rate stayed flat again at around 6.83 RMB/US$. It resumed the path

of appreciation in June 2010 and the exchange rate further dropped to 6.5 RMB/US by April

2011. Figure 25-B plots monthly foreign reserves as shown on the balance sheet of the PBOC; a

clear trend emerges as the reserves increased rapidly since 2003.[76] On the balance of payments

side, the current account surplus grew from $37 billion in 1997 to $305.4 billion in 2010; net

export grew from 2.5% of GDP in 2004 to 8% of GDP in 2008 and then dropped to 3.1% in 2010

due to a decrease in net exports. The capital account was mostly positive during the period 1995

to 2009, implying a net capital inflow. The current account surplus has come mainly from trade

surpluses, while the capital account surplus mainly comes from FDI. It has long been recognized

that a large stock of foreign reserves has both pros and cons. Abundant foreign reserves enable

a country to maintain a stable exchange rate and to meet its foreign debt obligations. It can also

be used to cushion the sudden shocks on a country's current and capital accounts. However, an

increase in foreign exchange reserves leads to an accumulation of foreign assets, a component

of the monetary base. Thus an increase in foreign reserves, ceteris paribus, causes monetary

expansion and puts inflationary pressures on the economy, resulting in an appreciation of the

real exchange rate. This experience is not unique for China. Many East Asian countries have

experienced similar problems induced by large (private) capital inflows starting in the late 1980s.

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[76] The PBOC has made use of its foreign reserves in ways other than investing in low risk assets such as long term government bonds. As discussed above, some foreign reserves were used to recapitalize the large state owned financial institutions.

Exchange Rate of RMB/USD and HK/USD (2000-Sept.2011)
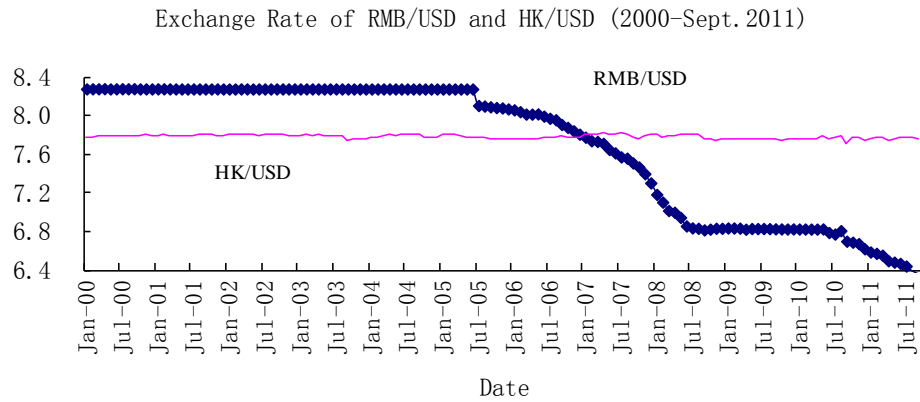
Figure 25-A Trends of Exchange Rates (US$, RMB, and HK$)

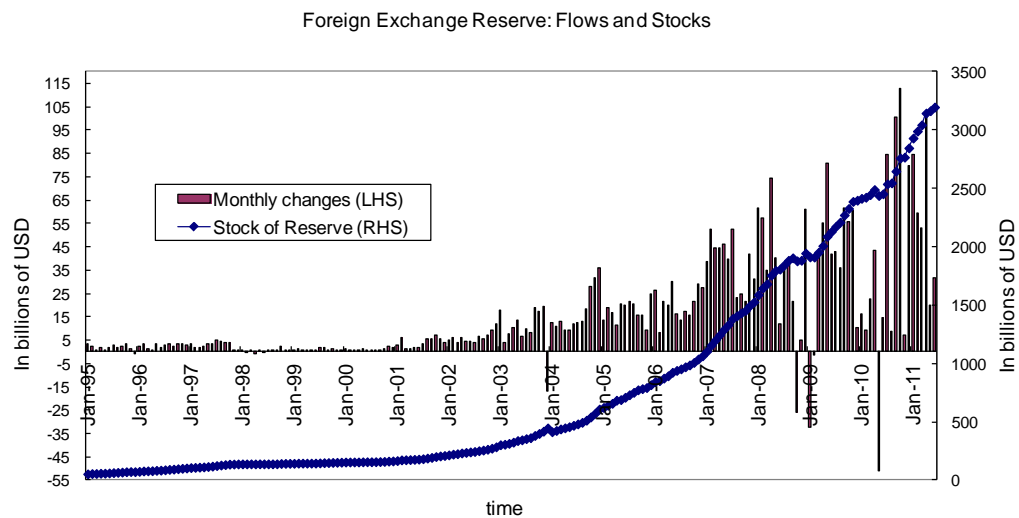Foreign Exchange Reserve: Flows and Stocks

