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Financial Liberalization and Financing Constraints: Some Evidence from Panel Data of Listed Chinese Firms

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Abstract

This paper examines the impact of recent financial liberalization in China on the financing constraints and investment of publicly-listed Chinese firms. Two continuous indices are constructed to measure the evolution and intensity of financial reforms: a financial liberalization index and a capital control index. Dynamic panel GMM method is used to estimate firms' financing constraints in an Euler-equation investment model. The results indicate that while smaller firms face significant financing constraints than larger firms, financial liberalization has raised the financing constraints for the latter and failed to relieve the constraints for the former. It appears financial reforms in China have subjected larger firms to greater market discipline but the reforms probably have not been profound enough to benefit smaller firms.

JEL classification: E22, G31, G18, O16

Keywords: Financial liberalization, investments, financing constraints, Chinese firms

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1. Introduction

This study examines the effects of financial liberalization in China. More specifically, we test whether financial reforms have reduced financing constraints of publicly-listed Chinese firms. Tremendous economic growth displayed by China since its initiation of economic reforms in 1978 has generated an extensive and growing body of empirical studies that explore various aspects of the Chinese economy. Yet, few studies, particularly those that use firm-level data, have looked at the impact of financial reforms that have been carried out recently in China.

Many fast-growing emerging markets initiated financial reforms and capital account liberalization in 1980s and 1990s. However, recent financial debacles, from the 1997-98 Asian crisis to the 2007-09 global meltdown, have invoked serious doubt on the presumed benefits of financial liberalization. Yet, there are others who advocate continued efforts in liberalizing financial markets. For example, even at the peak of the global financial crisis in 2008, McCormick, the then US Undersecretary of Treasury for International Affairs, called China's leaders to "strengthen their commitment to the bold path of financial reforms" and argued that financial liberalization "is critical to China's future economic growth and stability".[1] Empirical studies on the effects of financial globalization on developing countries have produced ambiguous results and therefore not been helpful in producing any clear policy guidelines. An extensive survey by Kose et al. (2006) suggests that using micro data is more suitable in detecting specific channels in which financial liberalization can affect economic growth and therefore helpful in resolving the ambiguity associated with studies that use only country-level data. Our study is part of a growing effort to use disaggregated data to examine various aspects of the financial liberalization – growth nexus in emerging markets.

Transitional economies inherit from their earlier central-planning phase a repressed financial system in which, among others, a ceiling was imposed on both lending and deposit rates to keep interest rates artificially low, and active directed credit programs channelled funds at a subsidized price to large state-owned enterprises and export manufacturers. Various financial deregulations aimed at phasing out these practices are expected to lead to not only higher savings that can be used to finance investment but also to more efficient allocation of funds to businesses.

That being said, it is not clear whether firms with different characteristics (size, age, political connection, business group affiliation, etc.) would all benefit or benefit uniformly from these reforms. For example, elimination of directed-credit programs may make it easier for smaller or private firms to compete for funds while subject those benefited previously from these programs to higher financing constraints. While a larger number of private or foreign-owned banks encouraged by lower entry barriers to the banking system can promote lending to firms of different sizes, increases in interest rate as a result of different liberalization initiatives may also mean higher financing cost for a subset of firms. In addition, given asymmetric information problems in the financial system, large firms may continue to enjoy easier access to credit due to

[1] See McCormick (2008).

their high net worth or collateral. And firms affiliated with a business group or with political connection may be granted preferential credit access despite of financial reforms.

In this paper, we examine how financial liberalization in China has affected financing constraints of Chinese firms of different size. We construct two complementary continuous indices, a financial liberalization index and a capital control index, to capture the evolution and degree of financial reforms in China. Based on panel data of exchange-listed firms for 1996-2007, we find that large firms face no credit constraints and smaller firms display significant constraints. However, the sensitivity of large firms' investment to their cash holdings is heightened as more financial reforms take place. This suggests financial reforms have subjected large firms, primarily state-owned enterprises (SOEs) in China, to harder budget constraints via stricter market discipline. This conclusion is consistent with results from studies on other developing and emerging-market countries. In this study, we do not detect any significant change in financing constraint for smaller firms in China along the financial liberalization process. This is interpreted as financial liberalization in China has not been substantial enough for its benefits to reach smaller firms.

Section 2 provides a brief literature review. Section 3 presents the investment model and estimation methods. Description of data and construction of financial liberalization indices are contained in Section 4. Section 5 presents and discusses the regression results. This is followed by a conclusion in Section 6.

2. Literature review

In a perfect capital market where financial friction is absent, as assumed by Modigliani and Miller (1958), internal and external funds are perfect substitutes and a firm's investment decisions are made independently of its financing choices and therefore its capital structure. Capital markets in reality tend to be less than perfect and firms face higher cost for external financing due to asymmetric information and agency problems.[2] Therefore, firms that are considered financially constrained when their investment are sensitive to internal funds.

Financial reforms are considered to promote capital market efficiency and therefore alleviate firms' financing constraints. This relationship has been a subject of active research, particularly on emerging markets.[3] For example, Jaramillo et al. (1996) investigate whether financial reforms introduced in the 1980s were successful at reducing financial constraints for Ecuadorian firms. Using panel data to estimate an investment model based on an Euler equation approach, the authors find that small and young firms were subjected to financing constraints while large and old firms were not; and there is no evidence to suggest that financial reforms helped reduce the constraints for small firms. Similarly, Hermes and Lensink (1998) do not find evidence supporting the hypothesis that banking reforms in Chile in 1980s contributed to reducing market

[2] The 2007-2009 global financial turmoil, triggered by problems in the US debt market, reinforces this reality.
[3] See Schiantarelli (1996) for a review of earlier studies.

imperfections for small firms.[4] However, Forbes (2007)'s assessment of capital controls instituted in Chile during 1991-1998 indicates that small firms experienced significant financing constraints within the control period whereas these constraints were absent before and after. She concludes that there was a cost of capital controls in terms of increasing financing constraints for smaller firms. Although the policy changes examined in the two studies on Chile are not identical, possible explanations as for why small Chilean firms did not benefit from a more liberalized financial regime in the first study but did so in the second study are (1) benefits of financial reforms may take some time to trickle to smaller firms that normally face greater asymmetric information problem relative to their larger counterparts or (2) earlier policy reforms were not substantial enough to reach disadvantaged firms.

Some recent studies combine cross-country and time-series data to examine various aspects of relationship between external and domestic financial liberalization and firms' dependence on internal funds. Love (2003), using a data panel consisting of 5000 firms in 36 developed and developing countries, shows that financial development reduces the sensitivity of firms' investment to internal funds, especially for smaller firms. While the author corrects for sampling bias -- developing countries are under-represented and developed countries over-represented in the sample -- the results still reflect the average effect of financial development across many countries, including many of the most sophisticated financial and economic systems in the world. The empirical study by Laeven (2003) is closer to our study in that the author constructs a financial liberalization index from six aspects of financial reforms during 1988-98, for each of thirteen Asian and Latin American emerging markets to examine the impact of financial deregulations on firms' financing constraints. The main conclusion of the study is large firms become more financially constrained as financial liberalization progresses, while small firms become less so. Laeven (2003) employs a binary indicator for each of the six categories of financial reforms, which cannot capture the gradual nature and intensity of the reforms; that is, reforms in each category could be taken in steps and certain steps may be more radical than others. Our study uses a continuous measure of financial reforms. We also construct another continuous index that captures liberalization in China's equity market.

Despite being an enormous and increasingly important emerging market, China is not included in these studies. Other transitional economies are also often excluded on the ground that firms in former centrally-planned economies are considered to have "soft" budget constraints due to favourable directed-credit or subsidized loan programs.[5] While it may be true that some firms in these economies, especially SOEs, are still not subject to the same market discipline as their counterparts in a more developed Western economies are, governments in these transitional countries have pursued many market-oriented reforms in order to achieve a more efficient

[4] However, they find evidence suggesting regulation changes were effective in promoting credit access for non-conglomerate firms.

[5] A recent exception is Konings et al. (2003). However, this study only investigates whether firms in Bulgaria, Romania, Poland, and Czech Republic face credit constraints, and does not consider effects of financial liberalization.

economic system. Therefore it is natural to assess whether these financial reforms have yielded intended consequences. The empirical results then would have useful policy implications.

