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Could financial distortions be no impediment to economic growth after all? Evidence from China

by

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Abstract

Using data for 30 Chinese provinces over the period 1989-2003, this study examines the relationship between finance, and real *GDP*, capital, and total factor productivity growth. We find that traditionally used indicators of financial development and China-specific indicators measuring the level of state interventionism in finance are generally negatively associated with growth and its sources, while indicators measuring the degree of market driven financing in the economy are positively associated with them. These effects have been gradually declining over time, and are weaker for high *FDI* recipients, suggesting that *FDI* may be used to alleviate the costs associated with the inefficient banking sector.

JEL Classification: E44; G21; N15; O16; O40

Keywords: Financial development; Financial distortions; Economic growth; Capital accumulation; Productivity growth; China

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Non-technical summary

This paper analyzes the links between finance and growth in 30 Chinese provinces, over the period 1989-2003. China represents an interesting case study since it is often cited as a counterexample to the findings of the finance-growth literature: in spite of a malfunctioning financial system, it is in fact one of the fastest growing economies.

Existing research on the links between finance and growth in China has led to contrasting results: some authors documented a positive relationship; others, a negative one; and others, no relationship at all. Our analysis extends the literature in several dimensions. First, we use a wide range of financial indicators, including traditionally used indicators of financial development (ratio of bank loans, total loans, or total household saving deposits in the banking system over GDP); China-specific indicators measuring the level of state interventionism in finance (credit provided by the four main state-owned banks over total credit or GDP; ratio of loans to deposits of the state-owned banks); and indicators measuring the degree of market driven financing in the economy (share of fixed assets investment financed by domestic loans relative to that financed by state budget appropriation; share of total investment financed by retained earnings). Our wide selection of indicators allows us to account both for the size and quality effect of financial intermediation. Second, for the first time in the Chinese context, we analyze the links between finance and two sources of GDP growth, namely physical capital accumulation and total factor productivity (TFP) growth. Third, we investigate whether, as a result of the progressive restructuring of the banking sector in China, the link between finance and growth has changed after 2000. Finally, considering that China is among the top Foreign Direct Investment (FDI) recipients in the world, we investigate whether the finance-growth nexus changes for regions with different ratios of FDI stock to GDP.

We find that traditionally used indicators of financial development and China-specific indicators measuring the level of state interventionism in finance are generally negatively associated with growth and its sources, while indicators measuring the degree of market driven financing in the economy tend to promote GDP and TFP growth, as well as capital accumulation. This suggests that financial distortions do represent an impediment to growth.

In order to explain how, in spite of the distortions, China managed to sustain phenomenal growth rates, we show that the adverse effects of financial distortions on growth have gradually declined over time, probably due to the progressive restructuring of the banking sector in China. We also show that these effects tend to be weaker for high FDI recipients, suggesting that FDI may be used to alleviate the costs associated with the inefficient banking sector: private firms, which are generally discriminated against by the local financial system, might be able to use foreign joint-ventures as sources of finance, and might consequently achieve higher productivity and growth rates. FDI could therefore provide an explanation for why China is a counter-example to the findings of the finance-growth literature, being characterized by malfunctioning financial institutions and phenomenal growth rates.

1. Introduction

Studying the linkages between financial development and growth is a popular topic both in theoretical and empirical macroeconomics. According to Levine (2005), financial systems foster growth as they produce ex ante information about possible investment; monitor investment and exert corporate governance after providing finance; facilitate the trading, diversification, and management of risk; mobilize and pool savings; and ease the exchange of goods and services. As early as 1969, Goldsmith (1969) provided the first cross-country empirical study documenting the existence of a link between finance and growth. A number of studies followed, generally confirming the existence of a strong positive link between the functioning of the financial system and growth (see Levine, 2005, for a survey).

This paper analyzes the links between finance and growth in 30 Chinese provinces, over the period 1989-2003[1]. China represents an interesting case study: Allen et al. (2005) characterize it as a counterexample to the findings of the finance-growth literature, as in spite of a malfunctioning financial system, it has one of the fastest growing economies[2]. The Chinese case suggests therefore that there might be circumstances under which financial distortions do not represent an impediment to growth.

Existing research on the links between finance and growth in China has led to contrasting results: some authors documented a positive relationship; others, a negative one; and others, no relationship at all. Our analysis extends the literature in several dimensions. First, we use a wide range of financial indicators, including traditionally used indicators of financial intermediary development (ratio of bank loans, total loans, or total household saving deposits in the banking system over *GDP*); China-specific indicators measuring the level of state interventionism in finance (credit provided by the four main state-owned commercial banks over total credit or *GDP*; ratio of loans to deposits of the state-owned banks); and indicators measuring the degree of market driven financing in the economy (share of fixed assets investment financed by domestic loans relative to that financed by state budget appropriation; share of investment financed by retained earnings). Our wide selection of indicators allows us to account both for the size and quality effect of financial intermediation. Second, for the first time in the Chinese context, we analyze the links between finance and two sources of *GDP* growth, namely physical capital accumulation and total factor productivity (*TFP*) growth. Third, we investigate whether, as a result of the progressive

[1] Using cross-national instead of cross-country data in addressing this issue has the advantage of making data compatibility issues less severe.

[2] According to our data, China's annual growth rate of real *GDP* has been on average 9.1 percent over the period 1989-2003.

restructuring of the banking sector in China, the link between finance and growth has changed after 2000. Finally, considering that China is among the top Foreign Direct Investment (*FDI*) recipients in the world (Prasad and Wei, 2005), we investigate whether the finance-growth nexus changes for regions with different *FDI* stock to *GDP* ratios. This exercise is motivated by Harrison et al. (2004), who show that firms in countries with greater *FDI* inflows are less likely to face financial constraints, as incoming foreign investment provides an additional source of capital. It is therefore possible that, in the Chinese case, *FDI* provides capital to firms which would otherwise be constrained in their growth by the inability to obtain funds, due to distortions in the banking sector[3].

We find that traditionally used indicators of financial development and China-specific indicators measuring the level of state interventionism in finance are generally negatively associated with growth and its sources, while indicators measuring the degree of market driven financing in the economy tend to promote *GDP* and *TFP* growth, as well as capital accumulation. These effects have gradually declined over time and tend to be weaker for high *FDI* recipients, suggesting that *FDI* may be used to alleviate the costs associated with the inefficient banking sector.

The remainder of this paper is organized as follows. In Section 2, we briefly describe the Chinese financial system and review the literature on the finance-growth nexus in China. Section 3 describes our data set and provides some descriptive statistics. Section 4 illustrates our baseline specification and presents our main empirical results. Section 5 investigates how the relationship between growth and our financial indicators has evolved over time, and how it is contingent on the level of *FDI* received by each province. Section 6 concludes.

2. Financial system and finance-growth nexus in China

2.1 China's financial system

Before 1978, the Chinese economy was centrally planned and production was exclusively conducted by state-owned enterprises. The financial system consisted of a single bank, the People's Bank of China (*PBC*), which served both as a Central Bank and as a commercial bank. Yet, the role of the *PBC* was very limited as most long-term investment financing was

[3] In line with this idea, Huang (2003) formulates a "demand perspective" on *FDI*, which stresses that private Chinese enterprises may be forced to look for foreign investors as they are constrained in their activity due to discrimination relative to state-owned enterprises both from the banking system and the equity market. Private firms might therefore use foreign joint-ventures as a way to acquire needed capital in order to undertake investment.

not channelled to enterprises through the banking system, but financed with budgetary grants. The *PBC* only provided working capital to enterprises.

In 1978, the single bank was split. The *PBC* was left to operate as a Central Bank; and three state-owned banks were created: the Bank of China, the People's Construction Bank of China, and the Agriculture Bank of China, respectively dealing with foreign currency transactions, investment in manufacturing, and banking in rural areas. A fourth state-owned bank was created in 1984, the Industrial and Commercial Bank of China. It took over all commercial transactions from the *PBC*. After 1984, a number of non-state owned banks also entered the financial system, including commercial banks, urban and rural credit cooperatives, trust and investment companies, financial companies, and other institutions. Yet, in 1994, the state-owned banks still dominated the financial sector: their total assets covered around 78 percent of the total assets of the entire financial sector. Moreover, the banking system was plagued by huge amounts of non performing loans (Podpiera, 2006).

Major banking reforms were initiated in 1994 when the central government decided to separate policy banks from commercial banks, and established three policy-lending banks and four specialized commercial banks. The banking reforms thereafter include, among others: transforming the urban credit cooperatives into commercial banks (1996-1998); granting limited licenses to some foreign banks; reducing government intervention in credit allocation; loosening interest rate controls; recommending standard accounting and prudential norms (Shirai, 2002). A further impulse for changes in the banking sector came about with China's entry into the World Trade Organization (*WTO*) in 2001. Progresses include fewer restrictions on ownership and increased operational freedom. As a consequence of the reforms, by the end of 2002, the state-owned banks' market share had declined to 68 percent, and non performing loans had also significantly declined (Podpiera, 2006; Allen et al., 2006).

Despite the large size of the banking sector in China, until recently, most bank credit was directed to inefficient state enterprises, leaving good private enterprises without access to external funding. Until 1998, the four state-owned commercial banks (*SOCBs*, i.e. the Bank of China, China Construction Bank, the Industrial and Commercial Bank of China, and the Agricultural Bank of China) were instructed to lend to state-owned enterprises (*SOEs*). The Chinese state enterprises submitted investment plans and funding requests that had to be approved at the provincial and central authority level. Based on this, lending quotas were issued to enterprises. Since private enterprises were excluded from submitting investment plans, they were, naturally, also excluded from lending quotas. In addition, there was also a legal bias against private domestic firms, which made it harder for them to collateralize their

assets in order to obtain loans, and made it riskier for banks to lend them money (Huang, 2003).

The system was liberalized at the end of 1990s, when the China Constitution acknowledged the private sector to be an integral part of the economy, and theoretically it is not in place any more. However, in practice, banks still consider private enterprises to be riskier than their public peers either due to their short credit history or lower chance of being bailed out by the government. Moreover, as discussed in Park and Sehrt (2001), lending by state banks is still determined by policy reasons, rather than by commercial motives.

In summary, a major problem in China's corporate sector is a political pecking order of firms which leads to the allocation of China's financial resources to the least efficient firms (state-owned enterprises), while denying the same resources to China's most efficient firms (private enterprises). Although they are the engine of growth in the Chinese economy[4], private firms are discriminated against in terms of access to external funding, property rights protection, taxation, and market opportunities. Such distortions may force private Chinese firms to look for foreign investors (Huang, 2003). By establishing cross-border relationships with foreign firms, private domestic firms can bypass both the financial and legal obstacles that they face at home. *FDI* can in fact be seen as a form of equity financing (Harrison et al., 2004). Moreover, from the very beginning of economic reforms in China, foreign-invested firms were accorded a superior legal status compared with private firms.

2.2 The finance-growth nexus in China

A number of studies have looked at the links between indicators of financial development and growth in China obtaining contrasting results. Like ours, most of these studies are panel studies based on Chinese provinces. For instance, Liu and Li (2001) analyze the links between growth and the four sources of total investment in fixed assets (state budget appropriation, national bank loans, self-raised funds, and foreign investment). They find that between 1985 and 1998, the growth of national bank loans and self-raised funds are both positively related to the growth of provincial output, while state appropriation only affects growth in the interior regions, where non state sources of finance might be unavailable. Aziz and Duenwald (2002) use data for 27 provinces over the period 1988-97 and find no evidence that financial development (proxied by bank lending) boosts growth among Chinese provinces.

