

Ownership and Financing Discrimination:

Evidence from Investment-Cash Flow Sensitivity of Chinese Listed Firms

Jinyu Liu^a, Wuxiang Zhu^a, Zhengwei Wang^{b*}

^aSchool of Economics and Management, Tsinghua University, Beijing, China

^bPBC School of Finance, Tsinghua University, Beijing, China

Abstract

We study the existence of financing discrimination between state-owned and non-state owned enterprises from the perspective of investment-cash flow sensitivity and the effects of privatization reform on muffling the institutionally rooted discrimination. By employing the dynamic multi-equation model, we find that the non-State-owned Enterprises (non-SOEs) exhibit significantly lower investment-cash flow sensitivity than that of the State-owned Enterprises (SOEs), suggesting non-SOEs' privileged accessibility to external financing when cash flow plummets and stronger capability to protect the investment opportunities against cash flow shocks. The evidence of financing behaviors illustrated in the multi-equation model further confirms the existence of ownership discrimination. Further, we find that the difference in investment-cash flow sensitivities between the two types of firms sharply declines after the Split-share Structure Reform, shedding light on the positive impact of the reform in eliminating ownership discrimination and improving credit allocation efficiency in the capital market.

Key words: Ownership discrimination; Investment-cash flow sensitivity; Split-share Structure Reform

JEL Classification: G32, P22, and D90.

* Jinyu Liu: (86)13720001753, liujy.12@sem.tsinghua.edu.cn; Wuxiang Zhu: (86) (10) 62789873, zhuwx@sem.tsinghua.edu.cn; Zhengwei Wang: (86) (10) 62798760, wangzhw@pbcfs.tsinghua.edu.cn

1. Introduction

A growing strand of literature has indicated that in transition economies, where state-owned banks dominate the financial system, credit unfairly tilts towards State Owned Enterprises (SOEs) and cannot be explained by fundamental factors at firm and industry levels (Brandt and Li, 2003; Cull and Xu, 2005; Song et al., 2011). This phenomenon is widely referred to as “Ownership Discrimination” in financial market. Investigations into the existence of ownership discrimination have alerted people to the potential inhibitions and impediments exerted by inefficient financial systems in transition economies (Cull and Xu, 2005). The “discrimination” refers to the mismatch in, and inefficient allocation of, social capital. Specifically, in industrial sector, SOEs are comparatively inefficient in generating profits, managing risks and serving public interests (Grossman and Krueger, 1993; Boycko et al., 1995; Shleifer, 1998) while in financial sector, they have more privileged access to external financing and notoriously enjoy disproportionately large shares of credit, especially in the early stages of a market economy (Johnson et al., 2002). The in-coordination between the prosperity of real sector and the development of financial system poses a potential encumbrance to economic transformation and physical capital accumulation (King and Levine, 1993; Levine, 1997; Rajan and Zingales, 1996; Levine et al., 2000). Therefore, the ownership discrimination, if really exists, is detrimental to the non-SOEs because a general lack of long-term stable funding sources forces them to resort to trade credits (Ge and Qiu, 2007), costly private borrowing and other informal financing channels. The inferior position of non-state-owned enterprises in the access to external financing limits the growing opportunities of non-SOEs, posing an overwhelming threat to their prosperity.

This paper provides direct evidence of the existence of ownership discrimination by examining the investment-cash flow sensitivity of listed firms in China. Further, we investigate the effects of privatization reform on muffling the institutionally rooted financing discrimination towards non-SOEs. We argue that the investment-cash flow sensitivity measures the capability of a firm to acquire external financing and protect current investment opportunities when confronted with cash flow shocks. Specifically, from a dynamic perspective, there is a hedging effect of corporate investment and financing decisions. Cash flow shocks serve as a good “touchstone” for the real financing capacity of SOEs and non-SOEs. When enterprises encounter cash flow shocks (particularly negative shocks), they have two options: (1) Adjust investment decisions. For instance, when cash flow is on the edge of exhaustion, a company without sustainable financing may be compelled to close down parts of the investment, give up valuable projects or relinquish profits; or (2) *Adjust financing decisions* (including equity and debt financing) to finance for the current investments. We could reasonably expect all firms (i.e., both SOEs and non-SOEs) to prefer the second option since it can minimize the detriment exerted by cash flow volatility on investment and protect corporate investment opportunities. In this regard, changing financing decisions is much less costly, therefore serving as a cheaper alternative to accommodate fluctuations in cash flow (Gatchev et al., 2010). Therefore, if the ownership discrimination towards non-SOEs exists, there should be a significantly higher investment-cash flow sensitivity for non-SOEs because they bear a relatively inferior capability to acquire external financing when cash flow fluctuates and have to adjust investment decisions. More importantly, investment-cash flow sensitivity, as a new angle for investigating ownership

