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The Connection between Financial Repression and Economic Growth: The Case of China

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Abstract

China exhibits the typical symptoms of a financially repressed economy, such as regulated interest rates, a dominance of state ownership, and managed credit allocation. A repressed financial system acts as a double-edged sword: on the one hand, the system may help China accomplish extraordinary economic growth by subsidizing investment and production, but on the other hand, it endangers China's economic health by damaging economic efficiency, slowing job creation, and distorting the country's economic structure. Therefore, a more market-oriented financial system is required to rebalance China's distorted economy and make China's economic growth more sustainable.

Keywords: Financial repression; economic growth; China

1. Introduction

The relationship between financial development and economic growth has been of great interest to economists over the past two decades. Using

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country-level, industry-level, and firm-level data, the so-called finance and growth literature provides deeper insights into the finance and growth nexus and "suggests a positive, first-order relationship between financial development and economic growth" (Levine, 1997, p. 688). Taken as a whole, most existing research indicates that countries with better-functioning banks and markets grow faster and that a better-functioning financial system which eases the external financial constraints that impede firm and industrial expansion is a fundamental mechanism through which financial development plays a role in growth (Levine, 2005).

However, certain apparent anomalies to the "finance matters" hypothesis exist, the most notable of which is China. Despite its weak financial system, China has experienced remarkable economic growth over the past three decades and has surpassed Japan as the world's second largest economy. According to Allen, Qian, and Qian (2005), "China is an important counter example to the findings in the law, institutions, finance, and growth literature: neither its legal nor financial system is well developed, yet it has one of the fastest growing economies."

More accurately, China's financial system is not only weak and underdeveloped but also repressed. China's financial system conforms to the stereotype described by the financial repression theory (McKinnon, 1973; Shaw, 1973). For example, 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 paper, we shall try to solve this puzzle. We shall show that the connection between financial repression and economic growth is more complicated than is suggested by previous studies. On the one hand, financial repression can arguably promote 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 economic efficiency, slowing job creation, and distorting the country's economic structure. Therefore, China is not an anomaly for financial repression theory or the "finance matters" hypothesis; rather, China is a more complicated case where economic success should be judged according to social welfare standards rather than simple growth indicators such as gross domestic product (GDP).

The rest of the paper is organized as follows. Section 2 offers an overview of the financial repression theory. Section 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 empirically examines the connections between financial repression and economic growth in China. Finally, we conclude the paper in Section 5.

2. A Brief Overview of the Financial Repression Theory

According to Ito (2008, p. 430), financial repression refers to "the notion that a set of government regulations, laws, and other non-market restrictions prevent the financial intermediaries of an economy from functioning at their full capacity". The policies that cause financial repression include interest rate controls, liquidity ratio requirements, high bank reserve requirements, capital controls, restrictions on market entry into the financial sector, credit ceilings or restrictions on the direction of credit allocation, and government ownership or control of banks.

The financial repression theory has its origins in the work of McKinnon (1973) and Shaw (1973). McKinnon and Shaw argue that many countries, including developed and, in particular, developing countries, have historically restricted competition in the financial sector with government interventions and regulations. According to their argument, a repressed financial sector discourages both saving and investment because the rates of return are lower than could be obtained in a competitive market. In such a system, financial intermediaries do not function at their full capacity and fail to efficiently channel savings into investments, 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 some fundamental macroeconomic variables, such as savings rates, investment, and economic growth. For example, Fry (1978) tests the validity of the McKinnon–Shaw Model for seven less-developed countries (LDCs) in Asia and concludes that the real interest rate exerts a positive influence on the ratio of domestic savings to GNP; a 10% increase in the real interest rate would raise the ratio of savings to GNP by approximately 1.4–2.1%. Fry (1997) reports that financial distortions as measured by the real interest rate squared and the black market exchange rate premium reduce

investment ratios (and export growth), which in turn reduce output growth rates. Roubini and Sala-i-Martin (1992) show the harmful effects of financial repression on economic growth: countries with real interest rates of less than –5% in the 1970 s experienced growth rates that averaged 1.4 percentage points less than the growth rates in countries with positive real interest rates.