[4] Allen et al. (2005) document that the private sector in China dominates the state and listed sectors, both in terms of output size and growth trend. Specifically, they show that between 1996 and 2002, the private sector grew at an annual rate of 14.3 percent, while the combined state and listed sector only grew at 5.4 percent.

Specifically, domestic private credit plays a small role in the financing of the fast growing provinces. Using similar data over the period 1990-1999, Boyreau-Debray (2003) finds that credit extended by the banking sector has a negative impact on growth, which she attributes to the burden of supporting the state-owned corporate sector. Chen (2006) shows that Chinese growth has been fostered by the substitution of loans for state budget appropriation, but not by loan expansion. His findings are challenged by Cheng and Degryse (2006) who argue that banking development spurs growth in China[5].

These studies make use of different financial indicators, and different econometric techniques, which might explain their contrasting results. Yet, none of them examines the channels through which financial development might affect growth. Our paper fills this gap, by looking at the links between finance, *GDP* growth, and two of its sources: physical capital accumulation and *TFP* growth. Our paper also contributes to the literature, making use of a very wide range of financial indicators measuring both financial development and distortions, and focusing for the first time, on whether the effects of these indicators on growth have declined over time, and on whether they differ across provinces characterized by different levels of *FDI*. Our objective is to understand whether there might be circumstances under which financial distortions do not hinder growth.

3. Data description and summary statistics

The key data used in this paper are our indicators of financial intermediary development and distortions, as well as measures of real per capita *GDP* growth and its components, i.e. per capita capital stock accumulation and per capita productivity growth. Our sample consists of a panel of 30 provinces in Mainland China with annual data for the period 1989-2003[6]. The Appendix provides details on all variables used in our analysis and information on data sources.

3.1 Indicators of financial development and distortions

Our intention is to evaluate the impact of measures of both financial intermediaries' development and financial distortions on growth and its sources in the context of China. Despite its large size, the Chinese banking sector is still dominated by four large state banks

[5] Using a multivariate Vector Autoregression (*VAR*) approach, based on annual Chinese data over the period 1952-2001, Liang and Teng (2006) find that high levels of bank credit in China do not cause higher growth.

[6] China is administratively decomposed into 31 provincial units, which fall into three categories: 22 provinces or *sheng*; 4 autonomous regions or *zizhiqu* (Nei Monggol, Xinjiang, Tibet, Ningxia and Guangxi); and 4 municipal cities or *zhixiashi*, under direct supervision of the central power (Shanghai, Tianjin, Beijing, and, since 1997, Chongqing). Tibet is excluded from our sample due to data constraints.

that allocate most of their financial resources to the inefficient and loss-making state-owned enterprise sector (Boyreau-Debray, 2003). As such, the transition to a modern and profit-oriented banking sector is far from being achieved.

A major challenge in this paper is therefore to disentangle between the effect of financial deepening and that of the distorting nature of the state-ruled banking sector. We go further than the indicators of financial development traditionally used in the literature, and rely on three families of indicators, intended to proxy for the development of the financial sector (Family 1), the misallocation of financial resources (Family 2), and the more modern and profit-oriented financial transactions (Family 3). The use of different measures focusing on different aspects of financial intermediation will allow us to account for both a size and a quality effect of the latter. To assess the robustness of our results, we will use several indicators within each family.

To evaluate the impact of the development of the financial sector, we will use three measures of financial depth (Family 1), one based on banks alone, and the other two on both bank and non-bank sources of private sector financing. More specifically, we will use the following three indicators:

(1) The ratio of total bank loans to *GDP*, which measures banking sector size (*BANK CREDIT*)[7].

(2) The ratio of total (bank and non-bank) loans to *GDP,* which measures the overall depth of the financial sector (*TOTAL CREDIT*).

(3) The ratio of household savings deposited in financial intermediaries relative to *GDP* (*SAVINGS*), which serves as a proxy of China's financial intermediary development[8].

To evaluate the specific impact of misallocation of funds in the finance-growth nexus in China, we rely on the following three measures of the role of distortions induced by state interventionism in the financial sector (Family 2):

(4) The share of state-owned commercial banks in total bank credit (*SOCB CREDIT* share). Chinese statistics do not provide any information on credit allocation between

[7] Unlike past studies and following Beck et al. (2000), we carefully deflate those financial intermediary statistics, which are expressed as a ratio to *GDP*. Specifically, financial stock items are measured at the end of the period, while *GDP* is measured over the period. Simply dividing financial stock items by *GDP* can therefore produce misleading measures of financial development. This paper deflates end-of-year financial balance sheet items by end-of-year consumer price indices (*CPI*), and deflates the *GDP* series by the annual *CPI*. We then compute the average of the real financial balance sheet item in year *t* and *t*-1, and divide this average by real *GDP* measured in year *t*.

[8] This indicator excludes corporate deposits, which might be affected by the central government's credit policies. As argued by Chen (2006), households' deposits are based on households' own decisions, and are much less influenced by the central government's policies than loans.

state and non-state enterprises. However, given that the state banks' primary function is to channel savings to *SOE*s, the ratio of the *SOCB*s credit to total bank credit can be interpreted as a proxy for the credit channelled to the state-owned sector. For instance, conservative estimates suggest that in the late 1990s, 80 percent of the total amount of credit by the *SOCB*s was extended to the *SOE*s (Boyreau-Debray, 2003). Even with the recent emphasis on profit maximization and management responsibility, state banks may still favor the *SOE*s, with which they have a long customer history and which are more likely to be bailed out by the government than non-state enterprises in case of financial distress. In contrast, projects in the non-state sector are perceived as more risky because of higher information costs and moral hazard.

(5) The ratio of state-owned commercial banks' credit to *GDP* (*SOCB CREDIT* to *GDP*).

(6) The ratio of loans to deposits of the *SOCB*s (*CENTRAL*). This ratio captures another distortion of the Chinese banking sector, namely the interventionism of the Central Bank. It was previously used by Lardy (1998), Dayal-Gulati and Hussain (2002), and Boyreau-Debray (2003). In China, while the volume of deposits is determined by economic activity, the volume of lending is largely determined by policy objectives and is set through a credit plan, independently of the ability of branch banks in each region to finance the lending target from local deposits (Lardy, 1998). As pointed out by Boyreau-Debray (2003), some rapidly growing provinces could therefore have a low credit quota and be constrained in their lending relative to the rapid growth of their deposits. Alternatively, branch banks in slower growing regions could be assigned high quotas with insufficient local deposits to finance their lending: these provinces would therefore depend on the Central Bank to lend them additional funds. We follow the literature and consider the ratio of *SOCB* loans to deposits as a measure of the Central Bank's credit to local branch banks aimed at helping them to meet their lending quotas.

Our third family of indicators intends to proxy for the efficient use of capital in a context of widespread misallocation. We rely on information of the decomposition of fixed asset investment financing by source. This is typically broken into domestic loans, state budgetary appropriation, foreign investment, and self-raised funds[9]. In general, loans are considered a

[9] Domestic loans include funds borrowed from domestic banks and non-bank financial institutions by local enterprises and institutions. State appropriation consists essentially of appropriation in the government budget earmarked for capital construction and infrastructure projects. Foreign investment refers to foreign funds in fixed assets, foreign funds borrowed and managed by the government or by individual units, as well as foreign funds in joint-ventures. Self-raised funds include funds raised by various types of enterprises through non-state

more efficient means of resource distribution than state budget allocation. Unlike state budget appropriation, loans call in fact for payments of interest and principals, helping to harden enterprises' budget constraints, and promoting more efficient use of capital. Retained earnings may represent even harder budget constraints in a context of ineffectual decision-making and excessive investment. Both Liu and Li (2001) and Chen (2006) make use of these measures of fixed assets investment financing. The former find a significant relationship between growth and fixed asset investments financed by domestic loans and retained earnings, and the latter conclude that, while loan expansion did not directly contribute to growth, the substitution of loans for state budget appropriation did.

We construct the following two measures of market and profit-oriented financial transactions (Family 3):

(7) The share of fixed asset investment financed by domestic loans relative to that financed by state budgetary appropriation (*LOANS* over *APPRO*).

(8) The share of fixed asset investment financed by retained earnings (*RETAINED EARNINGS INVESTMENT*).

3.2 Indicators of economic growth and its sources

Our investigation of the finance-growth nexus in China will assess the impact of our various indicators of financial development on real per capita *GDP* growth, capital accumulation, and productivity growth.

The rate of real per capita *GDP* growth (*GROWTH*) is computed as yearly growth of per capita *GDP* deflated by consumer prices. The growth rate of the per capita physical capital stock (*CAPITALGROWTH*) is computed using the perpetual inventory method. We follow Harberger's (1978) suggestion for deriving an initial estimate of the capital stock, which assumes that each province was at its steady-state capital-output ratio in 1974[10]. We then apply the perpetual inventory method with a depreciation rate (δ) of five percent to compute capital stocks in later years. The capital stock (K_t) is therefore computed using the following formula: $K_{t+1} = K_t + I_t - \delta K_t$, where I_t represents real investment in fixed assets.

As in Beck et al. (2000), our measure of productivity growth (*TFPGROWTH*) builds on the neoclassical production function. We assume that this aggregate production function is

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channels such as bonds, stocks, venture capital, and retained earnings. As the latter is the prevalent component of self-raised funds, we will refer hereafter to self-raised funds as retained earnings.

[10] As argued by Beck et al. (2000), while this assumption is surely incorrect, it is better than assuming an initial capital stock of zero, which many researchers use. The initial stock is computed for the year 1974, the first year for which data on investment flows are available. Alternative measures of capital growth based on assuming an initial stock of zero produced similar results.

common across provinces and time, so that aggregate output in province *i*, Y_i, is given by the following expression: $Y_i = A_i K_i^{\alpha} L_i^{1-\alpha}$, where *K* denotes the capital stock; *L*, labor; and *A*, the level of total factor productivity. We solve for the growth rate of per capita productivity by first dividing all terms in the production function by *L* to get per capita production. We then take logarithms and the time derivative. Finally, we rely on the ratio of compensation of employees to *GDP* at factor cost in the People's Republic of China from the national accounts and on input-output tables to set the capital share. The overall economy-wide share of labor is about 0.6 (Young, 2003). We therefore assume a capital share α=0.4 and solve for the growth rate of total factor productivity per capita, which leads to:

$$TFPGROWTH = GROWTH - 0.4 * CAPITALGROWTH \quad (1)$$

3.3 Descriptive statistics and correlations

The summary statistics of our variables are presented in Table 1a. Column (1) refers to the entire sample; columns (2) and (3) to the early (1989-1999) and late (2000-2003) periods, respectively; and columns (4) and (5), respectively to those province-year observations belonging to the three lower quartiles, and the highest quartile of the distribution of the *FDI* stock to *GDP* ratio.

Comparing the early with the late period, we can observe no major differences in the growth rates of *GDP*, *TFP*, and capital stock. Yet, the later period is characterized by a much higher *GDP* per capita, with no major differences in the *FDI* inflows to *GDP* ratio. It is also interesting to note that the share of population with more than primary education increased from about 73 percent in the early years to 86 percent in the later years, that the inflation rate declined from 9.28 percent to 0.52 percent, and that the share of state entities in total fixed assets declined from 65 percent to 52 percent.

