4 Does financial repression retard China's economic growth?

An empirical examination

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4.1 Introduction

It has long been argued that financial repression is detrimental to economic growth. In their seminal works, McKinnon (1973) and Shaw (1973) show that a repressed financial sector discourages both savings and investment because the rates of return are lower than what could be obtained in a competitive market. In such a system, financial intermediates do not function at their full capacity and fail to channel savings into investment efficiently, thereby impeding the development of the overall economic system.

The influence of financial repression, especially interest rate distortion, has been tested by numerous empirical studies, many of which have identified a negative association between interest rate repression and certain fundamental macroeconomic variables, such as savings rates, investment, and economic growth (Fry 1978, 1997; Roubini and Sala-i-Martin 1992). Other repression policies, such as entry restrictions and state ownership in the banking sector, have also proven to be harmful to financial development (Barth *et al.* 2006; World Bank 2001).

There are certain anomalies to the predication of financial repression theory, however. For example, China's financial system conforms to the stereotype described by financial repression theory: interest rates are still controlled by the government and credit allocation is heavily influenced by political factors rather than commercial motives. A puzzle emerges: although theory indicates that financial repression is harmful to economic growth, China has achieved remarkable success in economic development over the past several decades in spite of its repressed financial system.

In this chapter, we will try to solve this puzzle. We will show that the connection between financial repression and economic growth is more complicated than has been suggested by previous studies; on the one hand, financial repression could arguably promote China's economic growth by lowering the cost of capital, thereby encouraging investment and production. On the other hand, evidence shows that financial repression endangers China's economic health by damaging its economic efficiency, slowing job creation, and

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distorting the country's economic structure. A repressed financial system therefore acts as a double-edged sword for economic growth in China.

The rest of the chapter is organized as follows. Section 4.2 describes the historical development of China's financial system. Section 4.3 discusses the repressed nature of China's financial system and the channels through which financial repression may influence economic growth in China. Section 4.4 empirically examines of the connections between financial repression and economic growth in China. Finally, Section 4.5 concludes.

4.2 China's financial development

When economic reforms began in the late 1970s, it could hardly be said that there was a real financial system in China. The situation has changed drastically since the beginning of economic reforms. The People's Bank of China (PBOC), which served as both a central bank and a commercial bank during the planned economy era, was gradually stripped of its corporate finance functions and began operating as the country's central bank. Four state-owned banks, namely, the Agriculture Bank of China (ABC), the Bank of China (BOC), the People's Construction Bank of China (PCBC, renamed the China Construction Bank, or CCB, in 1996), and the Industrial and Commercial Bank of China (ICBC), then emerged to function as financial intermediaries, and provide commercial banking services.

Given their magnitude[2] in China's financial system, the four State-owned banks (later known as the 'Big Four') have always been the focus of financial reform and appear to undergo an overhaul every ten years. In 1994, the government created three new policy banks – the Agricultural Development Bank, the China Development Bank, and the Export-Import Bank – which were expected to assume responsibility for policy lending, relieving the Big Four of the obligation to extend loans for policy purposes. In 1995, China enacted the Commercial Bank Law, which laid the legal foundation for the commercialization of the State-owned banks by, for example, mandating that banks should be responsible for their own profits and losses, as well as stipulating technical requirements such as capital-adequacy ratios in line with international banking practice. Another round of banking reforms was launched in 2004, which ultimately led to the limited privatization of the Big Four through the recruitment of strategic investors and listing on stock exchanges (Walter and Howie 2011).

Beginning in the mid-1980s, the state began to increase competition in the financial sector by allowing the entry of new financial institutions, including new commercial banks and non-bank financial entities. By the end of 2012, China had 12 joint-stock banks[3] 144 city commercial banks, 337 rural commercial banks, 147 rural cooperative banks, 1,927 rural credit cooperatives, 1 postal savings bank, 4 banking asset management firms, 42 locally incorporated foreign banking institutions, 67 trust companies, 150 finance companies owned by corporate groups, 20 financial leasing companies, 5

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money brokerage firms, 16 auto financing companies, 4 consumer finance companies, 800 village or township banks, 14 lending companies, and 49 rural mutual cooperatives. Overall, there were 3,747 banking institutions employing 3,362 million people and holding financial assets of CNY133.6 trillion.[4] It can therefore be argued that China's financial system is much more diversified and competitive than before.

Compared with its banking sector, China's financial markets, including both stock and bond markets, are less developed and less important. Following their creation in 1990, China's domestic stock exchanges, the Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE), grew quickly, if unsteadily. At the end of 2012, there were 2,494 companies listed on the SHSE and SZSE, and the total market capitalization reached CNY23.04 trillion, equivalent to 44.36 per cent of GDP in fiscal year 2012.[5] By the same year, the SHSE was the seventh largest exchange in the world in terms of market capitalization and the fourth largest in terms of the value of shares traded.[6]

Following decades of development, however, the level of market depth remains quite low. While the total market capitalization was equivalent to 44.36 per cent of GDP in 2012, part of the total market capitalization was represented by non-tradable shares owned by 'legal persons' or government entities. Excluding the value of these non-tradable shares left China with an equity depth of only 35 per cent of GDP, which was very low compared with other countries. In fact, before 2006, the ratio of the market capitalization of tradable shares to GDP had never been higher than 20 per cent.[7]

The underdevelopment of the bond market, especially the corporate bond market, relative to the banking sector further diminishes the role played by direct financing in serving the economy. The largest component of the bond market is the government bond. Compared to the market for government-issued bonds, the corporate bond market is minuscule: in terms of the amount of outstanding bonds at the end of 2004, the corporate bond market is less than one-twelfth of the size of the government bond market (CNY2577.76 billion) (Allen *et al.* 2008). The ratio of corporate bonds to GDP in China in 2004 was only 1 per cent, giving the country a lower ranking on an international comparison.

In general, after three decades of reform and development, China's financial system has been fundamentally changed. On the surface, China has virtually all the institutions of a modern financial system: a central bank in charge of setting monetary policy, a diversified banking system that consists of, for example, commercial banks and policy banks, and a capital market on which over 2,000 companies are listed.

However, China's financial system has lagged behind the rest of the economy in the transition process. The most serious problem faced by China's financial system is the dominance of its banking sector, which, according to Naughton (2007: 459) "has been one of China's most protected industries, overregulated, dominated by state ownership, and protected from international competition." The scarce capital is thus allocated inefficiently and

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unproductively. Consequently, China's financial system is claimed to be "both distorting China's growth and holding it back" (McKinsey Global Institute 2006) and is regarded as the "economy's Achilles' heel" (Dobson and Kashyap 2006).