Other repressive policies are also considered harmful to financial development. For example, entry restrictions, despite some possible justifications for their adoption, such as promoting bank stability and protecting the economy from the negative effects of bank failures, may be implemented by regulators in response to the demands of incumbent bankers who are eager to protect their rents from the competition of new entrants. The adverse effects of regulatory restrictions on competition in banking have been confirmed by empirical evidence from around the world (Barth, Caprio, & Levine, 2006). Similarly, state ownership in the banking sector is shown to be detrimental to financial development and economic growth (World Bank, 2001).

Finally, some empirical studies show financial repression will also be harmful to China's economic growth. For example, Boyreau-Debray (2003) finds that the ratio of state-owned bank credit to GDP has a negative impact on provincial economic growth and this negative impact is largely the result of the burden of supporting the state-owned sector. Similarly, Guariglia and Poncet (2008) report that the indicators measuring the level of state interventionism in China's finance sector, such as the share of state-owned banks in the total bank credit or the ratio of state-owned banks' credit to GDP, are negatively associated with GDP growth, physical capital accumulation, and productivity growth.

In general, the negative effect of financial repression on economic growth has been confirmed by both theoretical arguments and empirical evidence, and a process of financial liberalization that relaxes or abolishes financial repression is necessary to promote economic growth in developing countries (Abiad & Mody, 2005). Based on China's growth experience, however, we shall show that the connection between financial repression and economic growth is more complicated than has been reported by previous studies. Financial repression, particularly the interest rate controls that lower the cost of capital for the corporate sector, has contributed to China's extraordinary economic growth performance by subsidizing investment and production.

3. Is Financial Repression Detrimental to China's Economic Growth? Theoretical Discussion

3.1 Financial Repression in China

China's financial system has lagged behind the rest of the economy in the transition process. The scarce available capital is allocated inefficiently and unproductively, as a disproportionately large part of the savings is directed to large state-owned enterprises (SOEs), whereas private small and medium-sized enterprises (SMEs), the real growth engines of the economy, are deprived of capital. In addition, households continue to earn very low returns on their financial assets. 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 & Kashyap, 2006).

Interest rate controls and credit misallocation stand out as the most salient components of the Chinese version of financial repression. The People's Bank of China (PBOC, China's central bank) maintained the cap on deposit rates for all financial institutions and mandated that lending rates could not fall below 0.9 times its established benchmark rates. More importantly, the central bank appears to adjust the benchmark interest rates in an asymmetric manner in response to inflation (Liu, Margaritis, & Tourani-Rad, 2009). Thus, the central bank adjusts deposit and lending rates more quickly downward than upward. When inflation increases, the rigidity of interest rates leads to lower or even negative real interest rates. This trend has been 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 (Lardy, 2012). Since the beginning of 2004, the real return on a one-year deposit has been in negative territory for approximately half the time and averaged –0.5 per cent. In contrast, the corporate sector benefits greatly from such a monetary policy. Since the beginning of 2004, the real interest rate on a one-year loan has averaged only 1.7 per cent.

In addition to interest rate controls, China's economy suffers from another type of financial repression: the failure of financial intermediaries to channel credit to the most productive regions, industries, and enterprises. Scarce financial resources have been systematically and continually

allocated to the less profitable but politically preferable entities, especially 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). However, the non-state sector, especially private enterprise, 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 significant ownership shares, continued to absorb between one-half and two-thirds of new bank lending.

The argument that the private sector is financially disfavoured in China is further supported by some statistical evidence. For example, Brandt and Li (2003) find that compared with township and village enterprises (TVEs), which are set up and owned by local township governments, private firms (as well as later privatized TVEs) were significantly less likely to obtain loans, received smaller loans, and were subject to higher loan standards. On the basis of a data set covering more than 20,000 Chinese firms over the period from 1998 to 2005, Poncet, Steingress, and Vandenbussche (2010) find that private firms, in contrast to SOEs, significantly relied on their cash flow to finance their investments, which is evidence of credit constraints.

3.2 The Complicated Connections between Financial Repression and Economic Growth

According to the conventional theory of financial repression, both interest rate controls and credit misallocation are 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 the rationing of the limited supply, which in turn leads to inefficient economic outcomes:

> Rationing 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. (Shaw, 1973, p. 86)

Interest rate controls further distort the economy in other ways (Fry, 1997). First, low interest rates produce a bias in favour 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 want to borrow at the higher market-clearing interest rate.