3. Model, hypotheses, and estimation method

We adopt a standard investment model based on the Euler-equation approach used recently by Forbes (2007), Harrison et al. (2004), Love (2003), and Laeven (2003), all of which build on Gilchrist and Himmelberg (1999).[6] In this model, each firm is assumed to maximize its present value, which is equal to the sum of discounted expected dividends, subject to capital accumulation and external financing constraints. The maximization problem is:

$$V(K_t, \xi_t) = \max_{\{I_{t+s}\}_{s=0}^{\infty}} D_t + E_t\left[\sum_{s=1}^{\infty} \beta_{t+s-1} D_{t+s}\right] \tag{1}$$

subject to:

$$D_t = \Pi_t(K_t, \xi_t) - C(I_t, K_t) - I_t, \tag{2}$$

$$K_{t+1} = (1-\delta)K_t + I_t, \text{ and} \tag{3}$$

$$D_t \geq 0, \tag{4}$$

where K_t is the capital stock at the beginning of period t; ξ_t is a productivity shock; D_t is the dividend; $E_t[.]$ is the expectation operator conditional on information at time t; β is the discount factor; $\Pi(.)$ is the profit function; $C(.)$ is the adjustment cost function; I_t is investment over period t; and δ is the capital depreciation rate.[7]

Let λ_t be the multiplier for the non-negativity constraint on dividends (Equation 4). The first-order condition in the maximization problem is:

$$\left(\frac{\partial V}{\partial I}\right)_t = -(1+\lambda_t)\left[\left(\frac{\partial C}{\partial I}\right)_t + 1\right] + \beta_{t+1} E_t\left(\frac{\partial V}{\partial I}\right)_{t+1}. \tag{5}$$

Define marginal Q as the increase in the firm's value in the next period from one extra unit of capital:

$$Q_t = \left(\frac{\partial V}{\partial K}\right)_{t+1}. \tag{6}$$

Then the envelope condition is:

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[6] Earlier work on this topic used an investment model based on Tobin's q. In this framework, investment is hypothesized to respond to marginal q only. In actual empirical work, average q is used as a proxy for marginal q. This is only appropriate under very strong assumptions (e.g, firms are price takers with constant returns to scale in all markets). Moreover, when stock markets are inefficient (which is the prevalent case in emerging-market economies, including China), firm's market value and therefore average q is a poor measure of firm's profitability. See Schiantarelli (1996) for a methodology review.

[7] We adopt a simpler version of the model in Gilchrist and Himmelberg (1999) in that the possibility of debt financing is ignored. This, however, does not affect the first order condition and Euler equation for investment.

$$\left(\frac{\partial V}{\partial K}\right)_t = Q_{t-1} = -(1+\lambda_t)\left(\frac{\partial D}{\partial K}\right)_t + (1-\delta)\beta_{t+1}E_t Q_t . \tag{7}$$

Equations (5) and (7) are then combined to produce the Euler equation:

$$1+\frac{\partial C(I_t, K_t)}{\partial I_t} = \beta_t E_t\left[\left(\frac{1+\lambda_{t+1}}{1+\lambda_t}\right)\left\{\frac{\partial \Pi(K_{t+1}, \xi_{t+1})}{\partial K_{t+1}} + (1-\delta)\left(1+\frac{\partial C(I_{t+1}, K_{t+1})}{\partial I_{t+1}}\right)\right\}\right]. \tag{8}$$

The ratio $(1+\lambda_{t+1}/1+\lambda_t)$ is the relative shadow cost of external funds in period t+1 versus t. In a world without financial friction, $\lambda_t = \lambda_{t+1}$ for all period t and the firm is never constrained. If the shadow cost of external financing is higher at t than at t+1, then the firm is deemed financially constrained.

Gilchrist and Himmelberg (1999) show that if production takes the form of a Cobb-Douglas function then the marginal profit of capital (MPK) can be derived as:

$$MPK_{it} = \gamma_{0i} + \gamma_{1,t}\left(\frac{Sales}{K}\right)_{it}, \tag{9}$$

where γ_{0i} is firm's fixed effect, $\gamma_{1,t}$ is the ratio of capital's share in production to the mark-up, and Sales denote total sale revenue.

To make the Euler equation estimable, the time-varying shadow price λ_t needs to be identified with some observable firm characteristics. We follow the literature and let the relative shadow cost of external finance be a function of firm's cash stock at the beginning of period:[8]

$$\frac{1+\lambda_{t+1}}{1+\lambda_t} = \mu_{0i} + \mu_1\left(\frac{Cash}{K}\right)_{it}. \tag{10}$$

Here, if there is no market imperfection, $(1+\lambda_{t+1}/1+\lambda_t) = 1$ for all period t and investment is unrelated to cash holdings, $\mu_1 = 0$. On the other hand, the more severe is the market imperfection, the greater is the sensitivity of investment to the amount of cash.

The following adjustment cost function is assumed:

[8] Myers and Majluf (1984) provide a theoretical justification for the use of cash stock. In their model, the amount of cash holdings, or "financial slack", directly affects investment when informational asymmetry arises in the capital markets. Firms with ample financial slack would take all positive net-present-value (NPV) opportunities whereas firms without slack would pass up some. Their model suggests that if firms face costly external finance, there is a positive association between their investment and cash stock. Denis and Sibilkov (2010) present empirical evidence suggesting that greater cash holdings are associated with higher levels of investment for financially constrained firms with high hedging needs. Higher cash holdings allow constrained firms to undertake positive NPV projects that might otherwise be bypassed.

$$C(I_t, K_t) = \frac{\theta_1}{2}\left[\left(\frac{I}{K}\right)_t - \theta_2\left(\frac{I}{K}\right)_{t-1} - \theta_i + \theta_t\right]^2 K_t \ , \tag{11}$$

where θ_1 and θ_2 are constant, θ_i firm *i*'s fixed effect, and θ_t time effect. The lag term accounts for persistence in investment exhibited in the data. Equation (10) implies the marginal adjustment cost of investment:

$$\left(\frac{\partial C}{\partial I}\right)_t = \theta_1\left[\left(\frac{I}{K}\right)_t - \theta_2\left(\frac{I}{K}\right)_{t-1} - \theta_i + \theta_t\right]. \tag{12}$$

Note that in this function the adjustment cost is linearly homogeneous in capital and investment.

A first-order Taylor approximation around the means is used to linearize the Euler equation (8) and by letting $E\left(1+\lambda_{t+1}/1+\lambda_t\right)=1$, we obtain a baseline investment equation that will be used to investigate financing constraints:

$$\left(\frac{I}{K}\right)_{it} = \alpha_0 + \alpha_1\left(\frac{I}{K}\right)_{i,t-1} + \alpha_2\left(\frac{Sales}{K}\right)_{it} + \alpha_3\left(\frac{Cash}{K}\right)_{it} + f_i + d_t + \varepsilon_{it}, \tag{13}$$

where f_i is the firm-specific effect, d_t is the time effect, and ε_{it} is the white-noise error term.

We are interested in whether firm's investment is sensitive to internal funds (whether firm has to rely on "cash on hand" to finance investment), the alternative hypothesis is $\alpha_3 > 0$.[9] On the other hand, if firms can easily tap into external funds, whenever investment opportunities arise, then cash holdings represent no value to firms and their investment is not sensitive to the amount of cash; the null hypothesis is $\alpha_3 \le 0$.

Equation (13) can be modified slightly to take into account the possibility that firms of different size face different financing constraints:

$$\left(\frac{I}{K}\right)_{it} = \alpha_0 + \alpha_1\left(\frac{I}{K}\right)_{i,t-1} + \alpha_2\left(\frac{Sales}{K}\right)_{it} + \alpha_3\left(\frac{Cash}{K}\times \text{Small}\right)_{it} + \alpha_4\left(\frac{Cash}{K}\times \text{Large}\right)_{it} + f_i + d_t + \varepsilon_{it} \ , \tag{14}$$

where Small and Large are dummy variables indicating firms' size. If size matters, then α_4 is expected to be different from zero.