4.3 Is financial repression detrimental to China's economic growth? A theoretical discussion

4.3.1 Financial repression in China

Interest rate controls stand out as the most salient component of the Chinese version of financial repression. The PBOC maintains the cap on deposit rates for all financial institutions and, until 20 July 2013, also maintained the floor on loan rates. More importantly, the central bank appears to adjust the benchmark interest rates in an asymmetric manner in response to inflation (Liu *et al.* 2009). Thus, the central bank is quicker to adjust deposit and lending rates downward than upward. When inflation increases, the rigidity of interest rates leads to lower or even negative real interest rates. This trend has become more obvious since 2004 (Lardy 2012).

The direct result of the central bank's approach to setting nominal interest rates is that household interest earnings, on average, have been far less than they would have been in a more liberalized financial environment, where market forces play a major role in determining interest rates. In contrast, the corporate sector benefits greatly from such a monetary policy. The low real interest rates mean that the cost of capital for firms is artificially reduced and investment in projects that have low returns is encouraged. The low cost of capital in China has made it an anomaly in comparison with other countries, developed or developing (Geng and N'Diaye 2012)

In addition to interest rate controls, China's economy suffers from other financial repression policies, namely, credit misallocation, the dominance of State ownership, and exchange rate distortion. Credit misallocation means that scarce financial resources have been systematically and continually allocated to less profitable but more politically preferable entities, especially State-owned enterprises (SOEs), whereas private firms, which have become the driving force of China's economic growth, are forced to rely on informal and even underground credit channels to finance their survival (Huang 2006).

After several decades of economic reform, China's non-State sector has replaced SOEs as the key driver of China's economic growth (World Bank 2012). The non-state sector, however, especially private enterprises, has been intentionally discriminated against in terms of credit access and availability. For example, Huang (2006) shows that domestic private firms in China are among the most financially constrained in the world. In addition, Brandt and Zhu (2007) find that over the period from 1998 to 2003, the state sector, defined to include shareholding companies in which governments have

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significant ownership shares, continued to absorb between one-half and two-thirds of new bank lending.

China has the highest level of State ownership of banks of any major economy in the world. For example, Barth *et al.* (2006: 148–9) report that, by the end of 2001, while 87 countries had some government ownership of banks, in only 15 countries did the percentage of bank assets at government-owned banks exceed 50 per cent; China was identified as having the highest level of government ownership (98 per cent of bank assets were held by State-owned banks (SOBs)). China's situation also stands in contrast to the experience of Eastern Europe's transitional economies and other emerging markets. The McKinsey Global Institute (2006) shows that SOBs accounted for 83 per cent of bank assets in China in 2004, compared with 33 per cent in Brazil, 18 per cent in South Korea, 20 per cent in Poland, and 16 per cent in Chile. Similarly, Deng *et al*. (2011) claim that 18 of the 20 largest banks are directly State controlled and, at the end of 2009, accounted for CNY58.58 trillion, or approximately 73 per cent, of total bank assets.

Notwithstanding some significant institutional changes such as corporatization and public listings, China's SOBs for the most part continue to be governed as before. The top executives in Chinese SOBs are confronted with two different and often conflicting missions, namely, to advance the government's political objectives, and to optimize the bank's financial performance. When these two missions contradict each other, the former always dominates. In addition to the "policy burden" or "multitasking" problem, China's SOBs have been further criticized for a lack of effective internal risk management, and control systems, for weakness in information collection, data analysis, and credit assessment, and for their failure to integrate their local branches into unified national systems (McKinsey Global Institute 2006).

Finally, China's currency policy has always been criticized for its pursuit of mercantile advantage by devaluing the RMB and hence stimulating exports. For example, Goldstein and Lardy (2008) conclude that "any methodology that defines the equilibrium exchange rate for the renminbi as the real effective exchange rate that would produce 'balance' in China's global current account position, or in its basic balance, or in its overall balance-of-payment position, yields the qualitative conclusion that the renminbi is significantly undervalued and most likely by an increasing margin over time." Similarly, a Report issued by the International Monetary Fund (IMF) claims that "the renminbi remains moderately undervalued against a broad basket of currencies" (IMF 2013).

An inflexible exchange rate, in turn, requires a large set of distortionary policies for its maintenance over long periods. For example, Prasad (2009) shows that China's monetary policy independence has been severely weakened by the undervalued currency strategy. More specifically, as a result of China's undervaluation of its currency, the volume of export continually increases, capital inflows steadily grow, and a dramatic accumulation of foreign exchange reserves has been observed. In order to sterilize the liquidity

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generated by this growth pattern (and to address the corresponding inflation problem) the PBOC has to set interest rates administratively at very low levels so that its sterilization costs can be minimized and the speculative capital inflows can be discouraged. Distorted interest rates, as we have argued, will in turn lead to inefficient consequences.

4.3.2 The complicated connections between financial repression and economic growth

4.3.2.1 The dark side of financial repression

According to the conventional theory, financial repression is harmful to economic growth. When the interest rate is set at a level below the market-clearing equilibrium rate, the demand for credit greatly exceeds the available supply. This excess demand calls for rationing of the limited supply, which in turn leads to inefficient economic outcomes.[8] Interest rate controls further distort the economy in other ways (Fry 1997). First, low interest rates produce a bias in favor of current consumption and against future consumption. Therefore, these rates may reduce savings below the socially optimal level. Second, potential lenders may engage in relatively low-yielding direct investment instead of lending by way of depositing money in a bank. Third, bank borrowers able to obtain all their desired funds at low loan rates will choose relatively capital-intensive projects. Fourth, the pool of potential borrowers includes entrepreneurs with low-yielding projects, who would not wish to borrow at the higher market-clearing interest rate.

In summary, interest rate controls reduce savings and hence investments, encourage capital-intensive rather than labor-intensive technologies (and hence slow the pace of job creation), and damage economic efficiency by attracting unqualified borrowers to join financial markets. Therefore, the adoption of interest-rate controls hurts economic growth, which has been confirmed by numerous empirical studies (Fry 1978, 1997; Roubini and Sala-i-Martin 1992).

As a consequence of credit misallocation, enormous numbers of non-performing loans (NPLs) will be generated, and the bank system faces a high risk of insolvency. In addition, economic growth will be retarded because capital cannot be allocated to its best use and cannot be used in a cost-effective way. In China, a large amount of loans extended to SOEs, who are the most favored clients of the banking sector, eventually turn into NPLs. Using official figures, Allen *et al.* (2008) compare NPLs in China, the US, and other major Asian economies from 1998 to 2006. They report that, measured as a fraction of GDP, China's NPLs are the largest in the group from 2000 to 2006, reaching levels as high as 20.0–22.5 per cent of GDP in 2000 and 2001.