discrimination, can overcome the potential misleading bias of in existing literature, which regarding the significantly lower debt ratios (Li, et. Al, 2009) and shorter debt maturity structure¹ exhibited by non-SOEs as manifestation of ownership discrimination. However, the static leverage of the firms differs essentially from the debt that firms are capable acquire, especially when there is excess liquidity in the market. In other words, it is highly probable that CEOs of non-SOEs cautiously refrain from exhausting debt capacity and conservatively select a relatively low level of debt under complex market and policy environment. Apparently the greater motivation for liability management for non-SOEs (Wang, 2013) cannot be regarded as credit suppliers' discrimination. Since the previous proxy is critically challenged on the groups of measuring ability, our research serves as a good supplement to the literature by providing a more powerful proxy for firm's financing environment that can rule out the impact of firm's debt management strategy. Even if non-SOEs strategically choose (instead of being discriminated) to maintain a lower debt ratio than SOEs, they still prefer the second channel when confronted with cash flow shocks. After controlling for fundamentals, if we still uncover variations in the cash flow sensitivity of the two groups of enterprises, we can interpret the evidence as ownership discrimination towards non-SOEs.

We apply the dynamic multi-equation model proposed by Gatchev et al., (2010) to examine cash flow sensitivity. This model considers financing and investment decisions jointly subject to the constraint of "sources equal uses" of cash, thus acknowledging the interdependent and intertemporal nature of financial decisions and overcoming the

²According to the World Bank Report (2000), in the late 1990s less than one percent of bank loans were allocated to non-state-owned enterprises.

inconsistencies in traditional models. Compared with traditional single-equation investment-cash flow sensitivity models, the dynamic multi-equation model bears another favorable enrichment to our results: in the multi-equations, the coefficients of investment and financing on cash flow shocks are all incorporated, thereby it provides direct insight into the differences in financing behaviors between SOEs and non-SOEs.

China provides an ideal backdrop for the investigation of ownership discrimination. As a representative transition economy, China is characterized by the conflicts between a swiftly booming economy, immature privatization reforms, and an inefficient financial system, thus proffering a unique backdrop to test the existence and influence of ownership discrimination (Liao, et. al, 2014). On the one hand, banks are the primary source of external funding in China, and part of the larger institutional landscape (Cull and Xu, 2000; Riedel et al., 2007). The banking sector is represented by four major state-owned commercial banks² that dominate social credit allocation (Boyreau-Debray and Wei, 2005). Although market-oriented reforms of China's banking sector have been promoted for almost 30 years, property relations are still not thoroughly straightened out. The four major banks continue to possess overwhelming superiority the financial system and are primarily oriented toward supporting large SOEs (Boyreau-Debray and Wei, 2005). On the other hand, the ownership background of enterprises in China is clearly designated and has a profound influence on their operation, governance and development. Through the systematic privatization schemes operated by the government, non-SOEs have gradually grown to be a crucial force for the promotion of

² These four state-owned banks are Bank of China, Industry and Commercial Bank of China, Construction Bank of China, Agriculture Bank of China.

national economic development in China (Brandt et al., 2008). Even during the financial crisis, private enterprises continued to show vigorous vitality with remarkably dynamic, competitive and innovative power (China Statistical Yearbook, 2009). In contrast, SOEs have suffered from poor performance, ineffective corporate governance and the privileged allocation of domestic credit. Therefore, ownership discrimination and the financial imperfections of China have been proposed and widely discussed in extant literatures. Allen et al. (2005) point out that China scores poorly in terms of creditor rights, investor protection, accounting standards, and anti-corruption measures compared with other countries. When banking reform is not thoroughly promoted, political relations become a “stepping stone”, allowing many SOEs to obtain bank credit funds, thereby jeopardizing the efficiency of capital allocation (Brandt and Li, 2003; Allen et al., 2005). At this current stage of development, a high percentage of political lending is still a salient characteristic of the financial system in China (Cull and Xu, 2000). Many entrepreneurs of non-SOEs have complained of their inferior status when “knocking on bank’s doors.”³ If the misallocation of capital from more productive sectors (non-SOEs) toward less productive ones (SOEs) is a genuine problem, this will substantially decrease economic efficiency and slow the rate of economic growth. Therefore, assessing the financing environment for firms with different ownerships, and clarifying the existence and impact of ownership discrimination have important practical significance when promoting the development of China's capital market and deepening financial reform.

³ During an interview, the famous private entrepreneur Chuanzhi Liu, appealed to the government saying that “For private firms, the biggest reform bonus is that the government can create a very transparent, fair and equitable competitive environment on the capital market.”

We employ the dataset of non-financial A shares listed firms in China. The period we cover is 2003-2013, during which time China underwent the landmark Split-share Structure reform. By introducing an interaction term of cash flow with ownership dummy variable, we examine the difference in investment-cash flow sensitivity of SOEs and non-SOEs. Evidence indicates that there is a significantly lower investment-cash flow sensitivity for SOEs compared with non-SOEs, suggesting the existence of ownership discrimination. Moreover, the incremental short-term and long-term bank loans are both higher for SOEs when cash flow plummets, which further supports the favorable accessibility to external financing of SOEs.