Coming to our financial indicators, the statistics suggest that financial depth, which was already high at the start of the period, further increased from 1989 to 2003: the ratio of total bank loans to *GDP* rose from 78 percent to 91 percent, while the ratio of total loans to *GDP* rose from 95 percent to 109 percent. State interventionism, on the other hand, declined, probably as a result of the financial reforms discussed in the previous Section. In particular, the share of *SOCB* credit in total bank credit declined from 68 percent to 59 percent, while the ratio of loans to deposits of the *SOCB*s declined from 112 percent to 77 percent. Surprisingly,

the share of fixed assets investment financed by loans relative to that financed by state budget appropriation also declined over time, as did the share financed by retained earnings.

Comparing the low and high-*FDI* province-year observations, we can see that the latter are characterized by higher *GDP*, *TFP*, and capital stock growth, by a higher level of *GDP*, degree of openness, percentage of educated people, and a lower share of state entities in total investment. The high-*FDI* regions also display a higher degree of financial depth, and a lower degree of state interventionism than their low-*FDI* counterparts. Finally, the share of fixed assets investment financed by loans relative to that financed by state budget appropriation is higher for high *FDI* recipients, while the share financed by retained earnings is slightly lower.

Table 1b presents the correlation matrix between our growth variables and our financial indicators. We can see that our Family 1 and Family 2 indicators are negatively related with *GDP* and *TFP* growth, as well as with physical capital accumulation, while the correlation between our Family 3 indicators, growth, and its sources is generally positive. In the Section that follows, we will provide formal evidence for the effects of our financial indicators on *GDP* and *TFP* growth, and capital accumulation. We will also investigate whether the relationship between our financial indicators, growth, and its sources has changed over time, and whether it differs across provinces with different *FDI* stock to *GDP* ratios.

4. Baseline specification and estimation results

This section presents an empirical analysis of the impact of our financial indicators on provincial economic growth and its sources. We first present our baseline growth equation, and discuss the conditioning information set that we use as well as our econometric methodology. We then present and discuss the results.

4.1 Empirical framework

We use a cross-province time-series panel of data and employ dynamic panel techniques to estimate the relationship between finance and *GDP* growth, capital accumulation, and productivity growth[11]. Our baseline regression, which we initially estimate using a within-groups estimator, takes the following form:

[11] We rely on annual growth rate to maximize the number of observations. Our results were robust to using two year averages. The results based on the two year averages are not reported for brevity, but are available on request.

$$\Delta Y_{i,t} = \alpha + \beta\, FINANCE_{i,t} + \gamma\, CONTROL_{i,t} + \eta_i + \lambda_t + \varepsilon_{i,t} \qquad (2)$$

where i indexes provinces, and t, time. ΔY is either *GROWTH*, *CAPITALGROWTH*, or *TFPGROWTH*. *FINANCE* represents in turn each of the eight indicators presented in Section 3.1 to proxy respectively for the size of the financial sector, its state-induced distorting nature, and its market driven functioning. *CONTROL* represents a vector of conditioning information that controls for other factors associated with economic growth, including lagged real per capita *GDP*[12]. Provincial fixed effects and time fixed effects are denoted by η_i and λ_t respectively and, $\varepsilon_{i,t}$ is an idiosyncratic error term.

Equation (2) confronts us with some econometric issues. First, particularly in the regression for real *GDP* per capita growth, introducing the lagged dependent variable among the regressors together with fixed individual effects renders the within-groups estimator biased and inconsistent even if $\varepsilon_{i,t}$ is not serially correlated, as the lagged dependent variable is correlated with the error term[13]. Second, in all specifications, most of the explanatory variables can be expected to be endogenously determined. We thus need to control for the endogeneity arising both from the dynamic specification of the equation and from reverse causation. In order to do so, we rely on the system Generalized-Method-of-Moments (*GMM*) panel estimator, proposed by Arellano and Bond (1991) and Blundell and Bond (1998)[14]. The basic idea of the *GMM* system estimator is to rely on a system combining Equation (2) in levels and in first-differences. First-differencing allows us to control for the fixed effects. In order to control for the possible endogeneity of the regressors, we use once lagged first-differences of the regressors as instruments in the level equation, and twice or more lagged levels of the regressors as instruments in the first-differenced equation. The inclusion of the regression in levels in addition to that in first-differences helps to cope with weak-instrument biases[15].

The consistency of the *GMM* estimator depends on the validity of the assumption that $\varepsilon_{i,t}$ does not exhibit serial correlation and on the validity of the instruments. We use two tests

[12] All regressors are expressed in logarithms.
[13] This bias is generally referred to as the Nickell (1981) bias. Nickell (1981) derives a formula for this bias (when there are no exogenous regressors), showing that it approaches 0 as the sample size tends to infinity. The within-groups estimator is thus likely to perform well only when the time dimension of the panel is large.
[14] See Beck et al. (2000) for a complete discussion of the advantages and limitations of *GMM* estimators.
[15] Specifically, Blundell and Bond (1998) show that the instruments used with the standard first-differenced GMM estimator (i.e. the endogenous variables lagged two or more periods) become less informative in autoregressive models with persistent series, and in models where the variance of the fixed effects is particularly high relative to the variance of the transitory shocks. All our results were robust to using the simple first-difference GMM estimator rather than the system-GMM.

proposed by Arellano and Bond (1991) to test for these assumptions: the *J* statistic and the test for second order serial correlation of the residuals (*m2*). The former is the Sargan test for overidentifying restrictions, asymptotically distributed as a chi-square with degrees of freedom equal to the number of instruments less the number of parameters, under the null of instrument validity[16]. The *m2* test is asymptotically distributed as a standard normal under the null of no second-order serial correlation, and provides a further check on the specification of the model and on the legitimacy of variables dated *t*-2 as instruments. Failure to reject the null hypotheses of both tests gives support to our model.

4.2 Control variables (conditioning information set)

The vector of control variables, *CONTROL,* is defined according to the augmented Solow model as proposed by Mankiw et al. (1992). The logarithm of lagged real per capita *GDP* is included to control for convergence. We also introduce the share of population with more than primary schooling as a proxy for human capital (*EDUCATION*). The following five additional policy variables that have been identified in the empirical growth literature as being correlated with growth performance across countries (Barro, 1991; Easterly et al., 1997) are also included: government expenditure over *GDP* as an indicator of government size (*GOV*); the rate of inflation based on the Consumer Price Index *(CPI)*; trade as a share of *GDP* (*OPENNESS*) and *FDI* inflows as share of *GDP* (*FDI*), to capture the degree of openness of the economy; and the share of state entities in total investment (*STATE ENTITIES*) as an indicator of low progress in reform.

4.3 Regression results

Tables 2 and 3 report estimates of Equation (2) where $\Delta Y_{i,t}$ is the real per capita *GDP* growth rate ($GROWTH_{i,t}$). In Table 2, the within-groups estimator is used[17], and in Table 3, the system *GMM* estimator. In both Tables, the results show a statistically and economically significant relationship between our financial indicators and economic growth. Specifically, our Family 1 indicators all attract a negative coefficient, suggesting that financial depth is negatively associated with growth. To assess the economic magnitude of this association, let us consider, for instance, a province exogenously moving from the 25th percentile of the distribution of the ratio of bank loans to *GDP* (58.1 percent) to the 75th percentile (96.8

[16] It should be noted that when panels with a short cross-sectional dimension are used, the Sargan test has low power.

[17] The error structure is assumed to be heteroskedastic and possibly autocorrelated up to one lag. We therefore report Newey-West standard errors that allow for an *AR(1)* process in the error term.

percent). Using the coefficient in Table 2, this province would experience a 2.04 percentage points slower *GDP* growth rate, which is an economically significant number. These findings contrast with the typical conclusion of most cross-country studies that analyzed the finance-growth nexus, finding a positive link between financial depth and growth. They can be a consequence of policies, which have promoted inefficient allocation of savings. These policies can be explained by the fact that the state's main objective is not to maximize efficiency. In particular, it might channel capital to poor, slow-growing regions, with the aim of reducing poverty (Boyreau-Debray, 2003; Boyreau-Debray and Wei, 2005).

Our Family 2 indicators are also negatively associated with growth, probably due to the inefficient allocation of savings by the state-banking sector, as well as to the fact that state-owned banks mainly support the relatively inefficient state-owned sector. As argued by Boyreau-Debray and Wei (2005), the state typically channels capital (through state-owned banks) to the inefficient *SOEs*, in order to avoid the unemployment consequences that would follow from *SOE* bankruptcy. Focusing on the ratio of state-owned banks' credit to *GDP* and using the coefficients in Table 2, a province exogenously moving from the 25th percentile of the distribution of state-owned banks' credit to *GDP* (45.8 percent) to the 75th percentile (78.3 percent) would experience a 4.13 percentage points slower *GDP* growth rate, which is once again economically significant.

Finally, our Family 3 indicators generally display positive coefficients, suggesting that a higher use of more market and profit-oriented financial transactions (such as loans relative to state budget appropriation, and self-raised funds) promotes growth. For instance, based on Table 2, a province exogenously moving from the 25th percentile of the distribution of the share of fixed investment financed by retained earnings (41.1 percent) to the 75th percentile (52.8 percent) would benefit from a 0.80 percentage points faster *GDP* growth rate.

The variables in the conditioning information set also have the expected signs. Lagged *GDP* per capita attracts a negative and significant coefficient, indicating a process of convergence. Our proxy for human capital accumulation generally attracts a positive and significant coefficient. Finally, among our policy indicators, the share of state entities in total investment enters as a negative determinant of economic growth, while our proxies for the degree of openness (trade and *FDI* share of *GDP*) have a positive impact on economic growth.

In Table 3, the Sargan-test of overidentifying restrictions indicates that the orthogonality conditions cannot be rejected at the five percent level, and the *m2* test for the second order autocorrelation of the first-differenced residuals suggests that the error term is

not serially correlated. Thus, we do not reject the null hypothesis that the instruments are appropriate. The strong link between finance and growth does not appear to be driven by simultaneity bias.

Tables 4 and 5 present the within-groups and GMM estimates relative to physical capital accumulation, and Tables 6 and 7, those relative to *TFP* growth[18]. Both Tables 4 and 5 show that like in the case of real *GDP* growth, all our Family 1 and Family 2 indicators are negatively associated with physical capital accumulation. Thus, contrary to Beck et al. (2000), financial intermediary development indicators do have a significant impact on capital accumulation. This can be seen as evidence that the inefficient allocation of saving hampers capital accumulation, probably because the private firms, which have more potential to invest, are unable to obtain funds. Coming to our Family 3 indicators, we can see that the share of total investment in fixed assets financed by retained earnings has a significant effect on capital accumulation, although this effect only appears when GMM is used in estimation.

We obtain similar results for productivity growth (Tables 6 and 7): in this case, however, the coefficients associated with our Family 3 indicators are all positive and statistically significant. These results point to the fact that the positive impact of market and profit-oriented financial transactions on economic growth mainly operates through enhanced efficiency, while the negative impact of other financial indicators seems to work both through lower returns and capital constraints.

Our results so far indicate that financial distortions do represent an impediment to economic growth. But what can then explain the phenomenal growth characterizing the Chinese economy? We attempt to answer this question by looking first at whether the negative relationship between finance and growth has become weaker over time, as a consequence of the banking sector reforms, and then by trying to determine whether there are circumstances under which financial distortions might not be an impediment to economic growth after all.