Internal and informal finance, such as retained earnings, trade credit, and private loans, have played a more important role in financing the growth of private firms in China (Huang 2003; Allen *et al.* 2005; Héricourt and Poncet

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2009; Poncet *et al.* 2010). Whereas internal finance and informal lending can be expected to help private entrepreneurs start their businesses, the continued development of private firms will ultimately outgrow the support offered by these informal financial mechanisms. Without access to formal finance, private firms will inevitably be trapped in an inefficient state of small size, simple, and outmoded technologies, and short life spans (Huang 2006). Given the importance of private firms in driving China's economic growth, their cloudy future endangers the long-term sustainability of the economy.

State ownership has long been argued to be detrimental to financial development. For example, using data on the government ownership of banks from 92 countries around the world, La Porta *et al.* (2002) find that increased government ownership of banks in 1970 is associated with slower subsequent financial development and lower growth of per capita income and productivity. The World Bank (2001: 128) further argues that State ownership of banks tends to reduce competition and limits access to credit, and may even increase the risk of crisis. State-owned banks are inherently prone to be unproductive because government ownership tends to politicize resource allocation. In other words, state ownership of banks facilitates the financing of politically attractive projects but does not necessarily do the same for economically efficient projects. In addition, State ownership can lead to a conflict of incentives: governments are exposed to an incentive conflict when they have significant State ownership, as one part of government is then charged with monitoring another, most likely leading to weak official supervision (World Bank 2001: 130).

China does not seem to be an exception to the 'bad state-owned bank' story. For example, using Chinese provincial data from 1991 to 1997, Park and Sehrt (2001) find that economic fundamentals such as industrial growth, agricultural growth, and GDP per capita have had little effect on total lending by State banks, whereas the responsiveness of lending to policy concerns, such as SOEs' output, is significant. Based on data from 1997 to 2004, Podpiera (2006) reports that the pricing of credit risk by SOBs remains undifferentiated and that bank lending decisions continue to be driven by the availability of funds and do not appear to consider enterprise profitability. In addition, compared with the joint-stock banks, SOBs are less profitable (Ferri 2008), less prudent in lending (Jia 2008), and less X-efficient (Fu and Heffernan 2007).

The role of exchange rate distortion seems to be more controversial. While the disastrous effects of overvaluation on economic growth are widely documented in the empirical literature (Ghura and Grennes 1993; Acemoglu *et al.* 2003; Gala 2008), there are more disagreements over the effects of undervaluation on economic growth. After systematically reviewing the available literature, Magud and Sosa (2010) conclude that "[r]egarding the effect of undervaluation of the exchange rate on economic growth, the evidence is mixed and inconclusive."

Even if undervaluation may promote economic growth in the short or medium term, maintaining this policy for too long will have significant adverse

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consequences, such as an excessive accumulation of low-yielding foreign reserves, high and destabilizing liquidity growth and inflation, etc. (Haddad and Pancaro 2010). Eichengreen (2008) therefore concludes that "there is the earlier point that a relatively undervalued real exchange rate can have costs as well as benefits and that the cost/benefit ratio will tend to rise with the general level of economic and financial development" and countries that seek to use devaluation to accelerate economic growth "need to develop an exit strategy to avoid getting locked into a strategy that has outlived its usefulness."

4.3.2.2 The bright side of financial repression

Financial repression may not be as detrimental to economic growth as suggested by conventional literature. For example, in a study of the financial policies in East Asian economies, Hellmann *et al.* (1998) argue that modest financial repression, or in their terms "financial restraint," is beneficial to economic growth because under financial restraint, the government can create rent opportunities in the private sector through a set of financial policies. These rents may induce private sector agents to increase the supply of goods and services that might be underprovided in a purely competitive market, such as the monitoring of investments and the provision of deposit collection.

The complicated role of financial repression can be further illustrated by referring to the production function, $Y = AF(K, L)$, where Y is output, K is capital, L is labor, and A is a productivity parameter. Clearly, *ceteris paribus*, the lower the cost of capital, the stronger the incentive to undertake capital accumulation (investment $I = \Delta K$), and the more capital accumulation is undertaken, the greater the potential for economic growth. Therefore, financial repression may arguably promote economic growth by lowering the cost of capital (through, for example, interest rate control) and hence encouraging investment conducted by the corporate sector.

This phenomenon is exactly what we see in China today. Financial repression policies subsidize the corporate sector at the cost of households' welfare. In China, enterprises, particularly SOEs, may be the primary beneficiaries of interest rate controls. Ma and Wang (2010) find that net interest payments as a share of GDP by the non-financial corporate sector dropped by 50 per cent between 1992 and 2007. In particular, SOEs benefit disproportionately from such financial repression. For example, Ferri and Liu (2010) show that the costs of financing for SOEs are significantly lower than those for other companies, particularly private enterprises; if SOEs had to pay the same interest rates as private enterprises, their existing profits would be entirely wiped out.

The low cost of financing has led to a significant increase in the profitability of enterprises since the early 1990s. Whereas nominal firm profits increased more than 15-fold from 1992 to 2007, the ratio of profits to increased industrial value also improved remarkably, from approximately 21 per cent in the late 1990s to close to 30 per cent in 2007 (Yang *et al.* 2011). The lack of attractive financial investments implies that firms will either choose to spend their

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retained earnings on investment projects to expand capacity or put them in a low-yielding bank deposit. Thus, the implication of the distorted interest rate structure is that firms face a very low hurdle rate when deciding whether to pursue a given investment project. In summary, restricted bank lending rates and retained earnings have kept the cost of investment funds very low and thus have helped China achieve one of the highest ratios of investment to GDP in the world (Aziz and Dunaway 2007; Lardy 2007).

Investment has therefore, as Prasad (2009) concludes, "been a major contributor to growth during this decade." For example, Perkins and Rawski (2008) find that capital formation dominated China's growth picture during the decade following 1995, accounting for 52.7 per cent of GDP growth during 1995–2000 and 57.1 per cent of GDP expansion during 2000–5. Similarly, Knight and Ding (2012: 117) show that an increase in domestic investment of 1 percentage point raises GDP per capita growth by 0.2 percentage points.

In summary, the overall influence of financial repression on economic growth is theoretically uncertain. On the one hand, financial repression promotes economic growth by subsidizing and hence encouraging investment ($I = \Delta K$). On the other hand, financial repression hurts economic growth by damaging economic efficiency (A), slowing down the pace of job creation (L), and distorting the country's economic structure. The real effect of financial repression on economic growth is, therefore, a question that should be answered by empirical investigations.