To examine the impacts of financial liberalization on firms' financing constraint, we incorporate a financial liberalization index (FLI) and a capital control index (CCI) into the regression equation:

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[9] The coefficient α_3 in Equation (13) is just a re-parameterization of μ_1 (α_3 is positively related to μ_1). In addition, current investment is expected to positively related to past investment, $\alpha_1 > 0$, and current sales, $\alpha_2 > 0$.

$$\left(\frac{I}{K}\right)_{it} = \alpha_0 + \alpha_1\left(\frac{I}{K}\right)_{i,t-1} + \alpha_2\left(\frac{Sales}{K}\right)_{it} + \alpha_3\left(\frac{Cash}{K}\times \text{Small}\right)_{it} + \alpha_4\left(\frac{Cash}{K}\times \text{Large}\right)_{it} + \alpha_5\left(\frac{Cash}{K}\times FLI\times \text{Small}\right)_{it} + \alpha_6\left(\frac{Cash}{K}\times FLI\times \text{Large}\right)_{it} + f_i + d_t + \varepsilon_{it} \quad (15)$$

$$\left(\frac{I}{K}\right)_{it} = \alpha_0 + \alpha_1\left(\frac{I}{K}\right)_{i,t-1} + \alpha_2\left(\frac{Sales}{K}\right)_{it} + \alpha_3\left(\frac{Cash}{K}\times \text{Small}\right)_{it} + \alpha_4\left(\frac{Cash}{K}\times \text{Large}\right)_{it} + \alpha_5\left(\frac{Cash}{K}\times CCI\times \text{Small}\right)_{it} + \alpha_6\left(\frac{Cash}{K}\times CCI\times \text{Large}\right)_{it} + f_i + d_t + \varepsilon_{it} \quad (16)$$

Here we focus on the interaction terms of FLI or CCI, Cash, and size dummy variables. For example, if financial liberalization reduces the firms' credit constraints, then α_5 and α_6 are expected to be negative in Equation (15) while they are expected to be positive in Equation (16).[10] Equations (15) and (16) can be augmented with additional variables to control for other firm-level or macroeconomic effects.

A key issue is estimating Equations (13)-(16) is that there may be unobserved factors that influence both firms' investment and cash holdings, thereby rendering the cash variable to be endogenous. Another concern is the presence of the lagged dependent variable as a regressor that will bias coefficient estimates. To deal with these issues, we use GMM-difference dynamic panel estimator developed by Arellano and Bond (1991). This estimation method first-differences each variable to eliminate the firm-specific effects and then uses the lagged levels of the variables as their instruments. In the sensitivity analysis, we also include sales growth as a proxy for investment opportunities that may affect both firms' decision to invest and hold cash. To ensure the Arellano-Bond estimator is appropriate for this investment model, we resort to a Sargan test of over-identifying restrictions to test the validity of the instruments and a test of no second-order serial correlation in the differenced equation. An insignificant Sargan test statistic indicates that orthogonality of the instruments and the error terms cannot be rejected, which implies that the choice of instruments is appropriate.

4. Data

Data for Chinese firms listed on Shanghai and Shenzhen stock markets are obtained from the Worldscope database. There are other sources, but we use this database to maintain consistency, in terms of data construction, definition, and quality, with other studies. While Shanghai stock market reopened in 1991, not many firms were actively traded initially and the number of firms reported in the database was very low at the beginning. The number of firms covered by the

[10] Such practice of including product terms of firm-level variable and some macroeconomic variables exists in the empirical studies that use the Arellano and Bond estimation method (Harrison et al., 2004; Love, 2003; Laeven, 2003). It can be shown that the inclusion of such cross-product terms in Equations (15) and (16) would not affect the method of estimation.

Worldscope database increases substantially in 1996 so this year is chosen as the starting date for our sample. Only non-financial and non-services firms are included. Extreme outliers for the key variables in Equation (13) are excluded. The steps followed to create the data sample are described in Appendix A.

Our unbalanced sample, covering annual data for 1996-2007, consists of 7052 firm-year observations and up to 1271 firms. Variables used in the regression analysis are defined in Table 1. We divide the sample into small and large firms, based on an inflation-adjusted asset value of 1,250,000 Chinese yuan.[11] Firms can switch between small and large each year depending on their asset values in that year.

Table 2 provides some summary statistics for the key variables scaled by capital stock. In each cell, the first number is the mean value whereas the number in parentheses is the standard deviation. While small firms generate more sales per unit of capital they also hold more cash relative to larger firms. Greater cash holdings of smaller firms may be used to finance higher investment but this could be because smaller firms are subjected to greater financing constraints and therefore they choose to hold more cash as a precaution against liquidity constraints. We will examine this possibility in the sensitivity analysis section. Smaller firms seem to have higher leverage, although the amount of debt holding varies considerably more than that by larger firms.

To examine the effects of financial reforms on firms' financing constraints, we construct a financial liberalization index and a capital control index. For the former, we classify reform measures into five categories: interest rate (on both lending and deposits) liberalization, reduction of entry barriers, decreases in directed credit, promotion of prudential regulations, and privatization of state banks. These categories are based on Laeven (2003) and are consistent with those used in Yi and Ding (2007). However, our measures of financial reforms are continuous as opposed to discrete or qualitative indicators employed by Laeven (2003) and the International Monetary Fund (IMF).[12] We think continuous measures can better capture the nature of financial liberalization process that usually takes place gradually and may involve standstills or even reversals. It can also capture the intensity of financial reforms that a one-time binary indicator cannot.

More specifically, we first conducted a very general search for *any* change in financial and monetary reform measures. While it is true that we then fit these changes into the five categories, we took great care to avoid dropping relevant policy changes found in the previous step. We only deliberately excluded changes in bank reserves requirements because the People's Bank of China has been, and is expected to continue, routinely using it as a monetary policy instrument. Except the "Privatization" category, we evaluate and assign a value of 0.5, 1, or 2 to each reform or liberalization initiative with higher value reflecting more significant change in Table 3. Policy reversals or new restrictions take on negative value. These numbers are then aggregated over time to account for cumulative changes. A policy change may fall into more than one category and its impact on each category is evaluated separately. As for bank privatization, we measure

[11] This cut-off number is chosen because it is close to the sample median value of 1,217,810 yuan.
[12] See Annual Report on Exchange Rate Arrangement and Restrictions published by the IMF.

the cumulative increases in the portion of shares held by private investors (as opposed to state-owned portion) to the total number of shares when banks undertake initial public offering (IPO) or seasoned offering. For example, in July 2005, the Bank of Communication (BComm) became the first bank that went public with about 50 percent of total share being held by non-state investors. An arbitrary value of 1 is assigned for this event. Then in October 2005, China Construction Bank (CCB) went public with about 30 percent of shares being held by private investors. This increase of 30 percent over the 50 percent in privatively-owned share is weighted by CCB's assets (about 4.5 trillion yuan) relative to BComm (about 1.5 trillion yuan), yielding a value of about 1.8 for the IPO of CCB. Adding the values of BComm and CCB IPO events gives 2.8 for the year 2005. Values for other Chinese banks' offerings later on are calculated in the same fashion. Table 3 presents the summary time series for the five aspects of financial reforms. Appendix B presents the dates and details of policy changes as well as the numerical values assigned to these changes. We apply a principal component analysis to these five categories. The first component accounts for more than 80 percent of variance in the five series; it is used as the financial liberalization index (FLI) in our paper.

To look at financial liberalization from a different perspective, we also use a measure that captures the degree of capital controls in a country. This method, proposed by Edison and Warnock (2003), uses two monthly indices produced by the International Finance Corporation (IFC) for some emerging markets: a Global index (IFCG) designed to represent the stock market and an Investable index (IFCI) designed to represent the portion of that market available to foreign investors. The ratio of IFCI to IFCG measures the availability of a country's domestic equity to foreign investors. Hence, one minus this ratio is considered a measure of capital controls.

We focus on the IFCG and IFCI indices that are adjusted for asymmetric price shocks to investable and non-investable stocks so that the derived measure of capital controls changes only when restrictions change. In particular, we extend the measure of capital control (CCI for short) for China based on this formula:[13]

$$CCI_t = 1 - \frac{MC_t^{IFCI} / P_t^{IFCI}}{MC_t^{IFCG} / P_t^{IFCG}} \quad , \tag{16}$$

where MC is the market capitalization at time t of the IFCI and IFCG indices and P denotes the corresponding price index.[14]

As other emerging-market economies, China has a bank-dominated financial system. One may argue that a ratio of investable equity is not comprehensive enough to capture deregulations taking place elsewhere in China's financial system. However, equity market liberalization is normally pursued when other financial reforms have been put in place and the authorities feel the

[13] We extend this measure to 2007 since it ends in year 2000 in Edison and Warnock (2003).

[14] Edison and Warnock (2003) suggest that the price-adjusted version of capital control measure is more appropriate for time series work where as the non price-adjusted version is suitable only for cross-country analysis and over long periods.

domestic market is ready for foreign competition.[15] Kose et al. (2006) argue that this is one of the main reasons why studies using equity market liberalization dates have found very strong and positive effect of financial liberalization on economic growth in emerging markets. Moreover, Edison and Warnock (2003) show that the CCI corresponds well with the liberalization dates for many emerging markets studied in Bekaert and Harvey (2000) and is comparable to the restrictions-based measure in Quinn (1997). Since we use data from publicly-traded firms the CCI can capture financial reforms instituted in China since the reopening of the stock market in 1990 reasonably well.