5. Evolution over time and *FDI* contingency of the finance-growth relationship

5.1 Evolution over time

As we discussed in Section 2.1, since the beginning of the economic reform, China has experienced a fundamental change with regard to the means of allocating financial resources.

[18] Since the province of Chongqing was only created in 1997, it was not possible to compute its capital stock. As such, only 29 provinces are used in the capital stock and *TFP* growth equations

Major banking reforms were initiated in 1994, and a further impulse for changes in the banking sector came about with China's entry in the *WTO* in 2001. Consequently, as shown in Table 1a, state interventionism has significantly declined in the latest years of our sample. However, although these changes in banking policy are important, serious banking sector problems remain. It is therefore of primary interest to investigate whether the relationship between finance and economic growth has evolved over the period of reform. We would expect that the rationalization and introduction of market driven practices in the final years of our sample would mitigate the problem of misallocation of funds, and therefore reduce the estimated negative impact of our indicators of financial development and state interference on growth. We also anticipate that reforms will reduce the differences between the various sources of financing in terms of returns to investment. In a context of widespread efficiency, there is in fact no reason to expect higher effects on growth of investment financed by loans, state appropriation, or retained earnings. Returns to investment financed with different sources should converge and equalize in parallel with financial system reforms, so that our indicators of market driven finance would lose their relevance over time. In order to test these hypotheses, we estimate the following variant of Equation (2):

$$\Delta Y_{i,t} = \alpha + \beta_1 FINANCE_{i,t} + \beta_2 FINANCE_{i,t} * LATE_t + \gamma CONTROL_{i,t} + \eta_i + \lambda_t + \varepsilon_{i,t} \qquad (3)$$

where $LATE_t$ represents a dummy equal to 1 in 2000, 2001, 2002, and 2003, and 0 otherwise[19]. If the estimated negative impact of our indicators of financial development and state interference on growth is indeed reduced in the later years of our sample, and the positive impact of our indicators of market driven finance is mitigated, then we should observe a positive and significant β_2 coefficient for our Family 1 and 2 indicators, and a negative and significant β_2 coefficient for Family 3 indicators (together with a negative β_1 coefficient for Family 1 and 2 indicators, and a positive β_1 coefficient for Family 3 indicators).

The estimates of Equation (3) for *GDP* growth, capital accumulation, and *TFP* growth are presented respectively in Tables 8, 9, and 10. To save space, we only present the *GMM* estimates: all results were, however, robust to using the within-groups estimator. Tables 8 and 10 show that the coefficients associated with Family 1 financial indicators are negatively and precisely determined, while the interactions between the indicators and the *LATE* dummy are

[19] Our results were generally robust to setting the dummy $LATE_t$ equal to one in 2001 to 2003; or in 1999 to 2003.

generally positive and statistically significant. This suggests that the negative effect of most Family 1 financial indicators on *GDP* and *TFP* growth became weaker over the final years of our sample (2000-2003), possibly due to the financial system reforms, which reduced the system's inefficiencies. In a number of cases, summing the coefficients on the financial depth indicators and that on the same indicators interacted with the dummy gives a positive number: this shows that financial depth became positively associated with *GDP* and *TFP* growth after 2000. For instance, focusing on Table 8 and summing the coefficients on *BANK CREDIT*, and its interaction with the *LATE* dummy, yields 0.008, which can be interpreted as the coefficient on *BANK CREDIT* in the latest years of the sample (2000-2003). This number suggests that if a province were to exogenously move from the 25th percentile of the 2000-2003 distribution of *BANK CREDIT* (66 percent) to the 75th percentile (103 percent), it would experience a 0.36 percentage points faster *GDP* growth rate.

Table 9 reports the regressions for capital accumulation: the relationship between our Family 1 financial indicators and capital accumulation did not significantly change over time. This can be explained by the fact that a more efficient financial system led to a rationalization of investment behavior, and not to an increase in capital accumulation. Rawski (2006) documents China's traditional reliance on "extensive" growth achieved by adding more resources to the production process, rather than "intensive" growth based on higher productivity. Officially managed investments typically generate low returns, and the overall investment picture in China reveals a surprising persistence of Soviet-style outcomes. Vigorous reform efforts are expected to increase investment returns and address the problems of ineffectual decision-making (Von Pfeil, 2004). As such, financial system reforms should help mitigating the Soviet-style seasonality pattern in investment spending and reduce excessive investment.

The negative effects of most of our Family 2 indicators on *GDP*, *TFP*, and capital stock growth appears to generally have declined or been reversed over time, although not all indicators are associated with a positive and significant β_2 coefficient.

Coming to our Family 3 indicators, all Tables show that their positive effect on *GDP* and *TFP* growth, and physical capital accumulation, declined over time (the interaction terms attract negative and precisely determined coefficients), and in some cases became insignificantly different from zero. This can be explained by the fact that as the banking system became more efficient, it started to positively affect growth and its sources, reducing the difference in terms of effects on growth of the alternative forms of financing such as retained earnings.

Financial distortions have therefore declined over time, hindering growth to a lower extent. Yet, China's growth has been phenomenal not only after 2000, but also before that, when financial distortions were still severe. So what can explain the co-existence between this sustained growth and strong financial distortions?

5.2 FDI contingent finance-growth relation

We now investigate whether the sensitivity of economic performance to financial intermediation depends on the stock of *FDI* (relative to *GDP*) in each province. This contingency analysis is motivated by Harrison et al. (2004), according to whom firms in countries with greater *FDI* inflows suffer less from financial constraints and have therefore more growth opportunities, as incoming foreign investment provides additional sources of capital. Specifically, in the Chinese case, private enterprises may look for foreign investors, being constrained in their activity due to distortions in the state-dominated financial system (Huang, 2003)[20]. As we discussed in Section 2.1, most of the *SOCB*s' credit goes in fact to *SOE*s, and banks typically impose stricter scrutiny criteria and collateral requirements on private firms compared to other firms (financial bias). The problem was exacerbated prior to 2004 when China's Constitution did not commit to the protection of property rights of private firms (legal bias). Establishing joint-ventures with foreign firms may allow private firms to bypass both the financial bias (by using foreign firms as sources of finance) and the legal bias (by accessing the superior legal protection and regulatory treatment granted to foreign firms)[21].

Our aim is to determine whether in the presence of *FDI*, financial distortions may become less of an impediment to economic growth. We conduct a straightforward test of this hypothesis, introducing interaction terms of our indicators of financial intermediation, with the logarithm of the stock of *FDI* to *GDP* (*FDISTOCK/GDP*) in each province[22]. We therefore estimate the following Equation:

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[20] Havrylchyk and Poncet (2006) provide primary empirical confirmation of this thesis. They find that indicators of the distorting nature of the inefficient banking sector are significant determinants of the *FDI* received by Chinese provinces. It should be noted, however, that while this thesis might explain part of the inward *FDI* in China, it cannot explain the very rapid increase that took place more recently, when discrimination against private firms was becoming less relevant. See Prasad and Wei (2005) for a discussion of other possible factors explaining the behavior of *FDI* in China in recent years.

[21] Prior to 1999, private firms were also banned from exporting directly, while foreign-invested firms were granted automatic trading licenses within their lines of business. Establishing joint-ventures with foreign firms made it therefore easier for private firms to enter export markets.

[22] We use the stock of *FDI* to *GDP* ratio as an interaction term, instead of the ratio of *FDI* inflows to *GDP*, since the former indicator is likely to better capture the overall presence of foreign firms in each province. Our results were generally robust to using the ratio of *FDI* inflows to *GDP* as an interaction term.

$$\Delta Y_{i,t} = \alpha + \beta_1 FINANCE_{i,t} + \beta_2 FINANCE_{i,t} * \left(FDISTOCK_{i,t} / GDP_{i,t} \right) + \\ + \gamma CONTROL_{i,t} + \eta_i + \lambda_t + \varepsilon_{i,t} \quad (4)$$

A positive β_2 coefficient for Family 1 and 2 financial indicators, and a negative β_2 coefficient for Family 3 indicators (together with a negative β_1 coefficient for Family 1 and 2 indicators, and a positive β_1 coefficient for Family 3 indicators) would suggest that the higher the *FDI* in each region, the lower the constraints related to the misallocation of finance, and the less the heterogeneity in terms of returns to investment depending on financing sources.

The estimates of Equation (4) for *GDP* growth, capital accumulation, and *TFP* growth are presented in Tables 11, 12, and 13, respectively. The results suggest that provinces characterized by higher *FDI* stocks relative to *GDP* tend to suffer less from the negative effects of Family 2 indicators on *GDP*, capital, and *TFP* growth. For instance, the results in Table 11, show that if a province with an *FDI* stock to *GDP* ratio of 10.05 percent (the sample mean less one third the sample standard deviation) were to exogenously move from the 25th percentile of the distribution of the *SOCB CREDIT* share (55 percent) to the 75th percentile (74 percent), it would experience a 0.99 percentage points slower per capita *GDP* growth rate. For a province with an *FDI* stock to *GDP* ratio twice as large, the same increase in *SOCB CREDIT* would result in a 0.45 percentage points slower *GDP* growth rate. These findings support the view that *FDI* may be used as a way to bypass the inefficiencies of the local banking sector. In particular, private firms, for whom it is difficult to obtain loans from state banks, may use foreign joint-ventures to acquire needed capital, and can in this way achieve higher productivity and growth rates (Harrison et al., 2004; Huang, 2003)[23].

Similar results are observed for the effects of our Family 1 indicators on *TFP* growth, but not for *GDP* and capital growth[24]. Coming to our Family 3 indicators, we find that the

[23] Inspection of data from the World Bank Investment Climate Survey (2003), which includes 2400 firms surveyed in 13 cities in 2003, suggests that 12 percent of private firms (i.e. of those firms with a private share greater than 49 percent) have shares owned by a foreign partner. Moreover, the sales per employee of these firms are 15 times higher, and their growth over the period 2001-2002 was almost 5 times faster than those of the 100 percent domestically owned private firms. This evidence is consistent with our hypothesis that those private firms that enter joint-ventures with foreign firms are able to bypass the costs associated with an inefficient banking sector in China, and can consequently achieve higher productivity and growth rates.

[24] In Table 12, which reports the estimates for capital accumulation, we can see that while the Family 1 indicators do not attract statistically significant coefficients, their interactions with the *FDI* stock to *GDP* ratio attract negative and precisely determined coefficients. This finding can be explained by the fact that *FDI*-financed projects may be driven more by a logic of efficiency than by a logic of spending. Consequently, *FDI* abundant environments may promote less disbursement-driven investment, reducing the rhythm of capital accumulation.

positive effects of loans over state budget appropriation on *GDP* and *TFP* growth are lower in high *FDI* recipient provinces.

In sum, our results indicate that provinces with higher *FDI* stocks relative to *GDP* benefit from faster economic growth primarily thanks to enhanced efficiency, and seem to be less sensitive to the negative impact of state intervention induced inefficiency and constraints in capital access. *FDI* can therefore help to alleviate the costs associated with financial distortions, and could provide an explanation for why, as discussed by Allen at al. (2005), China is a counterexample to the findings of the finance-growth literature, being characterized by malfunctioning financial institutions and phenomenal growth rates[25].