4.4 Is financial repression detrimental to China's economic growth? An empirical examination

Based on the aforementioned discussion, we will investigate the following four relationships in this section:

Relationship 1: the relationship between financial repression and investment;
Relationship 2: the relationship between financial repression and employment;
Relationship 3: the relationship between financial repression and economic efficiency (particularly, TFP);
Relationship 4: the relationship between financial repression and economic growth.

Additionally, we will examine the relationship between financial repression and inflation (*Relationship 5*), as well as the relationship between financial repression and economic volatility (*Relationship 6*) because we believe financial repression may exacerbate inflation (for example, via a devaluation strategy that may encourage excessive capital inflows) and increase economic volatility (for example, by generating massive NPLs and hence endangering the viability of the banking system).

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In accordance with our theoretical discussions, in this section we will use four indicators to proxy China's financial repression: the real interest rate ('reali'), which can be relied upon to measure the level of interest control; the ratio of the volume of credit extended to private enterprises to that extended to SOEs ('relative'), which can be used to estimate the level of credit misallocation; the significance of SOBs ('sob'), which can be used to estimate the role of SOBs versus other financial institutions such as joint-stock banks in the allocation of financial resources; and the real effective exchange rate ('reer'), which can be relied upon to measure the level of exchange rate distortion.

4.4.1 Financial repression indicators

4.4.1.1 The real interest rate ('reali')

We calculate the real interest rate by subtracting the GDP deflator from the nominal interest rate, which can be obtained from the *China Financial Yearbook*. We focus on the one-year deposit interest rate; if there were interest rate adjustments in a year, the mean value of the interest rate during that year will be calculated and accepted as the interest rate of that year. The GDP deflator is calculated from nominal and real GDP data, which can be obtained from the *China Statistical Yearbook*. The relationship between nominal interest rates, GDP deflators, and real interest rates can be seen in Figure 4.1.

As we can see from Figure 4.1, prior to 1998, the nominal interest rate in China fluctuated at around 7.3 per cent, whereas after 1998, the interest rate remained at approximately 2.4 per cent. Because the inflation level before 1998

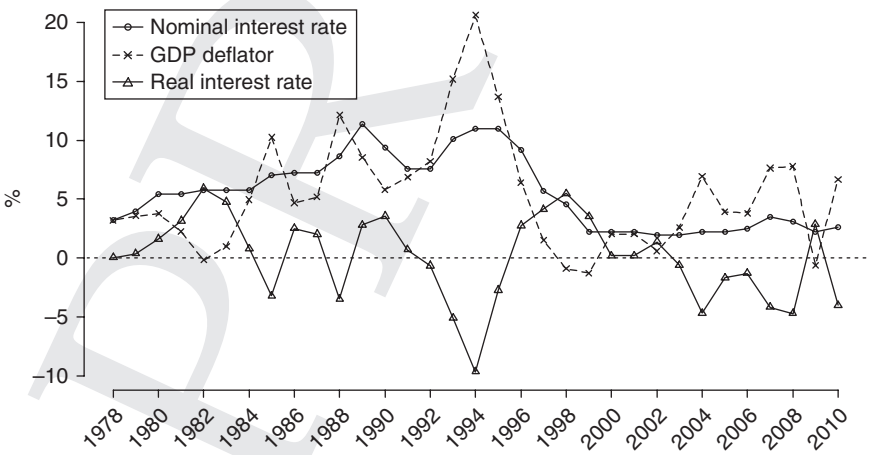

Figure 4.1 The nominal interest rates, GDP deflators, and real interest rates in China (1978–2010)

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was much higher than that after 1998, the real interest rate has not changed significantly, and has fluctuated at around 0 per cent.

4.4.1.2 Ratio of volume of credit extended to private enterprises to that extended to SOEs ('relative')

Because current data sources such as the *China Statistical Yearbook* do not provide detailed information on the relative proportion of credit provided to the private sector, we must first estimate the volume of credit extended to the private sector versus that extended to the State-owned sector based on the approach of Xu and Gui (2013). The basic model is as follows.

Domestic enterprises can be divided into two types, namely, private enterprises and SOEs. The credit coefficient (the ratio of credit volume to output; a higher credit coefficient indicates that more credit is required for each unit of output) of SOEs can be defined as $\beta = C_S/Y_S$, and the credit coefficient of private enterprises can be defined as $\alpha = C_P/Y_P$. Here, C_S and Y_S are credit extended to SOEs and output generated by SOEs, respectively, and C_P and Y_P are credit extended to private enterprises and output generated by private enterprises, respectively.

The total credit volume of a region can therefore be denoted as $C = C_S + C_P = \beta Y_S + \alpha Y_P$, and the level of financial depth (the credit-to-GDP ratio) in a region can be expressed as follows:

$$\frac{C}{Y} = \frac{\beta Y_S + \alpha Y_P}{Y} = \beta\frac{Y_S}{Y} + \alpha\left(1 - \frac{Y_S}{Y}\right) = \alpha + (\beta - \alpha)\frac{Y_S}{Y} = \alpha + \varphi\frac{Y_S}{Y} \tag{1}$$

where $\phi = \beta - \alpha$ is the difference between the two credit coefficients, which indicates the difference in the credit efficiency between State-owned and private enterprises. For example, $\phi > 0$ means that SOEs require more credit to produce the same volume of output. Based on equation (1), we can further construct a panel data model that includes fixed-period effects as follows:

$$depth_{i,t} = \alpha_t + \varphi_t state_{i,t} + \varepsilon_{3,t} \tag{2}$$

In equation (2), for each year, $depth_{i,t}$ and $state_{i,t}$ indicate, respectively, the level of financial depth and the proportion of output (GDP) that is produced by SOEs in a region of interest. Because obtaining regional data on the proportion of GDP produced by SOEs is difficult, we use the proportion of the gross industrial output value that was produced by SOEs as a proxy variable. From the *China Statistical Yearbook* and the *China Financial Yearbook*, we can obtain annual data on the credit-to-GDP ratio and the proportion of the gross industrial output value that was produced by SOEs for 31 Chinese

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Table 4.1 The mean values of 'depth', 'state', and 'relative' for various regions in China from 1978 to 2010