Figures 1 and 2 depict FLI and CCI, respectively, for 1993-2007.[16] The correlation between the two series is -0.91.

5. Empirical results

The empirical results are shown in Tables 4-7. All results are obtained by Arellano and Bond's dynamic panel estimation method corrected for heteroscedasticity. To control for unobserved individual effect and possible endogeneity due to the presence of the lagged dependent variable, Equations (13) – (16) are estimated in the first difference and lags of the explanatory variables are used as instruments.[17] In the baseline estimation, three lags of the explanatory variables are used as instruments. But we also estimate the investment model with two lags and four legitimate lags for robustness check. For each regression, we report the Wald statistics for testing the joint-significance of the explanatory variables and the period dummies although the coefficients on these dummies are not shown to save space. The bottom cells show statistics for testing the Sargan over-identification restrictions on the validity of the instruments and serial correlation tests, as discussed in Section 3.

Baseline results

The results for the baseline model, Equation (13), are shown in Column (1) of Table 4. The dependent variable is the ratio of investment to capital (investment for short). The coefficients on lagged investment and sales have positive sign, as expected, and significant at the 1 percent significance level. Under the null hypothesis of no financing constraint, firms' investment should not be sensitive to internal funds, here captured by cash holdings. The estimated coefficient on cash is positive and significant at 1 percent, indicating that Chinese firms on average are subjected to significant financing constraints. As a comparison, the magnitude of the financing constraint found here for Chinese firms, 0.0474, is larger than that, 0.022, for Chilean firms as

[15] For example, Shanghai stock exchange was only reopened in December 1990, after some other financial reforms had taken place.
[16] Shanghai stock exchange reopened in December 1990; moreover, data from IFC and Standard & Poor's for China are only available from 1993, hence the starting point for CCI.
[17] Values of the regressors lagged twice or more are legitimate instruments.

reported in Forbes (2007).[18] The difference in these two numbers may reflect a relatively more liberalized and sophisticated financial regime in Chile than that in China. Compared to Konings (2003), the cash coefficient here is higher than that for Bulgaria and Romania, the two "slow reformers" that are found to experience only soft budget constraint, and lower than that for Poland and Czech Republic, the two "fast reformers" that display significant financing constraint. Apparently, firms in the fast-reform markets are exposed to greater market disciplines, and therefore financing constraints, than those in slow-reform markets.

To take into account firms' size, we interact the cash holdings with the size dummies, as shown in Column (2). Small firms' investments display significant sensitivity to internal funds whereas large firms' investments do not. This is consistent with studies that look at both developed and developing countries. See, for example, Love (2003) and a literature review by Schiantarelli (1996). Small firms are subjected to greater asymmetric information problem and transaction costs whereas large firms, through political connection or directed-credit policies, may enjoy preferential credit access. It is therefore important to understand how financial reforms have affected these two groups of firms.

We interact the financial liberalization index (FLI) with individual firms' cash holdings and their size in Column 3 of Table 4. The results are similar to those in Column 2 in that small firms bear significantly higher constraints. The coefficients on the interaction terms suggest that financing constraints for large firms increase along the financial liberalization process. This is consistent with the results obtained in Laeven (2003), Koo and Maeng (2005), Forbes (2007), among others. Financial reforms that gradually eliminate preferential treatments to large firms subject these firms' investment decisions to stricter market-based criteria and therefore raise their financing constraints.

Our results, however, differ from those in the above studies in that there is no evidence suggesting that financial reforms in China have helped lowering financing constraints for smaller firms. The interaction term between FLI and cash and the dummy for small firms is insignificant and non-negative. As reviewed in Section 2, studies that use recent data or look at countries that have engaged in financial deregulations for quite some time are more likely to find evidence of reduction in financing constraints for small firms. The lack of qualitatively similar evidence in our sample could be attributed to limited data. Financial reforms, as other economic reforms, may take time to confer benefits and our data sample may not be sufficiently long to account for this delayed effect. However, our data sample shows that the financial liberalization seems to have clear effect on large firms. So a reasonably plausible alternative explanation is that the financial reforms in China have not been substantial enough to have favourable impact on smaller firms. China, despite having one of the highest saving rates in the world and having made great strides in many aspects of economic development, still has an underdeveloped financial system. It is likely that smaller firms still find it hard to obtain loans given asymmetric information problem or a long-standing "political pecking order" that discriminates against them

[18] During the period of capital control examined in Forbes (2007), the financing constraint rises to 0.215 for all firms although this coefficient is not significant.

in China (Huang, 2003). There have not been active policies specifically directed at improving credit access for small or private enterprises. This interpretation is consistent with Poncet et al. (2010), who, using panel data over 1998-2005, show that private firms, which are significantly smaller than SOEs in terms of asset value, display significant credit constraints.[19]

The regression with the capital control index (Column 4) confirms the results from FLI. The coefficient on the interaction term of CCI with cash and large size indicator suggests that lower capital controls heighten the sensitivity of large firms' investment to internal funds, implying higher constraints for large firms.[20] Again, no significant effect of lower capital control on smaller firms' investment constraints is detected.

To further verify the main results in this paper that financial liberalization has raised financing constraints for large firms but rendered no significant effect on smaller firms, we break the sample into quartiles based on firm size (measured by real total assets). Firms' cash holdings are interacted with a size dummy according to their placement in the quartiles.

The baseline regression (without FLI and CCI) is displayed in Column 1 of Table 5. The results show that firms in the smallest (first) quartile experience significant and highest financing constraints (0.0848). The magnitude of the constraints decreases for firms in larger quartiles and the constraints become statistically insignificant for firms in the third and fourth quartiles (0.0104 and -0.0021, respectively). The regression with FLI in Column 2 confirms the pattern displayed in Table 4. The value of the interaction terms between cash holdings, FLI, and quartile dummies is positive and increases from the second quartile (0.0004) to the fourth quartile (0.0183), implying larger firms are subject to higher constraints during financial reforms. When size is broken down into quartiles, these interaction coefficients are no longer estimated as precisely and they are not statistically significant. However, the regression with CCI and size quartiles continues to support the conclusion made earlier. The coefficient on interaction terms with CCI reaches the most negative value (-0.0845) for the largest quartile; it is significant at 5 percent level. This indicates the largest 25 percent of firms in our sample experience higher financing constraints during the process in which capital controls are being relaxed.

Sensitivity analysis

The above results are obtained by using 3 lags of the explanatory variables as instruments. We rerun the investment regressions with 2 lags and 4 lags to make sure the results are not specific to a certain lag length. These additional results presented in Table 6 are very close quantitatively and qualitatively to those in Table 4.

To check whether the results are sensitive to how values are assigned to policy reforms, we instead assign a value of 1 for each policy change (and -1 if it is a reversal); that is, no judgment on the relative importance of each policy change is made. Principal component analysis is applied to the new cumulative values in the five categories of reforms. The first component

[19] Poncet et al (2010) use private data set (as opposed to data from listed firms in our paper) and do not examine the effects of financial liberalization.

[20] CCI measures the intensity of capital controls; lower value of this index means reduction in controls.

accounts for 83 percent of variation in the data. We re-run all the regressions with this alternative construction of the FLI. The results are very similar to those obtained with the original FLI in Tables 4 and (5).[21]

To account for possible bias resulting from omitting relevant variables, we augment Equation (15) and (16) with additional control variables. The results are presented in Table 7. First, we include debt-to-capital ratio to examine the effect of firms' leverage. The coefficient on this term is expected to be negative since higher leverage is likely to raise the cost of external funds and therefore has negative impact on firm's investment. Columns 1 and 2 show that our earlier results are maintained in the presence of this additional control variable. The interaction terms between cash, large size indicator, and FLI or CCI have the same sign as before; they are significant at 10 percent and 1 percent respectively. The leverage term does have expected sign but is not statistically significant.

It is also possible that firms hold cash not for precautionary purpose, i.e., to guard against liquidity constraints, but in response to expected future profits. In this case, the coefficient on cash, and its interaction with other terms, may not reflect financing constraints. We include an "accelerator" term, defined as sales growth over capital stock, to account for future profits. This control variable has expected positive sign as shown in Columns 3 and 4 but is not significant. The results for the rest of the explanatory variables are similar to those in Columns 1 and 2 in Table 7 and the baseline results in Table 4.