In summary, interest rate controls reduce savings and hence investments, encourage capital-intensive rather than labour-intensive technologies (and thus slow the pace of job creation), and damage economic efficiency by attracting unqualified borrowers to join the financial markets. Therefore, the adoption of interest rate controls hurts economic growth, which has been confirmed by numerous empirical studies (see Section 2). China seems not to be an exception to this rule. For example, Feyzioğlu, Porter, and Takáts (2009) show that compared with the current interest rate strategy, a more liberalized policy would increase interest rates and hence discourage excessive and inefficient borrowing and improve the effectiveness of financial intermediation and monetary transmission. Kuijs and Wang (2006) report a negative correlation between China's investment expansion (stimulated by cheap credit as a result of interest rate controls) and employment growth.

As a consequence of credit misallocation, huge 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, which are the most favoured clients of the banking sector, eventually turn into NPLs. Using official figures, Allen, Qian, and Qian (2008) compare NPLs in the United States, China, and other major Asian econom-

ies during 1998–2006. 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% of GDP (in 2000 and 2001). The problem of NPLs appears to have been mitigated since 2006. However, this improvement should be primarily attributed to aid from the government, such as the recapitalization of bad loans and the transfer of bad loans from banks to asset management companies. Without some fundamental changes, the NPL problem may recur and again drive the banking sector to the verge of bankruptcy, as we witnessed by the end of the 1990 s (Lardy, 1998).

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 (Allen et al., 2005; Héricourt & Poncet, 2009; Huang, 2003; 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 finally 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 out-moded technologies, and short life spans (Huang, 2006). Given the importance of private firms in driving China's economic growth, their uncertain future endangers the long-term sustainability of the economy.

However, financial repression may not be as detrimental to economic growth as is suggested by conventional literature. For example, in a study of the financial policies in East Asian economies, Hellmann, Murdock, and Stiglitz (1998) argue that a modest financial repression, or "financial restraint" in their terms, 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 under-provided 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 labour, and A is a productivity parameter. Obviously, *ceteris paribus*, the lower the cost of capital, the stronger is the incentive to undertake capital accumulation (investment, $I = \Delta K$), and the more capital accumulation is undertaken, the greater is the potential for economic growth. Therefore, that financial repression may arguably promote economic growth by lowering the cost of capital (through, for

example, interest rate control) and therefore encouraging investment conducted by the corporate sector.

This phenomenon is exactly what we can witness 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% 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 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 1990 s. 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% in the late 1990 s to close to 30% in 2007 (Yang, Zhang, & Zhou, 2011). The lack of attractive financial investments implies that firms will either choose to spend their 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 & 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% of GDP growth during 1995–2000 and 57.1% of GDP expansion during 2000–2005. Similarly, Knight and Ding (2012, p. 117) show that an increase in domestic investment of one 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 investigation.

4. Is Financial Repression Detrimental to China's Economic Growth? Empirical Examination

Based on the aforementioned discussion, we shall try to investigate the following four types of 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.

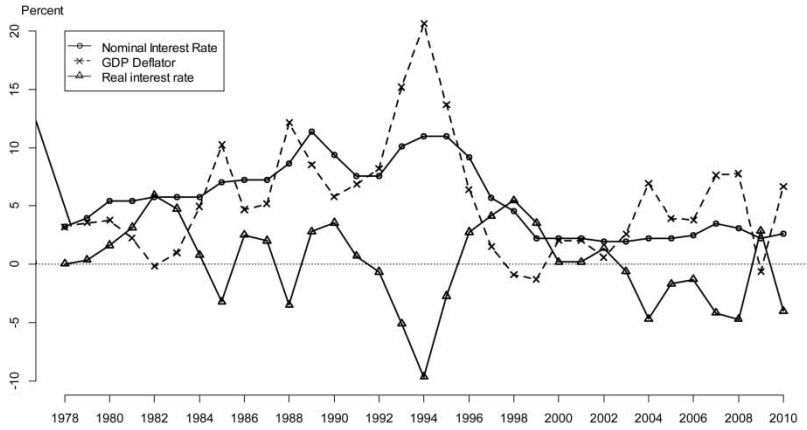
In accordance with our theoretical discussions, in this section, we shall use two indicators to proxy China's financial repression: the real interest rate ("*reali*"), which can be relied on to measure the level of interest control, and the ratio of volume of credit extended to private enterprises to that extended to SOEs ("*relative*"), which can be relied on to measure the level of credit misallocation.