Region	*depth*	*state*	*relative*	*Region*	*depth*	*state*	*relative*
Anhui	0.714	0.565	0.391	Jiangxi	0.753	0.615	0.352
Beijing	1.353	0.675	1.152	Jilin	1.053	0.697	0.558
Chongqing	0.898	0.654	0.496	Liaoning	0.945	0.58	0.749
Fujian	0.695	0.38	1.568	Ningxia	1.079	0.714	0.568
Gansu	0.932	0.801	0.17	Qinghai	1.013	0.804	0.234
Guangdong	0.878	0.342	2.304	Shaanxi	0.966	0.719	0.366
Guangxi	0.723	0.613	0.295	Shandong	0.705	0.418	0.944
Guizhou	0.821	0.735	0.13	Shanghai	1.176	0.578	1.322
Hainan	1.074	0.624	0.922	Shanxi	0.899	0.603	0.552
Hebei	0.625	0.478	0.462	Sichuan	0.945	0.57	0.833
Heilongjiang	0.84	0.765	0.127	Tianjin	1.186	0.511	1.601
Henan	0.726	0.512	0.564	Tibet	0.6	0.702	–0.136
Hubei	0.848	0.59	0.547	Xinjiang	0.841	0.822	0.019
Hunan	0.65	0.57	0.259	Yunnan	0.811	0.742	0.123
Inner Mongolia	0.779	0.678	0.239	Zhejiang	0.804	0.276	3.267
Jiangsu	0.697	0.312	1.998				

(Source: *China Statistical Yearbook* and *China Financial Yearbook*.)

regions from 1978 to 2010. The data are then regressed to estimate α_t (the credit coefficient of private enterprises each year) and ϕ_t (the difference in the credit coefficient between SOEs and private enterprises each year). The credit coefficient for SOEs can then be calculated as $\beta_t = \alpha_t + \varphi_t$.

Based on the credit coefficients and the proportion of output that was produced by SOEs, we can calculate the credit-to-GDP ratio for private enterprises and SOEs in different regions and finally obtain the second financial repression indictor ('relative'), which can be defined as the ratio of the volume of credit extended to private enterprises to that extended to SOEs:

$$\frac{C_s}{Y} = \frac{C_s}{Y_s}\frac{Y_s}{Y} = \beta \cdot state; \quad \frac{C_p}{Y} = \frac{C}{Y} - \frac{C_s}{Y} = depth - \beta \cdot state$$

$$relative = \frac{C_p}{C_s} = \frac{C_p}{Y} / \frac{C_s}{Y} = (depth - \beta \cdot state)/\beta \cdot state \tag{2}$$

Table 4.1 presents the mean values of financial depth ('depth'), the proportion of output that was produced by SOEs ('state'), and the ratio of the volume of credit extended to private enterprises to that extended to SOEs ('relative') for various regions in China from 1978 to 2010.

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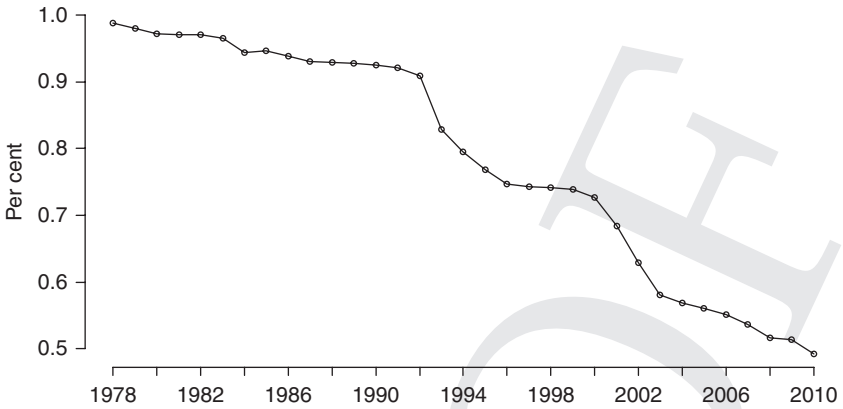

Figure 4.2 The ratio of assets of SOBs to total bank assets (1978–2010)

4.4.1.3 The significance of State-owned banks ('sob')

Data on assets and liabilities of all banks for each year come from the *China Financial Yearbook*. We then define the significance of SOBs, as the ratio of assets of SOBs (the Big Four plus the Bank of Communication) to total bank assets. As we can see from Figure 4.2, this ratio has decreased significantly over the last three decades, from 99 per cent in 1978 to 49 per cent in 2010.

4.4.1.4 The real effective exchange rate ('reer')

Data on China's real effective exchange rate ('reer') for the period from 1980 to 2010 is abstracted from the World Bank's World Development Indicators (WBWDI) dataset (2005=100).[9] As we can see from Figure 4.3, at the beginning of economic reforms, China maintained an overvalued currency under which it was generally unprofitable to export. Over the course of the reform period, the authorities devalued the official exchange rate in stages, from CNY1.5 to the US dollar in 1981 to 8.7 in 1994. Following a modest appreciation, the government effectively fixed the exchange rate at CNY8.3 to the US dollar in 1995, a rate that was not significantly changed until 2005.

4.4.2 The regression model

As specified, we will study the relationship between financial repression and investment, employment, economic efficiency, economic growth, inflation, and economic volatility. Therefore, we construct the regression equation as follows:

$$\begin{aligned} y_{i,t} = {} & \beta_1 reali_t + \beta_2 relative_{i,t} + \beta_3 sob_t + \beta_4 reer_t + \beta_5 depth_{i,t} \\ & + \beta_6 state_{i,t} + \beta_7 gov_{i,t} + \beta_8 trade_{i,t} + \beta_9 edu_{i,t} + \beta_{10} urban_{i,t} + u_t + \varepsilon_{i,t} \end{aligned} \tag{3}$$

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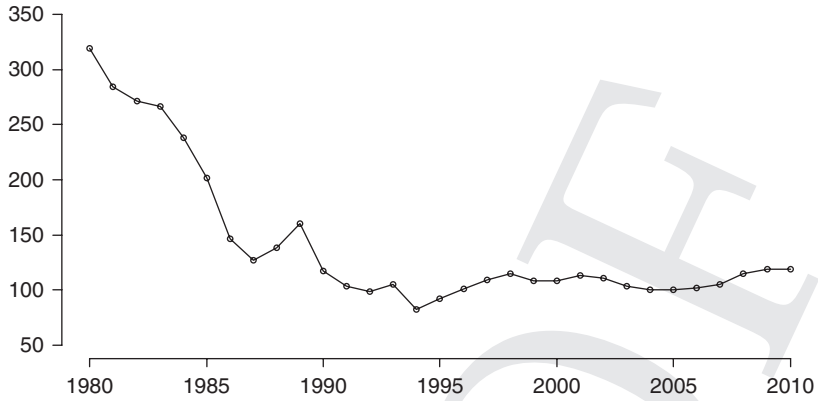