Another consideration is that firms' financing constraints could vary over business cycles in that it is easier for both small and large firms to obtain external funds during economic expansions than during contractions. An interaction term of real GDP growth rate and the firm-level measure of cash stock is added to the investment model to control for the effects of business cycles. The results in the last two columns of Table 7 show that the interaction term is negative, as expected, indicating that financing constraints are reduced during economic upturns; it is significant at 10 percent level in the regression with FLI. The key results from Table 4 continue to hold here.

Our results are subject to some qualifications: (1) Since we use data on publicly-traded firms, our sample cannot measure the impact of financial reforms that took place before the reopening of stock markets in China. Using data on non-listed firms would help deal with this issue; however, limited data exists for private firms, especially before 1990, and financial data for non-listed firms is subject to serious reliability issue. (2) Sampling bias: listed firms tend to be large and therefore even firms classified in the smallest quartile may not fairly represent the true small firms in Chinese economy. Results pertaining to smaller firms in our sample might change but the results for larger firms are likely to hold, given the sensitivity analysis on size quartiles. (3) It is possible that investment and cash holdings may be jointly determined by some common unobserved factors that would then render the decision to hold cash endogenous. However, we have chosen an appropriate estimation method to minimize this problem. We also include some

[21] This set of regression results is available upon request. We thank the anonymous referee for making this suggestion.

additional explanatory variables as proxies for unobserved factors to check the robustness of the estimation results.

6. Conclusion

It is plausible that financial liberalization decreases the role of relationship-based lending, which often leads to the syndrome of soft-budget constraint. As a result, large firms gradually lose their preferential treatment and encounter some difficulty in accessing credits during the liberalization process. Therefore, it is doubtful, that during the transition period to a more liberalized financial market, incremental reforms would be beneficial to the large firms. Small firms, due to asymmetric information and "political pecking order', may still face a long-standing bias against them in the credit market even after a long period of liberalization. China's financial system is still dominated by a few large state-controlled domestic and foreign banks that prefer dealing with large state-owned enterprises to small or private firms. The lack of small and medium banks means smaller firms have to resort to internal funds for investments just as before liberalization.

Subject to the above caveats, we can draw some policy implications based on the results obtained in this paper: (1) Financial reforms that are part of the financial liberalization process carried out hitherto seem to have exposed large corporations in China to greater financing constraints. If the policy reforms are to subject large firms, probably including many state-owned enterprises (SOEs), to greater competition and market disciplines in an attempt to promote efficiency, competitiveness, and transparency in these firms' operations, then it appears that they have met some of the goals. Further reforms are therefore encouraged. (2) Smaller firms in our sample, likely representing private small- and medium-sized enterprises, have not benefited from the reforms in terms of reduction in their financing constraints. Since these smaller, enterprises currently account for the majority of China's industrial output and have played a crucial role in absorbing excess labour produced by gradual privatization of SOEs, greater policy attention should be placed on promoting better credit access for these smaller firms. This policy implication is important given ample evidence pointing to better performance of smaller private enterprises as compared to their larger state-owned counterparts (Park et al., 2006; Luo and Park, 2001).

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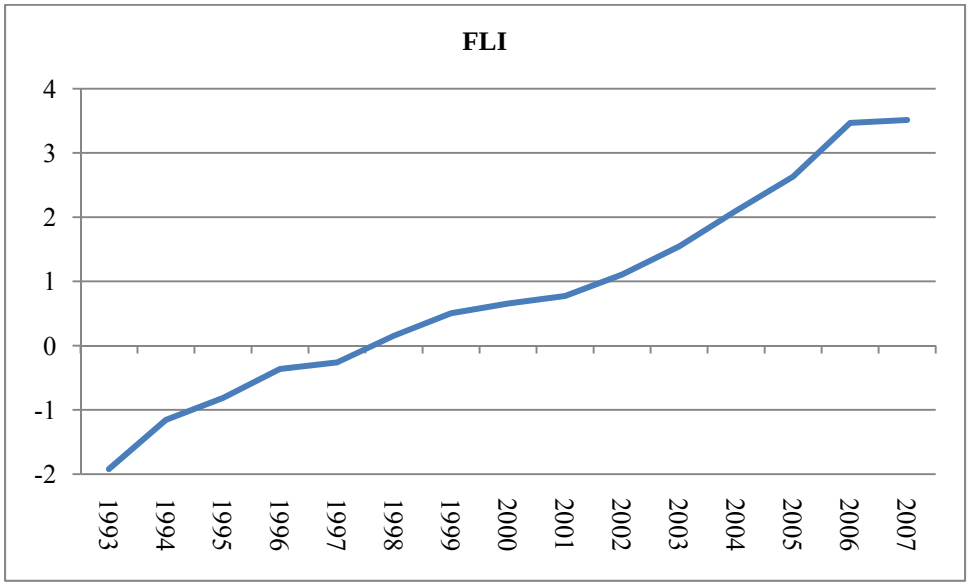

Figure 1.
Financial Liberalization Index (FLI) captures cumulative financial reforms in interest rates, entry barriers into the banking system, prudential regulations, directed credit, and bank privatization.

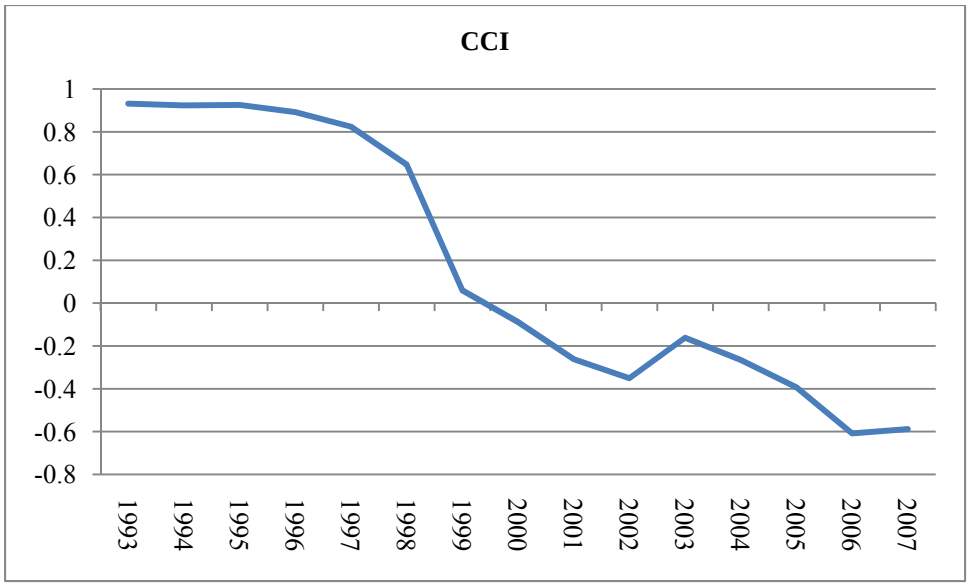

Figure 2
Capital Control Index (CCI) measures the degree of capital control by using one minus the portion of the stock market available to foreign investors.

Table 1: Variable definitions

Variable	Description
$Assets_t$	Total assets at the beginning of period t, adjusted for inflation.
I_t	Investment during t, measured by the value of capital expenditure, scaled by K_t.
K_t	Capital stock at beginning of t, measured as the value of property, plant, and equipment at the end of t less investment during t, plus depreciation and amortization expenses during t.
$Cash_t$	Cash and equivalent at the beginning of period t, scaled by K_t.
$Sales_t$	Net sales, scaled by K_t.
$Debt_t$	Book value of long- and short-term debt at the beginning of period t.
$Leverage_t$	Ratio of $Debt_t$ to $Assets_t$.
$Accelerator_t$	$(Sales_t - Sales_{t-1})/K_t$

Table 2: Average values of the key variables scaled by capital stock (1997-2007)

Variable	Investment	Cash	Sales	Leverage
All firms	0.2535(0.3364)	0.7978(1.1779)	2.3122(1.9981)	0.3368(4.6683)
Small firms	0.2836(0.3889)	0.8498(1.2240)	2.3691(1.9758)	0.3714(6.4547)
Large firms	0.2212(0.2654)	0.7421(1.1240)	2.2504(2.0204)	0.2989(0.1689)

Note: In each cell, the first number is the average value expressed as a portion of capital and the number in the parenthesis is the standard deviation.