6. Conclusions

We have used data for 30 Chinese provinces over the period 1989-2003 to study the relationship between finance and economic growth. Moving beyond existing literature, we have considered a wide range of financial indicators, accounting both for the size and the quality of financial intermediation; focused on two important sources of *GDP* growth: physical capital accumulation, and total factor productivity growth; and investigated whether the relationship between our financial indicators and growth has changed over time, and whether it differs across provinces characterized by different *FDI* stock to *GDP* ratios.

We found that traditionally used indicators of financial development and China-specific indicators measuring the level of state interventionism in finance are generally negatively associated with growth and its sources, while indicators measuring the degree of market driven financing in the economy tend to promote *GDP* and *TFP* growth, as well as capital accumulation. This suggests that financial distortions do represent an impediment to growth.

In order to explain how, in spite of the distortions, China managed to sustain phenomenal growth rates, we showed that the adverse effects of financial distortions on growth have gradually declined over time, probably due to the progressive restructuring of the banking sector in China. We also showed that these effects tend to be weaker for high *FDI* recipients, suggesting that *FDI* may be used to alleviate the costs associated with the

[25] Alfaro et al (2004), Durham (2004), and Hermes and Lensink (2003) use cross-country data to look at the other side of the coin: they examine the extent to which the effects of *FDI* on growth depend on the countries' level of financial development. They find that it is only countries with well-developed financial markets that gain significantly from *FDI.* They argue that the lack of development of local financial markets can limit the economy's ability to take advantage of potential *FDI* spillovers. In contrast, we show that, in the Chinese context, it is financial distortions at home that may lead domestic firms to establish joint-ventures with foreign firms.

inefficient banking sector: private firms, which are generally discriminated against by the local financial system, might be able to use foreign joint-ventures as sources of finance, and might consequently achieve higher productivity and growth rates. *FDI* could therefore provide an explanation for why, as discussed by Allen at al. (2005), China is a counter-example to the findings of the finance-growth literature, being characterized by malfunctioning financial institutions and phenomenal growth rates. It is obviously also possible that growth has been so high in China despite the poorly performing banking sector, because private firms were able to make use of alternative mechanisms such as internal finance, non-bank financial intermediaries, and coalitions of various forms among firms; investors, and local governments. Using firm-level data to understand how exactly the fast-growing private Chinese firms finance themselves would be a way of shedding more light on this issue and is on the agenda for future research. Yet, whichever the explanation, we can conclude that there are indeed circumstances under which financial distortions do not represent an impediment to growth in China after all.

Appendix: Definition of the variables and statistical sources

Most data on the banking and financial sector for Chinese provinces are taken from the annual issues of the "Almanac of China's Finance and Banking" (*ACFB*). Data on growth and its components as well as data on our control variables are taken from annual issues of the China Statistical Yearbook (*CSY*) and from two statistical books that provide data at the provincial level from 1978 onwards ("China Regional Economy, a Profile of 17 Years of Reform and Opening Up" issued by the China Statistical Bureau, *CRE,* and "1949-1999 China Statistical Data Compilation" issued by the China Marketing Research, *CMR*). This Appendix provides the exact definition (and the source, in parentheses) for each indicator used as explained or explanatory variables in our regressions.

Explained variables

GDP per capita and *GROWTH*: logarithm of real *GDP* per capita and annual growth (deflation based on annual *CPI*) (source: *CSY*).

CAPITALGROWTH: annual growth of real per capita capital stock (deflation based on annual *CPI*). The capital stock is computed based on the perpetual inventory method with a depreciation rate of five percent. The initial capital stock is computed following Harberger's (1978) assumption of a steady-state capital-output ratio in 1974. Investment flows are real investments in fixed assets (source: *CSY*).

TFPGROWTH: annual growth of per capita *TFP*, computed following Equation (1) in the text.

Explanatory variables

Financial indicators:

Family 1: Size of financial sector

BANK CREDIT: ratio of total bank loans to *GDP* (source: *ACFB*)

TOTAL CREDIT: ratio of total loans (in bank and non-bank financial institutions) to *GDP* (source: *ACFB*)

SAVINGS: ratio of households' savings deposits in financial intermediaries relative to *GDP* (source: *CMR* and *CSY*).

Family 2: State-related misallocation of funds

SOCB CREDIT share*:* share of state-owned commercial banks in total credit (source: *ACFB*).

SOCB CREDIT to *GDP*: ratio of state-owned commercial banks' credit to *GDP* (source: *ACFB*).

CENTRAL: ratio of loans to deposits of the state-owned banks (source: *ACFB*).

Family 3: Profit-driven allocation of funds

*LOANS*over*APPRO*: share of fixed asset investment financed by domestic loans relative to that financed by state budgetary appropriation (source: *CSY* and *CMR*).

RETAINED EARNING INVESTMENT: share of fixed asset investment financed by retained earnings (source: *CSY* and *CMR*).

Control variables:

EDUCATION: Share of population with more than primary schooling (source: *CSY*)

CPI: Inflation rate based on the *CPI* (source: *CSY*)

STATE ENTITIES: Share of state entities in total investment in fixed assets (source: CSY)

GOV: Government expenditure over GDP (source: *CRE*)

OPENNESS ratio: ratio of exports plus imports to *GDP* (source: *CSY*)

FDI/GDP: ratio of foreign direct investment inflows to *GDP* (source: *CSY* and authors' computation). *FDI* inflows are defined as the investments inside China by foreign enterprises and economic organizations or individuals (including overseas Chinese, compatriots from Hong Kong, Macao and Taiwan, and Chinese enterprises registered abroad), following the

relevant policies and laws of China for the establishment of ventures exclusively with foreign own investment, Sino-foreign joint-ventures, and cooperative enterprises, or for co-operative exploration of resources with enterprises or economic organizations in China. It includes the re-investment by foreign entrepreneurs of profits gained from investment, as well as the funds that enterprises borrow from abroad in the total investment of projects, which are approved by the relevant department of the government.

Other

FDI stock/GDP: ratio of foreign direct investment stock to *GDP* (source: *CSY* and authors' computation). The *FDI* stock is computed as the sum of the deflated *FDI* inflows.

List of provinces and municipalities

Beijing, Tianjin, Hebei, Shanxi, Nei Monggol, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Sichuan, Chongqing.

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Table 1a: Descriptive statistics

	(1) Entire sample	(2) Early Period: 1989-1999	(3) Late Period: 2000-2003	(4) Low *FDI* stock/*GDP*	(5) High *FDI* stock/*GDP*
Dependent variables					
Annual real per capita *GDP* growth	0.09	0.09	0.09	0.09	0.10
	(0.05)	(0.05)	(0.03)	(0.05)	(0.05)
Annual real per capita physical capital accumulation	0.13	0.13	0.13	0.12	0.14
	(0.05)	(0.05)	(0.04)	(0.04)	(0.06)
Annual real per capita *TFP* growth	0.04	0.04	0.04	0.04	0.05
	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)
Controls					
Lagged real per capita *GDP* (yuan)	3 442	2 754	5 289	2 430	6 354
	(2 804)	(1 991)	(3 702)	(1 184)	(3 883)
Inflation rate	6.94	9.28	0.52	7.73	4.78
	(8.17)	(8.36)	(1.47)	(8.20)	(7.75)
Share of population with more than primary schooling	0.76	0.73	0.86	0.73	0.85
	(0.11)	(0.10)	(0.09)	(0.10)	(0.10)
Share of state entities in total investment	0.62	0.65	0.52	0.64	0.55
	(0.16)	(0.15)	(0.14)	(0.14)	(0.18)
FDI flows/*GDP*	0.03	0.03	0.03	0.01	0.08
	(0.04)	(0.05)	(0.03)	(0.01)	(0.05)
Openness ratio	0.23	0.20	0.29	0.12	0.52
	(0.29)	(0.23)	(0.40)	(0.10)	(0.43)
Government expenditures over *GDP*	0.13	0.12	0.16	0.13	0.12
	(0.05)	(0.04)	(0.06)	(0.05)	(0.04)
Financial indicators					
Family 1: Total bank loans over *GDP*	0.81	0.78	0.91	0.77	0.93
	(0.32)	(0.26)	(0.44)	(0.25)	(0.46)
Total loans over *GDP*	0.99	0.95	1.09	0.90	1.21
	(0.43)	(0.37)	(0.54)	(0.28)	(0.63)
Savings over *GDP*	0.55	0.48	0.73	0.48	0.75
	(0.28)	(0.24)	(0.31)	(0.18)	(0.41)
Family 2: Share 4 *SOCB* credit over total	0.65	0.68	0.59	0.68	0.58
	(0.13)	(0.13)	(0.08)	(0.13)	(0.10)
4 *SOCB* credit over *GDP*	0.65	0.64	0.65	0.63	0.68
	(0.23)	(0.23)	(0.25)	(0.20)	(0.30)
Central relending: loans over deposits of 4 *SOCB*	1.02	1.12	0.77	1.10	0.82
	(0.32)	(0.32)	(0.10)	(0.32)	(0.20)
Family 3: Share of fixed assets investment financed by loans over share financed by state budget appropriation	5.02	5.34	4.27	4.50	6.56
	(3.66)	(3.50)	(3.92)	(3.18)	(4.46)
Share of fixed assets investment financed by retained earnings	0.48	0.48	0.45	0.48	0.45
	(0.09)	(0.09)	(0.08)	(0.09)	(0.06)
Observations	450	330	120	328	114

Notes: The Table reports the variables' means. Standard deviations are reported in parentheses. Column (4) refers to those province-year observations characterized by a ratio of *FDI* stock to GDP that falls in the bottom three quartiles of the distribution. Column (5) refers to those observations that fall in the top quartile. See the Appendix for precise definitions of all variables.

Table 1b: Correlation matrix

	Annual real per capita *GDP* growth	Annual real per capita capital stock growth	Annual real per capita productivity growth	Total bank loans over *GDP*	Total loans over *GDP*	Savings over *GDP*	Share of 4 *SOCB* credit over total	4 *SOCB* credit over *GDP*	Central relending: loans over deposits of 4 *SOCB*	Share of fixed assets investment financed by loans over share financed by state budget appropriation	Share of fixed assets investment financed by retained earnings
Annual real per capita *GDP* growth	1.00										
Annual real per capita capital stock growth	0.60	1.00									
Annual real per capita productivity growth	0.93	0.28	1.00								
Total bank loans over *GDP*	-0.12	-0.14	-0.08	1.00							
Total loans over *GDP*	-0.09	-0.12	-0.05	0.93	1.00						
Savings over *GDP*	-0.04	-0.09	-0.01	0.70	0.83	1.00					
Share of 4 *SOCB* credit over total	-0.20	-0.13	-0.18	-0.08	-0.22	-0.39	1.00				
4 *SOCB* credit over *GDP*	-0.19	-0.16	-0.15	0.87	0.84	-0.57	0.30	1.00			
Central relending: loans over deposits of 4 *SOCB*	-0.15	-0.20	-0.10	-0.10	-0.20	-0.46	0.61	0.14	1.00		
Share of fixed assets investment financed by loans over share financed by state budget appropriation	0.32	0.18	0.30	-0.03	0.09	0.12	-0.34	-0.12	-0.07	1.00	
Share of fixed assets investment financed by retained earnings	0.14	0.06	0.14	-0.41	-0.35	-0.23	0.03	-0.37	0.14	0.14	1.00

Notes: See the Appendix for precise definitions of all variables.