Figure 4.3 China's real effective exchange rate (1980–2010)

Here: i = 1, 2, …, 31, representing each of the 31 provinces (or municipalities or autonomous regions) that will be examined in this study. Variable t = 1, 2, …, 33, which represents each year from 1978 to 2010. Variable 'y' represents six dependent variables of interest:

- 'inv/gdp': The variables 'inv' and 'gdp' represent the nominal value of the gross fixed capital formation and GDP, respectively, for a particular region and year. The ratio 'inv/gdp' therefore refers to the rate of investment in fixed assets.
- 'ΔL/invc': The variable 'invc' is the amount of investment calculated in terms of 1978 fixed prices. 'ΔL' is the annual increase in the labor force, and 'ΔL/invc' represents the employment absorptive capacity of investment.
- 'TFP': is the total factor productivity (the calculation of which will be explained below).
- 'pgdp': is the real GDP per capita (calculated in terms of fixed prices of 1978) for each region.
- 'cpi': is the inflation rate for each region each year.
- 'volat': is the level of economic volatility and will be measured by the absolute value of the difference between the growth rate of two consecutive years.

With respect to the independent variables, 'reali' refers to the real interest rate, 'relative' is the ratio of the volume of credit extended to private enterprises to that extended to SOEs, 'sob', is the ratio of assets of SOBs to total bank assets and 'reer' is the real effective exchange rate. All of these indicators indicate financial repression. In addition, we use financial depth ('depth'), the proportion of the State-owned sector ('state') the scale of government expenditures ('gov'), the scale of foreign trade ('trade'), education ('edu'), and the level of urban employment proportions ('urban') as control variables. Descriptions of the variables can be found in Table 4.2.

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In this chapter the production function method is used to estimate the TFP. More specifically, we use the value of GDP in each region (expressed in terms of 1978 fixed prices) as the indicator of output, the number of employees in each region as the indicator of labor input, and fixed capital stock in each region as the indicator of capital input. The perpetual inventory method is used to calculate the fixed capital stock, and the fixed capital stock of 1978 in each region (as estimated by Zhang *et al.* 2004) is used as the stock in the base year. In addition, a 10 per cent depreciation rate is employed.

In this study, a Cobb-Douglas production function ($Y = AK^{\alpha}L^{1-\alpha}$) is assumed, and the TFP can therefore be expressed as $A = Y/(K^{\alpha}L^{1-\alpha})$. Before we estimate the TFP, it is necessary to set a value for α, the capital-output elasticity. Although in most studies that focus on countries outside of China, α is typically set to a value of approximately 0.3, this elasticity is relatively high in China (0.35–0.5) (Gui and Chen 2012). In the next section, we will use $\alpha = 0.4$ to conduct an estimation. We find that, for different values of α between 0.35 and 0.5, the estimated correlation coefficient remains greater than 0.94, which means that the choice of value of α has no significant influence on relative levels of the TFP.

4.4.3 Regression results

Before conducting a panel regression, we run stationarity tests on the variables. The approach of Maddala and Wu (1999) is used to perform an augmented Dickey-Fuller (ADF) unit root test on the variables. We choose a maximum lag of six years and use the akaike information criterion (AIC) to choose the optimal lag items. A model with an intercept and trend is employed. The results show that the aforementioned variables are stationary, with the p-values of the Chi-square statistics being less than 0.01.

Moreover, to avoid endogeneity bias, we include a one-period lag of 'reali', 'relative', 'depth', and 'state' as instrumental variables and therefore further set the model as a random-effects model, which may help us estimate the influence of individual-invariant variables, such as the real interest rate ('reali') more accurately. However, we are unable to integrate individual effects and time effects into the model simultaneously because of the introduction of instrumental variables. Given the great variance of statistical criteria among different years in China, we choose to include time-effects into the model. An 'F test' reveals that time-effects are significant (p-value<0.01). The regression results of the models are as follows.

In model 1 (inv/gdp), a decrease in the 'reali' and an increase in credit extended to SOEs ('relative') will stimulate investment. As we have argued, the lower the cost of capital (real interest rate), the stronger the incentive to undertake investment. Moreover, compared with private enterprises, SOEs have a stronger tendency to invest because of the problem of 'soft budget constraints.' An appreciation (rather than depreciation) of China's currency seems to be accompanied by an increase in investment, a phenomenon that is not consistent with the prediction that exchange rate distortion contributes to investment. Similarly, a decrease in the ratio of the assets of SOBs to total bank assets

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Table 4.2 Description of the variables

Variables	*Variable definition*	*Mean*	*Median*	*SD*	*Min*	*Max*	*No. of obs*
inv/gdp	rate of investment	0.355	0.326	0.142	0.045	1.106	1023
L/invc	employment absorptive capacity of investments (person/CNY 10,000)	0.563	0.193	0.959	–1.749	10.915	1023
log(TFP)	log(total factor productivity)	–1.014	–1.027	0.492	–2.183	0.385	1023
log(pgdp)	log(real per capita GDP) (CNY 10,000)	–2.035	–2.085	0.944	–4.054	0.695	1023
cpi	inflation rate	105.8	103.4	6.84	96.4	129.7	960
volat	economic volatility	0.042	0.03	0.04	0	0.316	992
reali	real interest rate	0.001	0.004	0.035	–0.096	0.059	33
depth	ratio of credit to GDP	0.872	0.829	0.305	0.199	2.585	1023
relative	ratio of volume of credit extended to private enterprises to that extended to SOEs	0.741	0.429	1.17	–0.588	10.75	1023
sob	ratio of assets of SOBs to total bank assets	0.79	0.80	0.17	0.49	0.99	33
reer	real effective exchange rate	141.40	113.20	64.7	82.65	319.20	31
State	proportion of State-owned sector	0.601	0.649	0.205	0.094	0.939	1023
gov	ratio of government spending to GDP	0.163	0.131	0.113	0.049	1.086	1023
trade	ratio of foreign trade to GDP	0.034	0.016	0.044	0.001	0.277	1023
edu	proportion of university graduates in the population	0.006	0.002	0.007	0	0.04	1023
urban	proportion of the population that is employed in an urban area	0.328	0.278	0.16	0.119	0.81	1023

(Source: *China Compendium of Sixty Years of Statistics*, *China Compendium of Fifty Years of Statistics* and *China Statistical Yearbook*.)

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('sob') is not associated with a decrease in investment, which may reflect the fact that the difference between SOBs and other types of banks such as joint-stock banks should not be overestimated, and therefore the proportion of SOBs does not matter as much for the level of investment (but they may hurt economic efficiency, such as TFP, as we will show). Finally, there is a positive correlation between financial depth and the investment rate, a positive correlation between the scale of government expenditures and the investment rate and a negative correlation between the development of foreign trade and the investment rate.