Table 3: Financial reforms

Year	Interest rates liberalization (1)	Reduction in entry barriers (2)	Prudential regulations (3)	Decrease in directed credit (4)	Bank privatization (5)
1978		1			
1979		2			
1980		3.5			
1981		4.5			
1982		4.5			
1983		6	2		
1984		7.5	2	1	
1985		9	2	1	
1986	1	9.5	2	2	
1987	1.5	10	2	2	
1988	1.5	9.5	1.5	2	
1989	1.5	9.5	1.5	2	
1990	1	10	1.5	2	
1991	1	10	1.5	2	
1992	1	11	2.5	2	
1993	1	11	3.5	2	
1994	1	11.5	4.5	4	
1995	1	12.5	6.5	4	
1996	2	13	6.5	5	
1997	2.5	12.5	7.5	5	
1998	4.5	13	9	5	
1999	7	14	9	5	
2000	8	14.5	9	5	
2001	8	15.5	9	5	
2002	8.5	17	10	5	
2003	9.5	18.5	11.5	5	
2004	13	19.5	12.5	5	
2005	13.5	20	12.5	5	2.8782
2006	14	21.5	12.5	5	7.0359
2007	14	21.5	12.5	5	7.3405

Note: The numbers represent cumulative changes in five areas. Specifically, larger numbers represent more liberalized interest rates in Column (1), lower entry barriers into the banking system in (2), greater promotion of prudential regulations in (3), decreases in directed credit in (4), and greater bank privatization in (5).

Table 4: Main results of the investment model

	(1) Baseline	(2) Size	(3) FLI	(4) CCI
$Investment_{t-1}$	0.1530***	0.1366***	0.1351***	0.1309***
	(0.0207)	(0.0189)	(0.0188)	(0.0195)
Sales	0.0956***	0.0969***	0.1015***	0.1049***
	(0.0175)	(0.0152)	(0.0152)	(0.0142)
Cash	0.0474***			
	(0.0150)			
Cash*Small		0.0735***	0.0648***	0.0594***
		(0.0146)	(0.0220)	(0.0209)
Cash*Large		0.0028	-0.0090	0.0017
		(0.0176)	(0.0216)	(0.0134)
Cash*FLI*Small			0.0106	
			(0.0097)	
Cash*FLI*Large			0.0184**	
			(0.0094)	
Cash*CCI*Small				-0.0823
				(0.0545)
Cash*CCI*Large				-0.0883***
				(0.0344)
Wald test[1]	205.14***	206.14***	288.68***	292.74***
Period dummies[2]	93.89***	99.01***	103.55***	108.74***
Sargan test[3]	103.06	141.56	139.98	133.80
Serial corr[4]	0.11	0.11	0.12	0.05
# firms	1271	1271	1271	1271
# observations	7052	7052	7052	7052

Note: ***, ** and * denote significance at the 1%, 5%, and 10% levels respectively. Standard errors are in parentheses. The dependent variable is investment-to-capital ratio (investment for short). The results are obtained by two-step estimation with robust standard errors. Period dummies are included.

[1] Wald statistic is a test of the joint significance of the explanatory variables (excluding time dummies).

[2] Period dummies is the Wald statistic for testing the null hypothesis that the period dummy variables are jointly insignificant.

[3] Sargan test is the χ^2 statistic for the null hypothesis of valid over-identifying restrictions.

[4] Serial correlation is the z-statistic for testing the null hypothesis of no second-order serial correlation in the residuals.

Table 5: Financial constraints for quartiles of different-sized firms

	(1) Baseline	(2) FLI	(3) CCI
$Investment_{t-1}$	0.1301***	0.1295***	0.1294***
	(0.0184)	(0.0185)	(0.0186)
Sales	0.0948***	0.0968***	0.0100***
	(0.0143)	(0.0144)	(0.0149)
Cash*1st quartile dummy	0.0848***	0.0839**	0.0662**
	(0.0250)	(0.0417)	(0.0329)
Cash*2nd quartile dummy	0.0762***	0.0804***	0.0698***
	(0.0151)	(0.0224)	(0.0229)
Cash*3rd quartile dummy	0.0104	0.0009	0.0105
	(0.0156)	(0.0254)	(0.0243)
Cash*4th quartile dummy	-0.0021	-0.0117	0.0032
	(0.0214)	(0.0217)	(0.0178)
Cash*1st quartile dummy*FLI		0.0015	
		(0.0156)	
Cash*2nd quartile dummy*FLI		0.0004	
		(0.0134)	
Cash*3rd quartile dummy*FLI		0.0166	
		(0.0125)	
Cash*4th quartile dummy*FLI		0.01827	
		(0.0119)	
Cash*1st quartile dummy*CCI			-0.0782
			(0.0855)
Cash*2nd quartile dummy*CCI			-0.0453
			(0.0696)
Cash*3rd quartile dummy*CCI			-0.0684
			(0.0538)
Cash*4th quartile dummy*CCI			-0.0845**
			(0.0372)
Wald test[1]	205.91***	279.46***	263.63***
Period dummies[2]	101.29***	92.18***	93.01***
Sargan test[3]	184.63	181.92	180.90
Serial corr[4]	0.08	0.10	0.05
# firms	1271	1271	1271
# observations	7052	7052	7052

Note: Firms in the first quartile are the smallest firms. Also see notes to Table 1.

Table 6: Different lag lengths for the instruments

	(1) FLI 2 Lags	(2) FLI 4 Lags	(3) CCI 2 Lags	(4) CCI 4 Lags
$Investment_{t-1}$	0.1336***	0.1337***	0.1343***	0.1297***
	(0.0209)	(0.0182)	(0.0209)	(0.0184)
Sales	0.0911***	0.1052***	0.0898***	0.1066***
	(0.0160)	(0.0152)	(0.0161)	(0.0146)
Cash*Small	0.0572**	0.0650***	0.0576**	0.0570***
	(0.0240)	(0.0218)	(0.0249)	(0.0207)
Cash*Large	-0.0098	-0.0098	0.0068	0.0009
	(0.0233)	(0.0207)	(0.0159)	(0.0145)
Cash*FLI*Small	0.0155	0.0118		
	(0.0101)	(0.0097)		
Cash*FLI*Large	0.0226**	0.0199**		
	(0.0107)	(0.0091)		
Cash*CCI*Small			-0.1042	-0.0843
			(0.0711)	(0.0524)
Cash*CCI*Large			-0.1037***	-0.0945***
			(0.0365)	(0.0359)
Wald test[1]	262.92***	296.82***	262.71***	274.91***
Period dummies[2]	99.19***	98.39***	95.94***	110.38***
Sargan test[3]	108.11	157.72	97.87	149.25
Serial corr[4]	0.12	0.09	0.16	0.02
# firms	1271	1271	1271	1271
# observations	7052	7052	7052	7052

Note: See notes to Table 1.

Table 7: Adding control variables

	Leverage▪		Accelerator♦		Business Cycle•	
	(1)	(2)	(3)	(4)	(5)	(6)
	FLI	CCI	FLI	CCI	FLI	CCI
Investment$_{t-1}$	0.1326***	0.1286***	0.1373***	0.1297***	0.1301***	0.1292***
	(0.0183)	(0.0189)	(0.0185)	(0.0187)	(0.0199)	(0.0205)
Sales	0.0971***	0.1009***	0.0922***	0.0960***	0.0997***	0.1011***
	(0.0139)	(0.0134)	(0.0152)	(0.0136)	(0.0148)	(0.0141)
Cash*Small	0.0728***	0.0656***	0.0715***	0.0597***	0.1941**	0.0107*
	(0.0220)	(0.0209)	(0.0195)	(0.0198)	(0.0800)	(0.0554)
Cash*Large	-0.0032	0.0047	0.0032	0.0068	0.1246	0.0509
	(0.0206)	(0.0138)	(0.0222)	(0.0137)	(0.0807)	(0.0564)
Cash*FLI*Small	0.0101		0.0080		0.0334*	
	(0.0101)		(0.0095)		(0.0180)	
Cash*FLI*Large	0.0174*		0.0167*		0.0408**	
	(0.0096)		(0.0100)		(0.0175)	
Cash*CCI*Small		-0.0801		-0.0770		-0.0774
		(0.0546)		(0.0544)		(0.0601)
Cash*CCI*Large		-0.0884***		-0.0819***		-0.0909***
		(0.0321)		(0.0304)		(0.0324)
Control variable§	-0.0128	-0.0112	0.0085	0.0080	-1.7536*	-0.4900
	(0.0119)	(0.0133)	(0.0082)	(0.0083)	(1.0583)	(0.5988)
Wald test[1]	300.83***	298.83***	248.67***	218.73***	275.96***	282.76***
Period dummies[2]	112.60***	111.55***	104.32***	118.94***	102.46***	102.70***
Sargan test[3]	167.85	160.16	176.08	168.59	134.33	129.20
Serial corr[4]	0.33	0.26	0.21	0.07	0.00	0.02
# firms	1271	1271	1271	1271	1271	1271
# observations	7052	7052	7052	7052	7052	7052

Note: See notes to Table 1 for numbered footnotes.