Figure 25-B China's Foreign Exchange Reserves

To offset the expansionary effect of the increasing foreign reserves, the central bank can

sterilize the foreign assets by taking opposite actions with domestic assets, or implement other

contractionary monetary policies. In China's case, the major sterilization tools are open market

operations (OMO) and raising required reserve ratios. These two methods affect the liability

side of the central bank's balance sheet in a similar way. Generally the cost of sterilization using

required reserves is lower than open market operations, since the central bank pays minimal

interest on required and excess reserves. OMOs in China mainly include central bank bill

issuance and short term repurchases operations (repos, usually within 91 days). Since February

2003, the central bank has engaged in two or more OMOs each week. The total PBOC bonds

outstanding as percentage of foreign reserves has been increasing consistently from 2000 to

2010, implying an increasing trend in sterilization.[77]

Moreover, China has been gradually raising the required reserve ratios since the third

quarter of 2003, corresponding to an increase in foreign reserves inflows. The required reserve

ratio rose from 6% to 21.5% in June 2011, an historical high. Since Chinese commercial banks

tend to maintain a high excess reserve ratio due to a lack of alternative investment channels,

the PBOC has decreased the interest rate on excess reserves from 1.62% in 2003 to 0.72% in

2008 to discourage the hoarding of excess reserves. To make sterilization effective, China also

has to impose tight capital controls. As the famous "trilemma" implicates, with a fixed exchange

rate and free capital flows, the sterilization process will be immediately offset by further capital

inflows. Though it has been documented that capital controls in China are somewhat porous

(Prasad and Wei (2007)), it is still widely believed that China has successfully sterilized at least

some of its rising foreign reserves (e.g., Prasad and Goodfriend (2006), Ouyang, Rajan and

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[77] There are also non-market tools such as transferring the deposits from the commercial banking system to the central bank. In recent years, the PBOC also started making foreign exchange swaps with big commercial banks as a tool for controlling liquidity.

Willett (2007), He. at el. (2005)). Moreover, due to a combination of rapid increases in foreign reserves and low interest rates on domestic bonds, the PBOC's income from foreign reserve investment is likely to exceed the sterilization cost stemming from central bank bill issuance and high required reserve ratios, enabling China to carry out sterilization to a large extent. Nevertheless, possible appreciation of the RMB may have a profound negative impact on the PBOC's income from foreign reserves in domestic currency terms.

3.6.2.3 Currency Crisis and Banking Crisis (A Twin Crisis)

A currency crisis that may trigger a banking crisis is a possibility. The rapid increase in foreign exchange reserves in recent years suggests there is a lot of speculative money in China in anticipation of an RMB revaluation. If there is a significant future revaluation or if after some time it becomes clear there will not be one then much of this money may be withdrawn. What happens then will depend on how the government and central bank respond. If they allow the currency to float so they do not use up the exchange reserves then any falls in the value of the RMB may occur quickly and this may limit further outflows. If they try to limit the exchange rate movement then there may be a classic currency crisis. This is in turn may trigger a banking crisis if there are large withdrawals from banks as a result. Quickly adopting a full float can help to avoid a twin crisis, and thus reduce the overall economic costs of the currency crisis.[78]

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[78] Chang and Velasco (2001) develop a model of twin crises based on the Diamond and Dybvig (1983) model of bank runs. Money enters agents' utility function, and the central bank controls the ratio of currency to consumption. In some regimes, there exists both a "good" equilibrium in which early (late) consumers receive the proceeds from short-term (long-term) assets, and a "bad" equilibrium in which everybody believes a crisis will occur and these beliefs are self-fulfilling. If the bad equilibrium occurs, there is a twin crisis.

3.6.2.4 Financial Contagion

Another phenomenon that has been present in many recent crises (e.g., the 1997 Asian crisis) is that financial crises are contagious. A small shock that initially affects only a particular region or sector can spread by contagion within the banking system or asset markets to the rest of the financial sector, then to the entire economy and possibly other economies. Contagion can occur in a number of ways. In the Chinese context with tight capital control and where financial markets are relatively unimportant it is most likely they will occur either from contractually interconnected financial institutions or large asset price movements that cause spillovers to financial institutions.

Allen and Gale (2000d) focus on the channel of contagion that arises from the overlapping claims that different regions or sectors of the banking system have on one another through interbank markets. When one region suffers a banking crisis, the other regions suffer a loss because their claims on the troubled region fall in value. If this spillover effect is strong enough, it can cause a crisis in the adjacent regions, and a contagion can occur which brings down the entire financial system. Allen and Gale (2004b) show how large price falls can come about as a result of forced liquidations when there is a limited supply of liquidity in the market. Cifuentes et al. (2005) show that contagion is likely to be particularly severe when these two factors interact.