4.1 Financial Repression Indicators

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 would 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 1.

Figure 1 The Nominal Interest Rates, GDP Deflators, and Real Interest Rates in China (1978–2010)



As we can see from Figure 1, prior to 1998 the nominal interest rate in China fluctuated approximately 7.3%, whereas after 1998 the interest rate remained at approximately 2.4%. Because the inflation level before 1998 was much higher than that after 1998, the real interest rate has not changed significantly and has fluctuated approximately 0%.

4.1.2 *The Ratio of Volume of Credit Extended to Private Enterprises to that Extended to SOEs ("Relative")*

Because the current data sources, such as the *China Statistical Yearbook*, do not provide detailed information on the relative proportion of credit to the private sector, we first have to estimate the volume of credit extended to the private sector versus that extended to the state-owned sector based on the approach of Zhang and Jin (2005) and Gui and Xu (2011). 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:

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

where $\varphi = \beta - \alpha$ is the difference between the two credit coefficients, which indicates the difference in the credit efficiency between state-owned and private enterprises. For example, $\varphi > 0$ 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:

$$depth_{i,t} = \alpha_t + \varphi_t state_{i,t} + \varepsilon_{i,t} \quad (2)$$

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 that was 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 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:

$$\frac{C_s}{Y} = \frac{C_s}{Y_s}\frac{Y_s}{Y} = \beta \cdot state;$$

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

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

Table 1 presents the mean values of financial depth ("*depth*"), the proportion of output that was produced by SOEs ("*state*"), and the ratio of volume of credit extended to private enterprises to that extended to SOEs ("*relative*") for various regions in China from 1978 to 2010.

4.2 The Regression Model

As specified, we shall try to study the relationship between financial repression and investment, employment, economic efficiency, and economic growth. Therefore, we construct four regression equations as follows:

$$(inv/gdp)_{i,t} = \beta_1 reali_t + \beta_2 relative_{i,t} + \beta_3 depth_{i,t} + \beta_4 state_{i,t} + \beta_5 gov_{i,t} + \beta_6 trade_{i,t} + u_t + \varepsilon_{i,t} \quad (3)$$

$$(\Delta L/invc)_{i,t} = \beta_1 reali_t + \beta_2 relative_{i,t} + \beta_3 depth_{i,t} + \beta_4 state_{i,t} + \beta_5 gov_{i,t} + \beta_6 trade_{i,t} + u_t + \varepsilon_{i,t} \quad (4)$$

$$\log(TFP)_{i,t} = \beta_1 reali_t + \beta_2 relative_{i,t} + \beta_3 depth_{i,t} + \beta_4 state_{i,t} + \beta_5 gov_{i,t} + \beta_6 trade_{i,t} + \beta_7 edu_{i,t} + \beta_8 urban_{i,t} + u_t + \varepsilon_{i,t} \quad (5)$$

$$\log(pgdp)_{i,t} = \beta_1 reali_t + \beta_2 relative_{i,t} + \beta_3 depth_{i,t} + \beta_4 state_{i,t} + \beta_5 gov_{i,t} + \beta_6 trade_{i,t} + \beta_7 edu_{i,t} + u_t + \varepsilon_{i,t} \quad (6)$$

Here $i = 1, 2, \ldots, 31$, representing each of the 31 provinces (or municipalities or autonomous regions) that will be examined in this study. $t = 1, 2, \ldots, 33$, which represents each year from 1978 to 2010. 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. The variable "*invc*"

Table 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				

Sources: *China Statistical Yearbook* and *China Financial Yearbook*.

is the amount of investment calculated in terms of fixed prices of 1978. "ΔL" is the annual increase in the labour force, and "$\Delta L/invc$" 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.

With respect to the independent variables, "*reali*" refers to the real interest rate, and "*relative*" is the ratio of the volume of credit extended to private enterprises to that extended to SOEs. Both of these indicators indicate financial repression: the lower the indicators, the more severe the 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 2.

In this paper, 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 fixed prices of 1978) as the indicator of output, the number of employees in each region as the indicator of labour 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, Wu, & Zhang, 2004) is used as the stock in the base year. In addition, a 10% 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, setting a value for α, the capital-output elasticity, is necessary. Whereas 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 & Chen, 2012). In the next section, we shall 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 the value of α has no significant influence on relative levels of the TFP.