§ Coefficient on leverage (▪), accelerator (♦), and business cycle (•) variable. The leverage variable refers the debt-to-capital ratio. The "accelerator" term is defined as sales growth over capital stock. The business cycle variable is measured as real GDP growth rate.

▪ To control for the effect of firm`s leverage on investment, a ratio of total debt to assets is added to the model.

♦ Sales growth over capital stock is included to model accelerator effects.

• An interaction term between real GDP growth and cash is added to account for business cycle effects.

Appendix A. Steps to create the data sample

1. Financial and service firms are excluded.
2. Delisted firms are dropped.
3. Exclude any firms that do not have data on cash, capital expenditure, and capital stock for 2005-2007.
4. Exclude outliers and unrealistic observations for the variables in Equation (13) as follows:
   . $K \leq 0$
   . $I/K < 0$ or $I/K > 3$
   . Cash/K <0 or Cash/K > 10
   . Sales/K <0 or Sales/K >10

Appendix B. Details on financial reforms

Interest rate liberalization

Year	Event
1986	On January 7th 1986, the State Council promulgated the "People's Republic of China (PRC) Provisional Regulations on Banking". They stipulated that inter-bank lending among Specialized Banks was permitted. The terms on loan maturity and lending rate could be determined by mutual agreement between the lenders and borrowers. **(+1)**
1987	In January 1987, the central bank carried out the first attempt to marketize the lending rates. Under the "Notice on the Devolution of the Right to Adjust Lending Rates", commercial banks could adjust their lending rates according to national economic policies. The lending rates should not deviate from the benchmark rate by more than 20 percent; the benchmark rate was the official lending rate on liquid capital. **(+0.5)**
1990	In March 1990, the "Pilot Scheme on the Regulations of Inter-bank Lending Market" was introduced. This was the first time that regulations were systematically introduced to the inter-bank lending market. The scheme also specified the principles that govern the upper limit of the inter-bank offered rate. **(-0.5)**
1996	On June 1st 1996, the People's Bank of China (PBC) issued the "Notice on the Abolishment of Regulations on the Upper Limit of the Inter-bank Offered Rate". This liberalized the inter-bank offered rate. **(+1)** The Ministry of Finance marketized Treasury bonds by issuing them through stock exchanges. The issuance method took various forms, including interest rate tender and yield rate tender. **(+0.5)** In order to alleviate the burden of interest payment on enterprises, the upside margin on the lending-rate band was reduced from 20 percent to 10 percent. The downside margin was kept at 10 percent. The margin was applied to loans on liquid capital only. **(-0.5)**
1997	On June 5th 1997, the PBC liberalized the repo rates in the inter-bank bond market. **(+0.5)**
1998	In August 1998, China Development Bank made the first bond issuance in the inter-bank bond market. **(+0.5)** In 1998, the PBC carried out reform on the discount rate determination mechanism. The discount rate and inter-bank discount rate were determined with reference to the rediscount rate plus additional basis points. The exact rate would be determined by commercial banks under the premise that it should not exceed the

lending rate in the same period. **(+0.5)**

In October 1998, the upside margin on the lending-rate band applied to small enterprises was widened to 10-20 percent. The upside margin for rural credit unions and cooperative banks was widened from 40 percent to 50 percent. (**+1)**

1999 In April and September of 1999, the lending-rate band to small enterprises was widened twice, resulting in a band width of 20-30 percent. **(+0.5)**

From 1999, market-based tender was used in the issuance of Treasury bonds. **(+0.5)**

Starting from October 1999, the PBC allowed the Chinese commercial banks to determine the deposit rate on large fixed deposits by Chinese insurance companies with balances of more than 30 million Renminbi (RMB) and maturities exceeding 5 years. The rate would be determined via mutual agreement between the banks and their clients. This was one of the early attempts of interest rate reforms. **(+0.5)**

In March 1999, the PBC promulgated and implemented the "Regulations on the Interest Rates of Renminbi". **(+1)**

2000 Starting from September 2000, the lending rates on foreign currency and the deposit rates on large foreign currency accounts (with balances of 3 million USD or above) were liberalized. The deposit rates for smaller foreign currency deposit accounts (balances below 3 million USD) remained under the control of the PBC. **(+1)**

2002 From March 2002, the PBC unified the regulatory policies on Chinese and foreign financial institutions. This provided fair treatments to both Chinese and foreign financial institutions regarding the policies on the interest rates of foreign currency. **(+0.5)**

2003 From July 2003, the PBC liberalized the deposit rates on small deposit accounts of British pound, Swiss franc, and Canadian dollar so that the rates could be determined independently by commercial banks.

Starting from November 2003, the PBC also liberalized the deposit rates on small deposit accounts of US dollar, Japanese yen, Hong Kong dollar and euro. The rates could be determined independently by commercial banks according to the interest rate movements in the international financial market as long as they would not exceed the upper limit. **(+0.5)**

With effect from November 2003, commercial banks and rural credit unions were allowed to accept Postal Savings Agreement Deposit with a minimum size of 30 million RMB and the minimum deposit maturity was reduced to 3 years (3 years not included). **(+0.5)**

2004 On January 1st 2004, the PBC once again widened the band on the lending rates of financial institutions. The range for commercial banks and urban credit unions was widened to [0.9, 1.7], and the range for rural credit unions was widened to [0.9, 2]. The band width no longer depended on the enterprises' ownership type and size. **(+0.5)**

From March 25th 2004, adjustable lending rates on loan refinancing were adopted.

From October 29th 2004, the upper bound on the commercial bank lending rates was abolished. The upper limit on the lending rates of urban and rural credit unions was widened to 2.3 times of the benchmark rate.

	For the first time, the RMB deposit rate was allowed to adjust downward. **(+2)**
	In November 2004, the PBC liberalized the deposit rates on small foreign currency deposits with maturity of 1 year or above. **(+0.5)**
	In December 2004, the PBC raised the upper limit on the lending rates of financial institutions. (**+0.5)**
2005	Starting from September 2005, according to the "Notice by the People's Bank of China on the Calculation and Settlement of RMB Deposit and Lending Rates" and with the exception of saving and fixed-time deposits, financial legal entities could determine the rates on other types of deposits (like principal-only-roll-over deposits) and inform their customers in advance, as long as the rates would not exceed the upper limit on the deposit rates in the same period. **(+0.5)**
2006	On January 24th, 2006, the PBC issued the "Notice on the RMB Interest Rate Swap Market Pilot Trading Points", which permitted RMB interest rate swap transactions to be carried out in the pilot trading places. **(+0.5)**

Decreases in entry barriers

Year	Event
1978	On February 23rd 1978, the State Council decided to resume the operation of the Agricultural Bank of China (ABC). **(+0.5)**
	On March 13th 1978, the Bank of China (BC) was separated from the People's Bank of China (PBC). (**+0.5)**
1979	In August 1979, China Construction Bank (CCB) was established by the Ministry of Finance. (**+0.5)**
	Credit underwriting program was implemented. **(+0.5)**
1980	The first representative office of foreign banks -- the Export-Import Bank of Japan -- was set up in China. **(+0.5)**
	Urban and rural credit cooperative unions began to emerge. **(+0.5)**
	Banks began to develop business on trust. **(+0.5)**
1981	Banks in Shanghai started business in the commercial papers and discount market. **(+0.5)**
	Treasury bonds were issued. **(+0.5)**
1983	The People's Insurance Company of China was established. **(+0.5)**
	The People's Bank of China (PBC) served as the central bank. **(+0.5)**
	Banks started to retain profits from credit lending. **(+0.5)**
1984	On January 1st, 1984, the Industrial and Commercial Bank of China (ICBC) was established and it took over the PBC's urban commercial and saving businesses. **(+0.5)**

From 1983, the first batch of associations of collective urban credit cooperatives was established in Zhengzhou, Shenyang, Changchun, Wuhan, Handan, and other cities. After 1984, various urban credit cooperative associations were established in many cities. **(+1)**

1985 Foreign financial institutions were formally permitted to set up branches in the special economic zones. **(+1)**

From 1985, the central bank's capital distribution to the specialized banks changed from government-directed allocation to credit lending. **(+0.5)**