Table 25 Trading Volume of National Interbank Market
(RMB billion)

Maturity	Overnight	7 days	20 days	30 days	60 days	90 days	120
2001	103.88	560.69	93.35	35.28	9.40	4.73	0.87
2002	201.52	852.34	100.35	29.17	10.78	4.76	11.81
2003	641.89	1,456.31	56.60	44.11	10.14	10.18	2.81
2004	283.34	1041.41	30.67	18.93	9.20	5.84	2.57
2005	223.03	896.26	60.42	29.91	7.51	14.09	1.54

2006	635.21	1290.43	38.13	19.11	12.03	5.22	1.41
2007	8030.47	2178.01	50.16	34.16	27.94	31.80	13.34
2008	10651.36	3500.47	110.71	113.55	44.52	66.61	18.50
2009	16166.60		102.15	204.84	53.80	71.00	62.3
2010	24486.20		65.01	161.30	46.61		19.75

Source: The People's Bank of China (2001-2010).

Given China's current financial system, what is the likelihood of financial contagion caused by contractual interlinkages as in the interbank market or because of a meltdown in asset prices if there are forced sales? China's interbank market grew very quickly since its inception in 1981; in fact, the growth of this market was so fast, with the participation of many unregulated financial institutions and with large amount of flows of funds through this market to fixed asset investment, that it exacerbated high inflation in the late 1980s. Since then the government and PBOC increased their regulation by limiting participation of non-bank financial institutions and by imposing restrictions on interest rate movements. In 1996 a nation-wide, uniform system of interbank markets was set up. It contains two connected levels: the primary network, which includes the largest PBOC branches, large commercial banks, and a few large non-bank financial institutions, and the secondary network that includes many banks and non-bank institutions and their local branches (see China Interbank Market Annual Reports for more details). Table 25 documents the growth of the interbank market during 2001-2010: while the trading volume of long maturity contracts (20 days or longer) is low, the volume of short-term contracts (overnight and week-long) has been high (reaching RMB 10 trillion to 20 trillion, or $1.5 billion to $2.9 billion). Therefore, the increasing interlinkages can potentially create a contagion if a crisis develops in one area or sector.

With regard to a meltdown of asset prices, this can happen because of a limited supply of liquidity if there is a rapid liquidation of assets. It seems unlikely that this can occur and cause a serious problem in China's securities markets. A more serious threat is real estate markets if

there are bankruptcies and forced selling. This could potentially interact with bank interlinkages and cause a systemic problem. As mentioned above, a crash in real estate and/or stock markets could quite possibly be the cause of a financial crisis in China.

3.7 Summary and Concluding Remarks

One of the most frequently asked questions about China's financial system is whether it will stimulate or hamper its economic growth. Our answer to this question, based on examining the history and current status of the financial system and comparing them to those of other countries, is in four parts. First, the large banking sector dominated by state-owned banks has played a much more important role in funding the growth of many types of firms than financial markets. While the problem of NPLs has been under control in recent years, continuing the improvement of the efficiency of major banks toward international standards will allow growth to continue. Second, the stock market has been growing fast since 1990, but has played a relatively limited role in supporting the growth of the economy. However, with rapid growth that is likely to be sustained in the near future the role of the financial markets in the economy will become increasingly more significant.

If we can summarize that the role of the banking sector and financial markets has been that they have done enough not to slow down the growth of the economy, our third conclusion is that alternative financing channels have had great success in supporting the growth of the Hybrid Sector, which contributes most of the economic growth compared to the State and Listed Sectors. The non-standard financial sector relies on alternative financing channels including internal finance, and on alternative governance mechanisms, such as those based on trust, reputation and relationships, and competition in output and input markets to

support the growth of the Hybrid Sector. It is possible that these alternative institutions are superior to western-style legal institutions in supporting a fast-growing economy such as China's.

We conclude by pointing out that economic stability is crucial for the continuing development of the Chinese economy, and the stability of the financial system relates to economic stability in three dimensions. The continuing effort by banks to reduce NPLs and improve efficiency can help to avoid a banking crisis, while the efforts to improve the regulatory environment surrounding the financial markets (including governance and accounting standards) can help to prevent a crash/crisis in the stock and/or real estate markets. If China further opens the capital account, there will be a large inflow of foreign capital, but large scale capital flows and speculations also bring the risk of a twin crisis (foreign exchange and banking/stock market crisis), which severely damaged emerging economies in Asia in 1997.

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