Table 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
Δ*L/invc*	Employment absorptive capacity of investments (person/10,000 CNY)	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) (10,000 CNY)	–2.035	–2.085	0.944	–4.054	0.695	1023
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
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

Sources: *China Compendium of Sixty Years of Statistics*, *China Compendium of Fifty Years of Statistics*, and *China Statistical Yearbook*.

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 "*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. A *F* test reveals that time effects are significant (p-value < 0.01). The regression results of the models are as follows.

The regression results are basically consistent with our theoretical discussion. In Model 1 (*inv*/*gdp*), a decrease in the real interest rate ("*reali*") and more credit extended to SOEs ("*relative*") will stimulate investment. Compared with private enterprises, SOEs have a stronger tendency to invest because of the problem of "soft budget constraints". In addition, 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 ($\Delta L/invc$), we find a significant positive relationship between the interest rate and employment because an increase in the interest rate will raise the cost of capital, inhibit 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 labour-intensive technologies that are more congruent with the comparative advantage of China. More 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

Table 3 Panel Regression Results

Explanatory Variables	*Model 1:* inv/gdp		*Model 2:* ΔL/invc		*Model 3: log*(TFP)		*Model 4: log*(pgdp)	
reali	–1.126**	–0.28**	6.046*	0.223*	–1.898	–0.136	–3.438	–0.129
	(0.469)	(0.117)	(3.211)	(0.118)	(1.379)	(0.099)	(2.346)	(0.088)
relative	–0.023***	–0.19***	0.01	0.012	0.026***	0.062***	0.036**	0.045**
	(0.004)	(0.037)	(0.035)	(0.043)	(0.008)	(0.02)	(0.015)	(0.019)
depth	0.116***	0.249***	–0.127	–0.04	–0.258***	–0.16***	–0.014	–0.005
	(0.016)	(0.035)	(0.129)	(0.041)	(0.033)	(0.021)	(0.06)	(0.019)
state	–0.019	–0.027	–0.368	–0.079	–0.609***	–0.254***	–0.409***	–0.089***
	(0.031)	(0.044)	(0.242)	(0.052)	(0.058)	(0.024)	(0.104)	(0.023)
gov	0.358***	0.285***	–0.498**	–0.059**	–0.319***	–0.073***	–0.041	–0.005
	(0.028)	(0.022)	(0.222)	(0.026)	(0.052)	(0.012)	(0.094)	(0.011)
trade	–0.046	–0.015	–3.205***	–0.156***	1.458***	0.139***	4.115***	0.204***
	(0.074)	(0.024)	(0.584)	(0.028)	(0.151)	(0.014)	(0.264)	(0.013)
edu	–	–	–	–	7.879***	0.109***	58.123***	0.419***
	–	–	–	–	(1.628)	(0.023)	(2.619)	(0.019)
urban	–	–	–	–	1.273***	0.413***	–	–
	–	–	–	–	(0.047)	(0.015)	–	–
Adj. R^2	0.274	0.274	0.056	0.056	0.78	0.78	0.701	0.701
No. of obs.	1023	1023	1023	1023	1023	1023	1023	1023

Note: 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.

is not significant). 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 negative impact on the TFP, which is not consistent with our previous prediction that a low interest rate will damage economic efficiency. A possible explanation, on the one hand, is that SOEs, which face a soft budget constraint, are not sensitive to interest rate changes and therefore will not reduce their demand for credit when interest rates increase. On the other hand, private enterprises, which are very sensitive to interest rate changes, will be crowded out of the credit markets when interest rates increase. A typical "adverse selection" process will emerge and harm economic efficiency. In addition, more credit extended to private enterprises has a significant positive influence on the TFP. 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.

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. In general, we can say that financial repression can, on the one hand, promote China's economic growth by encouraging investment and, on the other hand, hurt growth through efficiency loss. 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.

4.4 Further Discussion

We believe that our study offers a more convincing and comprehensive explanation for the coexistence of a repressed financial system and a fast-growing economy in China. Most studies that focus on the role of China's financial system have successfully revealed its repressed nature and the accompanying harmful effects to economic efficiency, resource allocation, and overall economic growth. However, these studies fail to

solve the puzzle of why the Chinese economy has sustained long-term rapid economic growth in spite of the apparent obstacles generated by a weak financial sector.