1986 In July 1986, the State Council allowed the Bank of Communication (BComm) (which previously had a combined collective and shareholding ownership structure) to reorganize its ownership structure so that it would become the first national commercial bank with pure shareholding ownership. **(+0.5)**

1987 China Merchants Bank, CITIC Industrial Bank, and Shenzhen Development Bank were established. **(+0.5)**

1988 Fujian Industrial Bank and Guangdong Development Bank were established. **(+0.5)**

Mergers and reorganizations on investment and trust companies were undertaken so that the number of investment trust companies shrank significantly. The markets for bank commercial papers and discount lending were terminated, and the market of inter-bank lending drastically contracted. **(-1)**

1990 In September 1990, to support the development of Pudong, Shanghai became the first city outside the special economic zones approved by the State Council to host foreign financial institutions. **(+0.5)**

1992 In 1992, the Everbright Bank of China, Shanghai Pudong Development Bank, and Huaxia Bank were established. **(+0.5)**
After Deng Xiaoping gave a speech in southern China in the spring of 1992, the Chinese government decided to speed up the economic reform and open-door policy. As a result, Dalian, Tianjin, Qingdao, Nanjing, Ningbo, Fuzhou and Guangzhou were permitted to bring in foreign financial institutions. **(+0.5)**

1994 Financial development was sped up. Foreign financial institutions were allowed to operate in Beijing, Shenyang and other major cities. (**+0.5)**

1995 The "Commercial Bank Laws" were promulgated; they broadened the business of commercial banks to 12 categories. Four banks were designated as state-owned commercial banks. **(+1)**

1996 On January 12, 1996, China Minsheng Banking Corporation was established. It was the first nationwide commercial bank invested by private enterprises. **(+0.5)**

1997 The PBC gave approval to nine foreign banks to conduct RMB business in Pudong on a trial basis. (**+0.5)**

The variety of treasury bonds was reduced substantially. The methods of treasury bonds issuance were reverted to government appropriation rather than through market-based methods like tenders or auctions. **(-1)**

1998 In October 1998, China gave approval to another eight foreign banks to conduct RMB business in Pudong on a trial basis. Also, Shenzhen became the second city in which the entry of foreign banks was permitted. (**+0.5)**

1999 January 27th 1999, territorial restrictions on the establishment of foreign banks in China were abolished. The entry of foreign banks was broadened from Beijing, Shanghai, Tianjin, Hainan province, and 23 other cities to all major cities. (**+0.5)**

The central bank allowed rural credit cooperative unions to enter the inter-bank lending market. It also permitted securities investment funds and securities companies to enter the inter-bank lending market through applications. (**+0.5)**

2000 As approved by the central bank, the second batch of five securities companies entered the national inter-bank lending market. They engaged in the businesses of credit lending, bond purchase and repurchase as well as cash transactions. (**+0.5)**

2001 In December 2001, China joined the World Trade Organization (WTO). Territorial and client restrictions on the foreign exchange business of foreign banks were abolished. Foreign banks were allowed to conduct foreign exchange business with Chinese enterprises and residents. China opened up RMB business to foreign banks in the cities of Shanghai, Shenzhen, Tianjin and Dalian. (**+1)**

2002 The Bank of China formally provided sale-agent services for open-end funds. It also established a fund trading management center. The central bank announced that a record-keeping system would be launched for the national inter-bank bond market, replacing the previous examination and approval system. (**+0.5)**

The State Council modified the "PRC Regulations on Foreign Financial Institutions" and the modifications would take effect from Feb 1. The new rules followed principles of prudential supervision adopted by foreign banks, thereby rendering greater consistency (more equal treatment) in terms of regulations between domestic and foreign banks. **(+0.5)**

In December 2002, China opened up RMB business in another five cities (Guangzhou, Qingdao, Zhuhai, Nanjing and Wuhan) to foreign banks. (**+0.5)**

2003 The China Banking Regulatory Commission decided to modify the methods and procedures for accession to the banking industry, with effect from July 1, 2003. **(+0.5)**

In 2003, Evergrowing Bank was established. **(+0.5)**

In December 2003, China opened up the RMB business in Jinan, Fuzhou, Chengdu and Chongqing to foreign banks. Foreign banks were permitted to carry out RMB business with Chinese enterprises in all areas in which RMB business had been opened up. **(+0.5)**

2004 In 2004, China Zheshang Bank was established. **(+0.5)**

In December 2004, Kunming, Beijing, Xiamen, Shenyang and Xi'an opened up RMB business to foreign banks. **(+0.5)**

2005 In December 2005, Shantou, Ningbo, Harbin, Changchun, Lanzhou, Yinchuan and Nanning opened up RMB business to foreign banks. **(+0.5)**

2006 In 2006, China Bohai Bank was established. **(+0.5)**

In December 2006, the territorial and client restrictions on the RMB business of foreign banks were abolished. Foreign banks were permitted to provide RMB banking services to all clients. The non-

prudential restrictions on foreign banks were also abolished. **(+1)**

Prudential regulations

Year	Event
1983	On September 7th 1983, the State Council established the role of the People's Bank of China (PBC) as China's central bank and confirmed that the PBC would supervise all other banks in China **(+2)**
1988	Reorganization and mergers on investment trust companies were carried out. The number of investment trust companies shrank significantly **(-0.5)**
1992	October 26th 1992, the China Securities Regulatory Commission was established. **(+1)**
1993	According to the "Decisions on the Reform of the Financial System" issued by the State Council, the PBC further strengthened its role on financial regulation, financial supervision, the conduct of policy-related operations, and duty of commercial banks to offer financial services. **(+1)**
1994	It was decided that most of the loan-refinancing decisions would be made by the PBC's headquarter. The central government no longer borrowed directly from the PBC. All banks would have to satisfy requirements on asset-liability ratio. **(+1)**
1995	The "Laws by the People's Bank of China" was promulgated. The PBC's central bank functionality was materially confirmed. **(+1)** The "Laws on Commercial Banks" was promulgated. Commercial bank services were expanded to 12 broad categories. (**+1)**
1997	In March 1997, the PBC established the Monetary Policy Commission. In April of the same year, rules set up by the PBC's Monetary Policy Commission were promulgated. As a result, the system under which the PBC formulates and implements monetary policy was improved. **(+1)**
1998	There was reform in the PBC's management system. The PBC's provincial branches were abolished. **(+1)** On November 18th 1998, the China Insurance Regulatory Commission (CIRC) was established. The duty to regulate securities and insurance products was passed from the PBC to the CIRC. (**+0.5)**
2002	The PBC promulgated the "5th Notice" in 2002. Financial institutions that entered nation-wide interbank bond market would be included in the record-keeping system, with effect from April 15. The State Council modified the "PRC Regulations on Foreign Financial Institutions" and the modifications would take effect from Feb 1. The new rules followed principles of prudential supervision adopted by foreign banks, thereby rendering greater consistency (more equal treatment) in terms of regulations between domestic and foreign banks. (**+1)**
2003	In March, the China Banking Regulatory Commission (CBRC) was established. (**+1)** From July 1st 2003, the CBRC modified the approaches and procedures for accession to the banking industry (**+0.5)**

2004	The Banking Supervision Law of the People's Republic of China was initialized. The "Laws by the People's Bank of China" and the "Laws on Commercial Banks" were modified. All three changes took effect from February 1, 2004. **(+1)**

Directed credit

Year	Event
1984	In 1984, capital allocated to enterprises by the government was no longer interest-free but became loans that required interest payments. **(+1)**
1986	With the exception of loans on fixed capital, all other loans were no long subject to mandatory control, but were only under directional guidance. **(+1)**
1994	Three policy banks were established: China Development Bank, the Agricultural Development Bank of China, and the Import-Export Bank of China. **(+2)**
1996	In June 1996, the central bank's "General Guidelines on Loans" were implemented. They stipulated that the credit rating of the borrowers had to be assessed based on the borrowers' quality, financial background, capital adequacy, credit history, operational efficiency, growth potential, and other factors. The credit rating assessment can be done by the lenders independently or by some credit-rating agencies authorized by regulatory authority. **(+1)**

Privatization

Year	Event
2005	In June 2005, the Bank of Communication's initial public offering (IPO) took place in Hong Kong. October 27th 2005, China Construction Bank went public in Hong Kong.
2006	In June and July of 2006, the Bank of China was listed in Hong Kong and Shanghai respectively. October 27th 2006, the Industrial and Commercial Bank of China was dual-listed in Hong Kong and Shanghai.
2007	In April 2007, the Bank of Communication was listed in Shanghai. September 25th 2007, China Construction Bank was listed in Shanghai.