Table 2: Finance and *GDP* growth (within-groups estimates)

Dependent variable: *GROWTH*	1	2	3	4	5	6	7	8	9
Lagged real *GDP* per capita	-0.085***	-0.102***	-0.131***	-0.094***	-0.124***	-0.157***	-0.137***	-0.091***	-0.098***
	(0.022)	(0.025)	(0.026)	(0.024)	(0.025)	(0.027)	(0.025)	(0.025)	(0.025)
EDUCATION	0.065	0.086*	0.121**	0.070*	0.089**	0.107**	0.108**	0.048	0.061
	(0.041)	(0.047)	(0.051)	(0.040)	(0.045)	(0.042)	(0.044)	(0.041)	(0.041)
*STATE ENTITIE*S: share in investment	-0.019	-0.017	-0.024	-0.023*	-0.024	-0.028**	-0.024*	-0.027**	-0.018
	(0.014)	(0.015)	(0.016)	(0.014)	(0.015)	(0.013)	(0.013)	(0.014)	(0.014)
FDI/GDP	0.008***	0.008**	0.011***	0.007**	0.011***	0.009***	0.006**	0.008**	0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
OPENNESS ratio	0.007	0.014	0.014	0.010	0.008	0.017	0.017	0.005	0.008
	(0.010)	(0.011)	(0.012)	(0.010)	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)
*GOV*ernment expenditure over *GDP*	0.004	0.009	0.005	0.019	-0.001	0.015	-0.017	-0.007	-0.005
	(0.017)	(0.018)	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)	(0.020)	(0.020)
CPI: Inflation rate	0.043	0.026	0.099	0.020	0.146	0.058	0.066	0.056	0.051
	(0.096)	(0.103)	(0.116)	(0.097)	(0.116)	(0.110)	(0.102)	(0.112)	(0.117)
BANK CREDIT		-0.040***							
		(0.013)							
TOTAL CREDIT			-0.038***						
			(0.014)						
SAVINGS				-0.051**					
				(0.021)					
SOCB CREDIT share					-0.050***				
					(0.017)				
SOCB CREDIT to *GDP*						-0.077***			
						(0.017)			
CENTRAL							-0.103***		
							(0.027)		
*LOANS*over*APPRO*								0.002**	
								(0.001)	
RETAINED EARNINGS INVESTMENT									0.032**
									(0.014)
Constant	0.538	0.971	0.852	0.946	0.414	1.230**	0.972	0.653	0.717
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.595)	(0.000)	(0.561)	(0.000)
Observations	434	407	377	431	376	398	398	399	399
R-squared	0.563	0.576	0.563	0.575	0.569	0.598	0.602	0.538	0.542
Fixed effects by province	yes	yes	yes	yes	yes	yes	yes	yes	yes
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: All regressions were estimated using a Within Groups estimator. Newey-West standard errors are in parentheses. All variables are expressed in logarithms. The sample used in estimation consists of 30 provinces between 1989 and 2003. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 3: Finance and *GDP* growth (*GMM* estimates)

Dependent variable: *GROWTH*	1	2	3	4	5	6	7	8	9
Lagged real *GDP* per capita	-0.019	-0.021	-0.022	-0.029**	-0.019	-0.031**	-0.041**	-0.023	-0.004
	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.018)	(0.015)	(0.014)
EDUCATION	0.038	0.057	0.066*	0.084**	0.042	0.085*	0.026	0.077**	0.024
	(0.028)	(0.035)	(0.037)	(0.034)	(0.033)	(0.046)	(0.038)	(0.037)	(0.034)
*STATE ENTITIE*S: share in investment	-0.035**	-0.034**	-0.029*	-0.037**	-0.034***	-0.016	-0.023	-0.030**	-0.028*
	(0.013)	(0.016)	(0.014)	(0.017)	(0.012)	(0.015)	(0.022)	(0.012)	(0.014)
FDI/GDP	0.011***	0.012***	0.011***	0.012***	0.009***	0.012***	0.006	0.009**	0.011***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
OPENNESS ratio	0.002	0.004	0.005	0.007	-0.001	0.010	0.010	-0.000	0.000
	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.010)	(0.008)	(0.007)
*GOV*ernment expenditure over *GDP*	-0.004	0.015	0.009	0.011	-0.003	0.020*	-0.019	0.001	0.005
	(0.009)	(0.011)	(0.010)	(0.009)	(0.009)	(0.011)	(0.017)	(0.009)	(0.013)
CPI: inflation rate	0.246*	0.001	0.038	0.055	0.201	0.108	0.248*	0.167	0.089
	(0.124)	(0.139)	(0.141)	(0.135)	(0.123)	(0.138)	(0.124)	(0.164)	(0.206)
BANK CREDIT		-0.018*							
		(0.010)							
TOTAL CREDIT			-0.019*						
			(0.011)						
SAVINGS				-0.026**					
				(0.011)					
SOCB CREDIT share					-0.036*				
					(0.021)				
SOCB CREDIT to *GDP*						-0.031***			
						(0.011)			
CENTRAL							-0.048**		
							(0.020)		
*LOANS*over*APPRO*								0.002**	
								(0.001)	
RETAINED EARNINGS									0.041**
INVESTMENT									(0.018)
Constant	-0.849	0.348	0.180	0.086	-0.661	-0.141	-0.715	-0.463	-0.216
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	434	407	377	431	376	398	398	399	399
Sargan	13.33	9.62	12.01	12.06	14.18	9.44	13.40	5.88	14.68
(degrees of freedom)	(177)	(182)	(182)	(182)	(177)	(160)	(81)	(182)	(136)
m2	1.20	1.12	0.96	1.18	0.58	0.78	0.91	0.87	1.14

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 30 provinces between 1989 and 2003. All right hand-side variables were instrumented using two or more lags of themselves in the first-differenced equation, and their first-difference lagged once in the levels equation. Test statistics and standard errors (in parentheses) are asymptotically robust to heteroskedasticity. *m2* is a test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. The *Sargan* statistic is a test of the overidentifying restrictions, distributed as chi-square under the null of instrument validity. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 4: Finance and capital stock growth (within-groups estimates)

Dependent variable: *CAPITALGROWTH*	1	2	3	4	5	6	7	8	9
Lagged real *GDP* per capita	0.013	-0.009	-0.022	0.012	-0.018	-0.021	-0.017	0.021	0.018
	(0.023)	(0.026)	(0.027)	(0.024)	(0.026)	(0.027)	(0.025)	(0.023)	(0.024)
EDUCATION	0.046	0.040	0.033	0.046	0.034	0.044	0.079	0.046	0.055
	(0.046)	(0.051)	(0.058)	(0.046)	(0.066)	(0.066)	(0.066)	(0.050)	(0.051)
*STATE ENTITIE*S: share in investment	-0.006	-0.003	-0.007	-0.007	-0.007	-0.012	-0.007	-0.029*	-0.025
	(0.018)	(0.019)	(0.020)	(0.018)	(0.021)	(0.019)	(0.017)	(0.018)	(0.017)
FDI/GDP	0.013***	0.013***	0.017***	0.013***	0.018***	0.016***	0.011***	0.013***	0.012***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
OPENNESS ratio	-0.011	-0.004	-0.004	-0.010	-0.007	-0.005	0.001	-0.006	-0.005
	(0.010)	(0.011)	(0.012)	(0.010)	(0.011)	(0.011)	(0.010)	(0.009)	(0.010)
*GOV*ernment expenditure over *GDP*	0.055***	0.064***	0.069***	0.056***	0.061***	0.070***	0.040**	0.063***	0.063***
	(0.019)	(0.020)	(0.021)	(0.020)	(0.021)	(0.020)	(0.018)	(0.021)	(0.021)
CPI: Inflation rate	0.380***	0.408***	0.496***	0.385***	0.516***	0.415***	0.385***	0.378***	0.377**
	(0.124)	(0.131)	(0.154)	(0.127)	(0.151)	(0.151)	(0.126)	(0.143)	(0.146)
BANK CREDIT		-0.030***							
		(0.011)							
TOTAL CREDIT			-0.027*						
			(0.014)						
SAVINGS				-0.002					
				(0.024)					
SOCB CREDIT share					-0.025				
					(0.023)				
SOCB CREDIT to *GDP*						-0.047***			
						(0.018)			
CENTRAL							-0.123***		
							(0.026)		
*LOANS*over*APPRO*								0.001	
								(0.001)	
RETAINED EARNINGS									0.014
INVESTMENT									(0.012)
Constant	-1.584	-1.555**	-1.742**	-1.649	-2.010	-1.489*	-1.361**	-1.661	-1.611
	(0.000)	(0.724)	(0.795)	(0.000)	(0.000)	(0.786)	(0.657)	(0.000)	(0.000)
Observations	427	400	370	424	369	391	391	392	392
R-squared	0.507	0.518	0.529	0.505	0.530	0.520	0.575	0.497	0.497
Fixed effects by province	yes	Yes	yes	yes	yes	yes	yes	yes	yes
Fixed effects by year	yes	Yes	yes	yes	yes	yes	yes	yes	yes

Note: All regressions were estimated using a Within Groups estimator. Newey-West standard errors are in parentheses. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 5: Finance and capital stock growth (*GMM* estimates)

Dependent variable: *CAPITALGROWTH*	1	2	3	4	5	6	7	8	9
Lagged real *GDP* per capita	-0.011	-0.008	-0.006	-0.016	-0.021	-0.014	-0.028	-0.011	-0.000
	(0.016)	(0.018)	(0.017)	(0.018)	(0.016)	(0.018)	(0.025)	(0.021)	(0.019)
EDUCATION	0.005	0.033	0.042	0.045	0.015	0.037	0.017	-0.023	0.030
	(0.043)	(0.042)	(0.038)	(0.043)	(0.044)	(0.046)	(0.054)	(0.043)	(0.045)
*STATE ENTITIE*S: share in investment	-0.067***	-0.052***	-0.046**	-0.062**	-0.064***	-0.049**	-0.067***	-0.048***	-0.045**
	(0.017)	(0.017)	(0.022)	(0.024)	(0.022)	(0.018)	(0.024)	(0.014)	(0.020)
FDI/GDP	0.016**	0.016***	0.017***	0.018***	0.017***	0.016***	0.014**	0.014**	0.016***
	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
OPENNESS ratio	-0.006	-0.004	-0.005	-0.005	-0.007	0.000	-0.008	-0.003	-0.009
	(0.008)	(0.009)	(0.010)	(0.009)	(0.009)	(0.010)	(0.013)	(0.010)	(0.011)
*GOV*ernment expenditure over *GDP*	0.025*	0.049***	0.039**	0.034**	0.028**	0.060***	0.008	0.016	0.029**
	(0.014)	(0.016)	(0.015)	(0.015)	(0.012)	(0.021)	(0.020)	(0.012)	(0.013)
CPI: inflation rate	0.567***	0.396**	0.416**	0.495**	0.668***	0.483***	0.640***	0.468*	0.483
	(0.175)	(0.167)	(0.154)	(0.218)	(0.168)	(0.169)	(0.149)	(0.260)	(0.322)
BANK CREDIT		-0.030**							
		(0.013)							
TOTAL CREDIT			-0.024**						
			(0.010)						
SAVINGS				-0.026**					
				(0.011)					
SOCB CREDIT share					-0.062*				
					(0.033)				
SOCB CREDIT to *GDP*						-0.043**			
						(0.017)			
CENTRAL							-0.074**		
							(0.033)		
*LOANS*over*APPRO*								0.000	
								(0.001)	
RETAINED EARNINGS									0.031**
INVESTMENT									(0.015)
Constant	-2.340***	-1.570**	-1.720**	-2.022**	-2.846***	-1.958**	-2.593***	-1.903*	-2.057
	(0.739)	(0.732)	(0.685)	(0.947)	(0.744)	(0.754)	(0.653)	(1.061)	(1.420)
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	427	400	370	424	369	391	391	392	392
Sargan	8.42	10.26	5.88	8.23	10.78	9.64	6.43	4.66	6.42
(degrees of freedom)	(177)	(182)	(165)	(160)	(134)	(160)	(81)	(186)	(138)
m2	0.63	0.50	0.46	0.59	0.52	0.37	0.63	0.54	0.25