In model 2 (ΔL/invc), we find a positive (but not significant) relationship between the interest rate and employment because an increase in the interest rate will raise the cost of capital, inhabit the preferences of enterprises for capital-intensive technologies, and therefore increase the employment absorptive capacity of investment. In addition, compared with SOEs, private enterprises are more market oriented and hence would prefer labor-intensive technologies that are more congruent with the comparative advantage of China. An increase in credit extended to private enterprises should therefore improve the employment absorptive capacity of investment, which is also confirmed by our empirical evidence (although the influence is not significant).

Exchange rate distortion seems to be harmful to employment. We find that there is a positive and significant relationship between real effective exchange rate and employment, which may reflect the fact that China's export sector is more capital-intensive than we expect and therefore has limited employment absorptive capacity. In that case, when the renminbi is devalued, the expansion of the export sector cannot be translated into employment growth (in fact, we find that there is a negative relationship between the development of foreign trade and employment growth).

The role of SOBs is confusing. We find a positive relationship between the proportion of SOBs and employment growth, which is not consistent with our theoretical argument and needs further investigation in the future. Finally, increases in the ratio of credit to GDP, the proportion of SOEs in a region, and the scale of government expenditures are harmful to the employment effects of investment.

In model 3 (log(TFP)), an increase in the interest rate has an insignificant positive impact on the TFP, which is consistent with our previous prediction that a low interest rate will damage economic efficiency. Similarly, more credit extended to private enterprises has a significant positive influence on the TFP, and the higher ratio of assets of SOBs to total bank assets has a significant negative impact on TFP. The correlation between the real effective exchange rate and TFP, however, is negative, which means that devaluation helps to improve efficiency (by stimulating exports and hence leading to export enterprises facing greater international competition).

Finally, increases in the ratio of credit to GDP, the proportion of SOEs in a region, and the scale of government expenditures have a negative effect on the TFP, whereas the expansion of foreign trade, improvement of education, and acceleration of urbanization have a positive effect on the TFP.

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Table 4.3a Panel regression results (a)

Explanatory variables	*Model 1: inv/gdp*		*Model 2: ΔL/invc*		*Model 3: log(TFP)*	
reali	–0.368*	–0.367*	0.377	—	0.587	—
	(0.175)	(0.172)	(4.018)	—	(1.061)	—
relat	–0.021***	–0.021***	0.012	—	0.026***	0.025***
	(0.004)	(0.003)	(0.03)	—	(0.008)	(0.008)
sob	–0.6***	—	2.817***	2.814***	–0.917***	–1.093***
	(0.142)	—	(1.066)	(1.055)	(0.281)	(0.227)
reer	0.022	—	0.456*	0.461**	–0.086	—
	(0.032)	—	(0.235)	(0.232)	(0.062)	—
depth	0.071***	0.068***	-0.198		–0.257***	–0.252***
	(0.016)	(0.014)	(0.128)		(0.033)	(0.032)
state	–0.009	—	–0.463*	–0.52**	–0.663***	–0.673***
	(0.033)	—	(0.259)	(0.219)	(0.066)	(0.065)
gov	0.353***	0.352***	–0.453**	–0.457**	–0.36***	–0.361***
	(0.027)	(0.026)	(0.216)	(0.215)	(0.055)	(0.055)
trade	–0.233***	–0.226***	–1.859***	–1.804***	1.427***	1.42***
	(0.081)	(0.078)	(0.642)	(0.626)	(0.163)	(0.163)
edu	–2.022**	–1.953**	30.945***	30.611***	3.741**	3.516*
	(0.939)	(0.93)	(7.403)	(7.343)	(1.881)	(1.874)
urban	0.335***	0.331***	–3.178***	–3.167***	2.361***	2.368***
	(0.052)	(0.051)	(0.409)	(0.408)	(0.104)	(0.104)
adj. R^2	0.32	0.32	0.125	0.125	0.755	0.756
obs.	1023	1023	1023	1023	1023	1023

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Table 4.3b Panel regression results (b)

Explanatory variables	*Model 4: log(pgdp)*		*Model 5: cpi*		*Model 6: volat*	
reali	–1.043	—	–126.673***	–126.707***	–0.044	—
	(–2.716)	—	(24.73)	(21.13)	(0.062)	—
relat	0.033***	0.033***	–0.152*	–0.17***	–0.001	—
	(0.008)	(0.008)	(0.078)	(0.055)	(0.002)	—
sob	–2.485***	–2.903***	28.649***	30.138***	0.065***	0.059***
	(0.692)	(0.537)	(6.312)	(5.343)	(0.024)	(0.015)
reer	–0.193	—	–3.589**	–3.595***	0.006	0.006*
	(0.157)	—	(1.432)	(1.22)	(0.004)	(0.003)
depth	–0.305***	–0.302***	0.098	—	0.001	—
	(0.034)	(0.033)	(0.34)	—	(0.007)	—
state	–0.845***	–0.856***	0.714	—	0.001	—
	(0.068)	(0.065)	(0.692)	—	(0.015)	—
gov	–0.021	—	0.196	—	0.046***	0.045***
	(0.057)	—	(0.625)	—	(0.013)	(0.011)
trade	2.032***	2.024***	2.306	—	0.041	—
	(0.168)	(0.168)	(1.74)	—	(0.038)	—
edu	10.586***	10.59***	–29.691	—	0.171	—
	(1.948)	(1.932)	(19.712)	—	(0.407)	—
urban	4.397***	4.4***	1.706	1.457**	–0.019	—
	(0.107)	(0.107)	(1.078)	(0.651)	(0.023)	—
adj. R^2	0.883	0.886	0.092	0.113	0.056	0.058
obs.	1023	1023	960	960	992	992

Notes:
The numbers in parentheses are the standard errors.
'***,' '**,' and '*' indicate 1%, 5%, and 10% levels of significance, respectively.
For each regression model, we report two types of results: the first type is the initial regression results with all explanatory variables included, and the second is the results with standardized regression coefficients.

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In model 4 (log(pgdp)), we examine the overall influence of each variable on economic growth. The results show that a low interest rate has a positive (but not significant) effect on economic growth; however, more credit extended to SOEs has a significant negative influence on economic growth. The correlation between the SOB indicator ('sob') and economic growth is negative, which means that a higher market share of SOBs will bring about slower economic growth. Finally, devaluation helps to promote economic growth, which is reflected by the negative relationship between exchange rate indicator ('reer') and economic growth.