Some recent literature, such as Allen et al. (2005), attempts to solve this puzzle by arguing that the formal financial system is irrelevant. In other words, the private sector, which is the driving force of China's economic growth, can find alternative financing channels to support its growth rather than relying on an inefficient and discriminatory banking sector. Such arguments, however, ignore the fact that without the help of a formal financial system, the growth of private enterprises would decelerate (Ayyagari, Demirguc-Kunt, & Maksimovic, 2010) and eventually face a dead end (Huang, 2006). Therefore, the formal financial system cannot be irrelevant.

In this paper, we explore the role of finance in China's economic growth from a more balanced perspective. The pro-growth effect of financial repression, namely through subsidizing investment and production, which is overlooked by conventional studies, has been examined theoretically and empirically in this paper. The apparent puzzle that a repressed financial system has not retarded China's economic growth can 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.

Certainly, some limitations still exist in our study. First, due to the problem of data availability, we use only two indicators to proxy China's financial repression, namely the real interest rate and the ratio of the volume of credit extended to private enterprises to that extended to SOEs. Some instruments of repression, such as high bank reserve requirements, capital account controls, and exchange rate restrictions, which are discussed extensively in conventional literature and are also frequently employed by the Chinese government, are not included in our study. Second, an implicit assumption of this study is that during the whole reform period, the influence of financial repression on investment, economic efficiency, job creation, and economic growth is constant, which may not be the case. In fact, Huang and Wang (2011) show that the connection between financial repression and economic growth is changeable: financial repression initially promoted economic growth in the 1980 s and 1990 s but has inhibited economic growth over the past decade. Therefore, our conclusion should be read with a certain degree of caution.

5. Concluding Remarks

Financial repression, with its nature of preventing financial intermediaries from functioning at their full capacity, has long been argued (and to a large extent proved) to be detrimental to economic growth. In this paper, 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: financial repression, on the one hand, may help China to accomplish extraordinary economic growth by subsidizing investment and production but, on the other hand, endangers China's economic health by damaging economic efficiency, slowing job creation, and distorting the country's economic structure.

China is not a rare example of this complicated financial repression–economic growth nexus. Some other economies, especially East Asian economies, have reportedly had a similar experience during their economic development. For example, Wade (1990) reports that in Taiwan, the government used concessional credit to lower the costs of production and thereby drive investment, first in heavy and chemical industries and more recently in electronics and machinery. Cho (1998) shows that in Korea, government intervention in the financial market was extensive in the 1960s and 1970s; the government owned the banking institution, controlled its interest rates, and directed a substantial portion of its loans. This strategy of financial repression arguably helped Korea achieve fast industrialization.

As with China, the major channel through which financial repression may exert a positive effect on economic growth in other East Asian economies is by encouraging investment (Rousseau & Vuthipadadorn, 2005; World Bank, 1993). While successful in accelerating industrialization, such policies finally led East Asian economies to a trajectory of input-driven, rather than productivity-driven, growth. Kim and Lau (1994, p. 235) find that

> By far the most important source of economic growth of the East Asian newly industrialized countries (Hong Kong, Singapore, South Korea, and Taiwan) is capital accumulation, accounting for between 48 and 72% of their economic growth, in contrast to the case of the Group-of-Five industrialized countries (France, West Germany, Japan, the United Kingdom, and the United

States), in which technical progress has played the most important role, accounting for between 46 and 71% of economic growth.

A similar conclusion is reached by Kim and Lau (1995, 1996) and Young (1994, 1995).

The inescapable problem encountered with the input-driven growth model is that there are diminishing returns associated with the addition of any one factor of production. With a given labour 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 total output of an economy 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). The East Asian financial crisis of 1997–98, which brought growth in many countries to an abrupt halt, can be cited as the strongest evidence for the unsustainable nature of the East Asian "miracle" (Crafts, 1999; Haggard, 1999).

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 over-expansion of production capacity (Xu, 2012). In addition, as Kuijs and Wang (2006) show, if China's current economic growth pattern continues, an investment-to-GDP ratio at an unprecedented level of 55% on average in 2014–24 will be required to maintain GDP growth at 8% 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 regulation and supervision 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 indepen-

dence, 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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