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 6: Finance and *TFP* growth (within-groups estimates)

Dependent variable: *TFPGROWTH*	1	2	3	4	5	6	7	8	9
Lagged real *GDP* per capita	-0.091***	-0.100***	-0.124***	-0.101***	-0.117***	-0.150***	-0.130***	-0.101***	-0.106***
	(0.020)	(0.022)	(0.022)	(0.021)	(0.021)	(0.024)	(0.021)	(0.023)	(0.023)
EDUCATION	0.037	0.058	0.097*	0.028	0.078*	0.081**	0.093**	0.012	0.029
	(0.040)	(0.047)	(0.049)	(0.038)	(0.044)	(0.037)	(0.040)	(0.041)	(0.042)
*STATE ENTITIE*S: share in investment	-0.017	-0.016	-0.021	-0.021*	-0.021	-0.023**	-0.021*	-0.015	-0.008
	(0.013)	(0.013)	(0.014)	(0.012)	(0.013)	(0.012)	(0.012)	(0.011)	(0.012)
FDI/GDP	0.002	0.002	0.004	0.001	0.004	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
OPENNESS ratio	0.011	0.016*	0.016*	0.015*	0.011	0.020**	0.017**	0.008	0.010
	(0.008)	(0.009)	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
*GOV*ernment expenditure over *GDP*	-0.018	-0.015	-0.022	0.001	-0.026	-0.013	-0.035**	-0.031*	-0.030
	(0.016)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.018)	(0.019)
CPI: inflation rate	-0.103	-0.132	-0.092	-0.134*	-0.053	-0.100	-0.080	-0.089	-0.092
	(0.077)	(0.083)	(0.092)	(0.079)	(0.092)	(0.089)	(0.088)	(0.090)	(0.093)
BANK CREDIT		-0.029**							
		(0.011)							
TOTAL CREDIT			-0.028**						
			(0.012)						
SAVINGS				-0.058***					
				(0.020)					
SOCB CREDIT share					-0.040***				
					(0.015)				
SOCB CREDIT to *GDP*						-0.058***			
						(0.014)			
CENTRAL							-0.056***		
							(0.021)		
*LOANS*over*APPRO*								0.001**	
								(0.001)	
RETAINED EARNINGS									0.025**
INVESTMENT									(0.012)
Constant	1.182	1.541***	1.580***	1.524	1.241	1.797***	1.479***	1.123	1.139
	(0.000)	(0.436)	(0.468)	(0.000)	(0.000)	(0.488)	(0.457)	(0.000)	(0.000)
Observations	427	400	370	424	369	391	391	392	392
R-squared	0.502	0.520	0.499	0.522	0.505	0.536	0.517	0.494	0.497
Fixed effects by province	yes	yes	yes	yes	yes	yes	yes	yes	yes
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: All regressions were estimated using a Within Groups estimator. Newey-West standard errors are in parentheses. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 7: Finance and *TFP* growth (*GMM* estimates)

Dependent variable: *TFPGROWTH*	1	2	3	4	5	6	7	8	9
Lagged real *GDP* per capita	-0.015*	-0.010	-0.010	-0.018*	-0.025**	-0.024**	-0.020	-0.013	-0.010
	(0.008)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)	(0.014)	(0.011)	(0.013)
EDUCATION	0.036	0.016	0.030	0.060*	0.037	0.038	-0.000	0.054	0.022
	(0.030)	(0.037)	(0.040)	(0.035)	(0.048)	(0.049)	(0.041)	(0.035)	(0.043)
*STATE ENTITIE*S: share in investment	-0.004	0.008	0.009	-0.005	0.015	0.014	-0.006	-0.002	-0.013
	(0.010)	(0.014)	(0.013)	(0.011)	(0.011)	(0.011)	(0.020)	(0.008)	(0.015)
FDI/GDP	0.004*	0.004	0.004	0.005**	0.003	0.004	0.004	0.002	0.004
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
OPENNESS ratio	0.006	0.010	0.012	0.010*	0.012*	0.016**	0.005	0.004	0.005
	(0.005)	(0.006)	(0.007)	(0.005)	(0.007)	(0.006)	(0.008)	(0.007)	(0.006)
*GOV*ernment expenditure over *GDP*	-0.016**	-0.005	-0.004	-0.005	-0.015	0.001	-0.022	-0.013	-0.013
	(0.007)	(0.011)	(0.011)	(0.008)	(0.010)	(0.015)	(0.017)	(0.009)	(0.009)
CPI: Inflation rate	0.021	0.007	-0.054	-0.131	0.050	-0.026	-0.020	-0.015	-0.046
	(0.088)	(0.091)	(0.093)	(0.110)	(0.083)	(0.100)	(0.160)	(0.116)	(0.131)
BANK CREDIT		-0.021**							
		(0.010)							
TOTAL CREDIT			-0.025**						
			(0.012)						
SAVINGS				-0.022**					
				(0.010)					
SOCB CREDIT share					-0.034**				
					(0.014)				
SOCB CREDIT to *GDP*						-0.026**			
						(0.011)			
CENTRAL							-0.031**		
							(0.015)		
*LOANS*over*APPRO*								0.002***	
								(0.000)	
RETAINED EARNINGS									0.042**
INVESTMENT									(0.017)
Constant	0.084	0.068	0.379	0.795	-0.030	0.360	0.233	0.220	0.340
	(0.373)	(0.415)	(0.430)	(0.490)	(0.382)	(0.463)	(0.708)	(0.493)	(0.626)
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	427	400	370	424	369	391	391	392	392
Sargan	10.56	9.19	4.75	5.90	7.33	6.87	16.17	7.80	4.57
(degrees of freedom)	(177)	(154)	(154)	(182)	(119)	(120)	(43)	(182)	(126)
m2	0.90	0.73	0.99	0.89	0.15	0.72	0.97	0.63	0.95

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 8: Finance and *GDP* growth: evolution over time

Dependent variable: *GROWTH*	1	2	3	4	5	6	7	8
Lagged real *GDP* per capita	-0.017	-0.019	-0.028**	-0.017	-0.024*	-0.039**	-0.022	-0.002
EDUCATION	0.035	0.053	0.076**	0.038	0.058	0.029	0.073*	0.013
*STATE ENTITIE*S: share in investment	-0.015	-0.015	-0.029	-0.037***	-0.004	-0.020	-0.031**	-0.027*
FDI/GDP	0.013***	0.013***	0.014***	0.008**	0.012***	0.006	0.007**	0.011***
OPENNESS ratio	0.003	0.003	0.005	-0.000	0.007	0.013	0.003	0.002
*GOV*ernment expenditure over *GDP*	0.008	0.004	0.007	-0.004	0.009	-0.016	-0.001	0.004
CPI: inflation rate	-0.003	0.025	0.045	0.191	0.124	0.245*	0.149	0.082
BANK CREDIT	-0.031**							
	(0.012)							
*BANK CREDIT * LATE*	0.039**							
	(0.015)							
TOTAL CREDIT		-0.028**						
		(0.013)						
*TOTAL CREDIT * LATE*		0.033*						
		(0.019)						
SAVINGS			-0.026***					
			(0.009)					
*SAVINGS * LATE*			0.023					
			(0.020)					
SOCB CREDIT share				-0.048*				
				(0.024)				
SOCB CREDIT share * *LATE*				0.055**				
				(0.024)				
SOCB CREDIT to *GDP*					-0.041***			
					(0.011)			
SOCB CREDIT to *GDP * LATE*					0.038**			
					(0.015)			
CENTRAL						-0.044**		
						(0.022)		
CENTRAL LATE*						0.031		
						(0.052)		
*LOANS*over*APPRO*							0.003***	
							(0.001)	
*LOANS*over*APPRO * LATE*							-0.003***	
							(0.001)	
RETAINED EARNINGS INVESTMENT								0.065***
								(0.023)
*RETAINED EARNINGS INVESTMENT *LATE*								-0.069***
								(0.024)
Constant	0.331	0.215	0.116	-0.618	-0.316	-0.697	-0.418	-0.247
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	407	377	431	376	398	398	399	399
Sargan	7.50	5.15	10.92	12.12	9.49	8.80	10.69	11.87
(degrees of freedom)	(186)	(186)	(182)	(177)	(164)	(85)	(186)	(164)
m2	1.06	0.85	1.21	0.59	0.80	0.82	0.74	1.11

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 30 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 9: Finance and capital stock growth: evolution over time

Dependent variable: *CAPITALGROWTH*	1	2	3	4	5	6	7	8
Lagged real *GDP* per capita	-0.008	-0.017	-0.014	-0.012	0.007	-0.021	-0.006	-0.003
EDUCATION	0.027	0.037	0.032	-0.001	-0.024	0.032	-0.024	-0.037
STATE ENTITIES: share in investment	-0.044**	-0.039	-0.076***	-0.066***	-0.048**	-0.054**	-0.049***	-0.052***
FDI/GDP	0.016***	0.018***	0.022***	0.011*	0.022***	0.011*	0.012*	0.016**
OPENNESS ratio	-0.003	0.008	-0.011	-0.003	-0.011	0.001	-0.002	-0.010
*GOV*ernment expenditure over *GDP*	0.047**	0.045**	0.045**	0.018	0.056**	0.019	0.011	0.009
CPI: inflation rate	0.381**	0.485**	0.590**	0.579***	0.616***	0.450***	0.596**	0.535**
BANK CREDIT	-0.032**							
	(0.015)							
*BANK CREDIT * LATE*	0.012							
	(0.022)							
TOTAL CREDIT		-0.037**						
		(0.016)						
*TOTAL CREDIT * LATE*		-0.007						
		(0.029)						
SAVINGS			-0.022					
			(0.015)					
*SAVINGS * LATE*			-0.021					
			(0.023)					
SOCB CREDIT share				-0.082**				
				(0.032)				
SOCB CREDIT share * *LATE*				0.159***				
				(0.047)				
SOCB CREDIT to *GDP*					-0.049***			
					(0.015)			
SOCB CREDIT to *GDP * LATE*					0.026			
					(0.026)			
CENTRAL						-0.073**		
						(0.034)		
CENTRAL LATE*						0.125*		
						(0.070)		
*LOANS*over*APPRO*							0.002**	
							(0.001)	
*LOANS*over*APPRO * LATE*							-0.006***	
							(0.001)	
RETAINED EARNINGS INVESTMENT								0.028*
								(0.016)
*RETAINED EARNINGS INVESTMENT *LATE*								-0.066*
								(0.035)
Constant	-1.501**	-1.930**	-2.467**	-2.545***	-2.790***	-1.733***	-2.663**	-2.361**
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	400	370	424	369	391	391	392	392
Sargan	10.04	9.98	6.75	9.45	9.70	4.24	8.13	4.73
(degrees of freedom)	(186)	(105)	(147)	(156)	(129)	(70)	(158)	(142)
m2	0.50	0.67	0.55	0.29	0.33	0.09	0.45	0.52