In addition, increases in the ratio of credit to GDP, the proportion of SOEs in a region, and the scale of government expenditures have a negative effect on economic growth, whereas the expansion of foreign trade and improvement of education have a positive influence on economic growth.

In summary, the connection between financial repression and economic growth is more complicated than suggested by conventional studies. On the one hand, interest rate controls contribute to economic growth by lowering the cost of capital, and exchange rate distortion promotes economic growth by stimulating exports; on the other hand, credit misallocation and state ownership in the banking sector retards economic growth by damaging economic efficiency. The apparent puzzle that a repressed financial system has not retarded China's economic growth can therefore be solved: when the pro-growth effects of financial repression outweigh its anti-growth effects, the overall influence of financial repression may be beneficial, rather than harmful, to economic growth.

In model 5 (cpi), we examine the relationship between financial repression and inflation. It seems that financial repression will worsen inflation. Both a decrease in the real interest rate ('reali') and increased credit extended to SOEs ('relative') will increase the level of inflation. Similarly, devaluation and a higher market share of SOBs also contribute to inflation. In addition, increases in the ratio of credit to GDP, the proportion of SOEs in a region, and the scale of government expenditures have a positive effect on inflation.

In model 6 (volat), we investigate the connection between financial repression and economic volatility. Most of our financial repression indicators contribute to economic volatility. The only exception is the exchange rate indicator. There is a positive correlation between this indicator and economic volatility, which means that devaluation of China's currency will reduce economic volatility. In addition, increases in the ratio of credit to GDP, the proportion of SOEs in a region, and the scale of government expenditures have a positive effect on economic volatility.

4.5 Concluding remarks

It has long been argued (and to a large extent proven) that financial repression, with its nature of preventing financial intermediaries from functioning

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at their full capacity, is detrimental to economic growth. In this chapter, we have shown that China is a more complicated version of the 'bad financial repression' story. The apparent paradox of the coexistence of a repressed financial sector and a high-growth economy in China can be solved by exploring the dual role played by China's financial system: while financial repression may help China to accomplish extraordinary economic growth by subsidizing investment and production, it also endangers China's economic health by damaging economic efficiency, slowing job creation, and distorting the country's economic structure.

The inescapable problem encountered with China's input-driven growth model is that there are diminishing returns associated with the addition of any one factor of production. With a given labor force, the addition of more and more machines will produce more output but at a steadily declining rate. Therefore, further investment can raise the level of an economy's total output but not its long-term growth rate. As the famous Solow Model shows, regardless of the level of capital with which an economy begins, without technological progress, the economy will end up at a steady state in which there is no per capita growth (Solow 1956).

China's investment-driven growth seems to face a similar destiny. China has one of the highest ratios of investment to GDP in the world, which has resulted in some serious economic and social problems, such as environmental degradation, slower job creation, urban-rural inequality, and production capacity overexpansion (Xu 2012). In addition, as Kuijs and Wang (2006) show, if China's current economic growth pattern continues, an investment to GDP ratio at the unprecedented level of 55 per cent on average in 2014–24 will be required to maintain GDP growth at 8 per cent per year. Financing such a high level of investment in the long run is impossible; under these circumstances, the investment-driven economy will finally reach a dead end.

A more market-oriented financial system is therefore called for to rebalance China's distorted economy, improve the social welfare of ordinary citizens, and make China's economic growth more sustainable. Financial liberalization is undoubtedly desirable given its positive effects on savings, investment, and economic development; however, without an effective system of prudential regulation and supervision, financial liberalization will inevitably lead to financial volatility, economic instability, and even social disturbance. Therefore, a well-designed and effectively operating regulatory and supervisory framework is a precondition for further financial reform that aims to end repression policies and practices in China's financial system. Among other actions, the government must strengthen the independence, effectiveness, staffing, and funding of regulatory bodies; insist on higher standards of disclosure, auditing, and accounting; and streamline the court system to address troubled banks and firms in a timely fashion (World Bank 2012). Building such a framework demands time, resources, and, most importantly, the determination of the government.

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Notes

1 This chapter is an extension of our earlier study (Xu and Gui 2013) and a follow-up study to Xu (2013). Compared with Xu and Gui (2013), this chapter adds more financial repression indicators, and discusses the influence of financial repression on inflation and economic volatility, in addition to economic growth. The focus of Xu (2013) is on the relationship between financial repression and China's distorted macroeconomic structure (investment-driven growth pattern), rather than the connection between financial repression and China's growth performance that is addressed by Xu and Gui (2013) and this chapter. This study is sponsored by the Program for Young Innovative Research Team at China University of Political Science and Law, and by the Beijing Municipal Program for Interdisciplinary Studies (Program of Law and Economics).
2 By the end of 2012, the Big Four together with the Bank of Communication held 44.9 per cent of total financial assets. See the *2012 Annual Report of the China Banking Regulatory Commission*, available online at http://zhuanti.cbrc.gov.cn/subject/subject/nianbao2012/English/Part1.pdf (accessed 14 May 2014).
3 There is another joint-stock bank, the Bank of Communication, which has been classified by the China Banking Regulatory Commission (CBRC) as a "large commercial bank" just like the Big Four.
4 See the *2012 Annual Report of the China Banking Regulatory Commission*, available online at: http://zhuanti.cbrc.gov.cn/subject/subject/nianbao2012/English/Part1.pdf (accessed 14 May 2014).
5 *China Securities Regulatory Commission Annual Report 2012*, available online at: http://www.csrc.gov.cn/pub/newsite/zjhjs/zjhnb/201307/P020130722553207507219.pdf (accessed 14 May 2014).
6 *2012 World Federation of Exchanges Market Highlights*, available online at: http://www.world-exchanges.org/files/statistics/2012%20WFE%20Market%20Highlights.pdf (accessed 14 May 2014).
7 *China's Securities and Futures Markets 2007*, China Securities Regulatory Commission, available online at: http://www.csrc.gov.cn/pub/csrc_En/about/annual/200812/P020090225529643752895.pdf (accessed 14 May 2014).
8 According to Shaw (1973: 86) "[r]ationing is expensive to administer. It is vulnerable to corruption and conspiracy in dividing between borrowers and officers of the intermediary monopoly rent that arise from the difference between low, regulated loan rate and the market-clearing rate. Borrowers who simply do not repay loans and keep their place in the ration queue by extending maturities can frustrate it. The rationing process discriminates poorly among investment opportunities … and the social cost of this misallocation is suggested by the high incremental ratios of investment to output that lagging economies report."
9 Available online at http://data.worldbank.org/country/china (accessed 29 May 2014).

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