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 10: Finance and *TFP* growth: evolution over time

Dependent variable: *TFPGROWTH*	1	2	3	4	5	6	7	8
Lagged real *GDP* per capita	-0.009	-0.012	-0.016*	-0.012	-0.013	-0.010	-0.013	0.012
EDUCATION	0.015	0.036	0.051	0.033	0.024	0.043	0.053	0.023
STATE ENTITIES: share in investment	0.011	0.019	0.004	-0.010	0.023**	-0.009	-0.003	-0.037*
FDI/GDP	0.005**	0.006***	0.007***	0.003	0.004	0.003	0.002	0.018***
OPENNESS ratio	0.006	0.007	0.007	0.001	0.009*	0.004	0.005	-0.018
Government expenditure over *GDP*	-0.014	-0.013	-0.009	-0.016*	-0.017	-0.015*	-0.014	0.025
CPI: inflation rate	-0.138	-0.118	-0.148	-0.027	-0.058	-0.078	-0.012	0.425
BANK CREDIT	-0.023**							
	(0.009)							
*BANK CREDIT * LATE*	0.038***							
	(0.009)							
TOTAL CREDIT		-0.030***						
		(0.010)						
*TOTAL CREDIT * LATE*		0.040***						
		(0.012)						
SAVINGS			-0.024***					
			(0.007)					
*SAVINGS * LATE*			0.029**					
			(0.012)					
SOCB CREDIT share				-0.036*				
				(0.020)				
SOCB CREDIT share * *LATE*				0.026				
				(0.024)				
SOCB CREDIT to *GDP*					-0.029***			
					(0.010)			
*SOCB CREDIT to GDP * LATE*					0.038***			
					(0.009)			
CENTRAL						-0.000		
						(0.012)		
CENTRAL LATE*						0.000		
						(0.027)		
*LOANS*over*APPRO*							0.002***	
							(0.001)	
*LOANS*over*APPRO * LATE*							-0.001*	
							(0.001)	
RETAINED EARNINGS INVESTMENT								0.072***
								(0.025)
*RETAINED EARNINGS INVESTMENT *LATE*								-0.083*
								(0.042)
Constant	0.742	0.690	0.857*	0.201	0.363	0.441	0.203	-1.856
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	400	370	424	369	391	391	392	392
Sargan	5.84	5.39	2.54	12.03	2.46	5.56	9.30	8.22
(degrees of freedom)	(186)	(186)	(182)	(130)	(164)	(186)	(183)	(116)
m2	0.63	0.56	0.93	0.46	0.80	0.96	0.57	0.11

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 11: Finance and *GDP* growth: *FDI* contingency

Dependent variable: *GROWTH*	1	2	3	4	5	6	7	8
Lagged real *GDP* per capita	-0.010	-0.019	-0.030**	-0.010	-0.025	-0.029	-0.018	-0.010
EDUCATION	0.033	0.061*	0.066*	0.017	0.074	0.047	0.063**	0.024
STATE ENTITIES: share in investment	-0.018	-0.029*	-0.042**	-0.029***	-0.008	-0.036**	-0.029**	-0.030**
FDI/GDP	0.011***	0.010***	0.010***	0.016***	0.014***	0.001	0.010***	0.014**
OPENNESS ratio	0.004	0.004	0.009	0.006	0.008	0.015	0.003	0.006
*GOV*ernment expenditure over *GDP*	0.009	0.005	0.011	0.000	0.006	-0.012	-0.000	0.003
CPI: inflation rate	0.018	0.032	0.039	0.034	0.071	0.240	0.141	0.124
BANK CREDIT	-0.042**							
	(0.019)							
BANK CREDIT(FDI stock/GDP)*	0.008							
	(0.005)							
TOTAL CREDIT		-0.013						
		(0.022)						
*TOTAL CREDIT *(FDI stock/GDP)*		0.001						
		(0.006)						
SAVINGS			-0.014					
			(0.015)					
*SAVINGS *(FDI stock/GDP)*			-0.003					
			(0.004)					
SOCB CREDIT share				-0.093***				
				(0.031)				
SOCB CREDIT share **(FDI stock/GDP)*				0.026***				
				(0.009)				
SOCB CREDIT to *GDP*					-0.058***			
					(0.016)			
SOCB CREDIT to *GDP *(FDI stock/GDP)*					0.012***			
					(0.004)			
CENTRAL						-0.070***		
						(0.023)		
CENTRAL(FDI stock/GDP)*						0.019**		
						(0.007)		
*LOANS*over*APPRO*							0.004***	
							(0.001)	
*LOANS*over*APPRO *(FDI stock/GDP)*							-0.001**	
							(0.000)	
RETAINED EARNINGS INVESTMENT								0.014
								(0.014)
*RETAINED EARNINGS INVESTMENT *(FDI stock/GDP)*								0.007
								(0.006)
Constant	0.167	0.169	0.165	0.017	0.053	-0.830	-0.372	-0.315
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	406	376	430	375	397	397	398	398
Sargan (degrees of freedom)	3.29 (229)	4.25 (207)	4.92 (205)	14.68 (202)	9.01 (185)	9.19 (104)	6.26 (205)	9.02 (161)
m2	1.16	0.93	1.16	0.72	0.92	0.91	0.93	1.14

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 30 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 12: Finance and capital stock growth: *FDI* contingency

Dependent variable: *CAPITALGROWTH*	1	2	3	4	5	6	7	8
Lagged real *GDP* per capita	-0.018	-0.014	-0.012	-0.006	-0.018	-0.021	-0.018	-0.009
EDUCATION	0.049	0.032	-0.011	-0.036	0.049	0.007	-0.002	0.017
*STATE ENTITIE*S: share in investment	-0.067***	-0.067***	-0.091***	-0.059***	-0.058***	-0.057***	-0.044***	-0.038**
FDI/GDP	0.013***	0.011**	0.004	0.020***	0.014***	0.009*	0.015***	0.016**
OPENNESS ratio	-0.001	-0.000	-0.003	-0.003	-0.000	0.001	-0.001	-0.002
*GOV*ernment expenditure over *GDP*	0.046***	0.033**	0.045***	0.028**	0.063***	0.011	0.020	0.028**
CPI: inflation rate	0.385**	0.354*	0.354**	0.447**	0.461**	0.515**	0.460	0.478
BANK CREDIT	0.018							
	(0.024)							
*BANK CREDIT *(FDI stock/GDP)*	-0.013*							
	(0.007)							
TOTAL CREDIT		0.044						
		(0.026)						
*TOTAL CREDIT *(FDI stock/GDP)*		-0.016**						
		(0.007)						
SAVINGS			0.041					
			(0.026)					
*SAVINGS *(FDI stock/GDP)*			-0.019***					
			(0.006)					
SOCB CREDIT share				-0.095**				
				(0.041)				
SOCB CREDIT share *(FDI stock/GDP)*				0.020**				
				(0.008)				
SOCB CREDIT to *GDP*					-0.017			
					(0.025)			
SOCB CREDIT to *GDP *(FDI stock/GDP)*					-0.008			
					(0.006)			
CENTRAL						-0.098***		
						(0.032)		
CENTRAL(FDI stock/GDP)*						0.019**		
						(0.007)		
*LOANS*over*APPRO*							-0.000	
							(0.002)	
*LOANS*over*APPRO *(FDI stock/GDP)*							0.000	
							(0.001)	
RETAINED EARNINGS INVESTMENT								0.022
								(0.014)
*RETAINED EARNINGS INVESTMENT *(FDI stock/GDP)*								0.001
								(0.006)
Constant	-1.427*	-1.360*	-1.382*	-1.820**	-1.734**	-2.061**	-1.780	-1.895
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	399	369	423	368	390	390	391	391
Sargan (degrees of freedom)	6.43 (207)	5.86 (105)	9.82 (147)	9.55 (156)	8.69 (129)	6.04 (99)	7.79 (179)	6.73 (141)
m2	0.47	0.43	0.61	0.35	0.34	0.60	0.51	0.36

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.

Table 13: Finance and *TFP* growth: *FDI* contingency

Dependent variable: *TFPGROWTH*	1	2	3	4	5	6	7	8
Lagged real *GDP* per capita	-0.017	-0.016	-0.026***	-0.007	-0.013	-0.022	-0.010	-0.007
EDUCATION	0.023	0.061	0.074**	0.026	0.039	0.058	0.048*	0.014
STATE ENTITIES: share in investment	0.009	0.008	0.020*	-0.010	0.023**	-0.010	-0.002	-0.017
FDI/GDP	0.008***	0.006**	0.008**	0.006***	0.008***	-0.000	0.005*	0.007*
OPENNESS ratio	0.005	0.004	0.012**	0.008	0.011	0.012*	0.007	0.009
*GOV*ernment expenditure over *GDP*	-0.022***	-0.013	-0.015*	-0.009	-0.016*	-0.016	-0.012	-0.006
CPI: inflation rate	-0.047	-0.068	-0.060	-0.148	-0.097	-0.045	-0.048	-0.039
BANK CREDIT	-0.039**							
	(0.016)							
*BANK CREDIT *(FDI stock/GDP)*	0.013***							
	(0.004)							
TOTAL CREDIT		-0.042**						
		(0.019)						
*TOTAL CREDIT *(FDI stock/GDP)*		0.010**						
		(0.005)						
SAVINGS			-0.029***					
			(0.010)					
*SAVINGS *(FDI stock/GDP)*			0.005**					
			(0.002)					
SOCB CREDIT share				-0.065***				
				(0.019)				
SOCB CREDIT share **(FDI stock/GDP)*				0.019***				
				(0.005)				
SOCB CREDIT to *GDP*					-0.058***			
					(0.014)			
SOCB CREDIT to *GDP *(FDI stock/GDP)*					0.015***			
					(0.004)			
CENTRAL						-0.030*		
						(0.017)		
CENTRAL(FDI stock/GDP)*						0.012**		
						(0.005)		
*LOANS*over*APPRO*							0.004***	
							(0.001)	
*LOANS*over*APPRO*(FDI stock/GDP)*							-0.001***	
							(0.000)	
RETAINED EARNINGS INVESTMENT								0.027*
								(0.014)
*RETAINED EARNINGS INVESTMENT *(FDI stock/GDP)*								0.007
								(0.004)
Constant	0.353	0.469	0.589	0.814*	0.637	0.391	0.372	0.346
Fixed effects by year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	399	369	423	368	390	390	391	391
Sargan (degrees of freedom)	7.75 (165)	4.71 (165)	4.86 (179)	6.99 (200)	13.68 (185)	12.16 (118)	5.58 (205)	3.49 (139)
m2	0.86	0.98	0.90	0.89	0.98	0.92	0.67	0.80

Note: All regressions were estimated using a GMM system estimator. All variables are expressed in logarithms. The sample used in estimation consists of 29 provinces between 1989 and 2003. Also see Notes to Table 3. *, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively. See the Appendix for precise definitions of all variables.