Provided that the financial discrimination towards non-SOEs is rooted in the political and institutional landscape of ownership structure and control rights of firms, we reasonable expect its existence to closely intertwine with reform of privatization and capital market mechanism. Therefore, we further take a close look at a potentially more interesting and yet not explored question: Does marketization reform successfully improve credit allocation efficiency and muffle the financing discrimination for firms with different ownership structures? The most influential privatization reform in China, *the split-share structure reform*, provides a very unique backdrop for the investigation of the effects of institutional reform on the ownership discrimination. The landmark reform commenced in 2005 with the intention of dismantling the dual share structure and opening up a competitive full share circulation environment in the secondary market. The reform is considered as mostly finished in 2007 with over 97% of the Chinese A-share market capitalization having undergone the reform (Li, et. al, 2011). There has been a large bunch of literature documenting the prominent

improvement in corporate behaviors, including the governance control, risk management systems and operating efficiency of listed SOEs after the reform (Liao, et. al, 2014; Li, et. al, 2011; Firth, et. al, 2010; Liu, et. al, 2011). The state-owned shares as well as other types of non-tradable shares are converted into tradable shares. In that case, the motivation of corporate governance and risk management by tradable shareholders are intensified, incentivizing effective internal and external monitoring of SOEs. Investments and debt holding are more carefully managed based on cash flow fluctuations, reducing their relentless bank lending. Meanwhile, the invisible protection from bankruptcy and corporate takeover of SOEs are to some extent eliminated⁴, weakening their advantages in external financing from banks, bond market and other firms in the supply chain. We find in this paper that the reform reduces the differences in investment-cash flow sensitivity between SOEs and non-SOEs and the main change of financing behaviors lies in the short-term bank loans: the difference between the two types of firms in terms of short-term loans significantly reduces after the reform. improvement in the ownership discrimination in Chinese market. These findings confirm the influences of the Split-share Structure Reform on corporate investment and debt management as well as the improvements of market efficiency in the market-financing environment, which tremendously favored the rapidly booming of non-SOEs.

Our analysis provides several contributions to the existing literature on ownership discrimination and has implications for understanding the vital importance of economic restructuring in a transition economy. Evidence for the existence of ownership discrimination

⁴ Liao, et. al, (2014) argue that the absolute dominance of SOE non-tradable shareholders is wiped out and external monitoring through corporate takeovers are virtually in effects after the reform.

has been well documented by previous studies. Research shows that the majority of the investment and working capital of non-SOEs is financed through retained earnings, informal networks, and inter-firm credit (Lardy, 1998; Song et al., 2011). Cultural and historical factors can offer some reasonable explanations (Arrow, 1998; Yinger, 1986). Shleifer and Vishny (2002) attribute the differences to relationship between the government and enterprises, as well as the political nature of business' backgrounds in transition economies. As to the evidence of ownership discrimination, SOEs finance more than 30 percent of their investments through bank loans; while for non-SOEs, the percentage is less than 10 percent (Song et al., 2011). Dollar and Wei (2007) find that SOEs are much more likely to rely on domestic banks when seeking financial support for investment than non-SOEs and foreign firms. In addition, Song et al. (2011) mentioned that the capital-output and capital-labor ratio are much lower in non-SOEs, indicating that SOEs are more capital intensive. They regard this gap between two types of enterprise as a sign that non-SOEs are financially repressed. Compared with the existing literature, the paper examines the issue from a different angle: investment-cash flow sensitivity, thus providing a relatively reliable and direct proxy for the discrimination to distinguish the "status quo" debt ratios and "ownership discrimination". Secondly, by employing the multi-equation model devised by Gatchev et al. (2010), we separate "pure" investment-cash flow sensitivity from the interdependent and intertemporal nature of the financial decisions. The notable difference in the sensitivity of both types of enterprises confirms the existence of ownership discrimination. Thirdly, we identify the effects of a Split-share Structure Reform, which eliminates discrimination for non-SOEs and promotes the market maturation process. These findings have useful implications for China's

future reforms and for the construction of a well-functioning financial system.

The remainder of the paper is organized as follows: Section 2 describes the empirical approaches, the data set and descriptive analysis; Section 3 discusses the empirical results; Section 4 provides robustness checks; and finally Section 5 provides the conclusions.

2. Methodology and Data

2.1 Empirical Methodology

As discussed in the introduction, we investigate the existence of ownership discrimination by examining the investment-cash flow sensitivity of the firms. The extensive research on investment-cash flow sensitivity stems from the doubt regarding the applicability of MM Theory (Modigliani and Miller, 1958) which highlights the determination of firms' financial choices only on their investment opportunities and the frictionless external financing in an ideal world without taxes, asymmetric information, transaction costs and risks, etc. However, these factors combine to place firms under financial constraints to varying degrees. Therefore external capital does not serve as a perfect alternative of internal financing, giving rise to the fluctuation of investment when firms have limited access to external financing market. This is reflected as significant investment-cash flow sensitivity (Fazzari et al., FHP, 1988; Lamont, 1997). Traditional literature examines this issue by estimating the following model (FHP, 1988):

$$\frac{CAPX_t}{K_t} = \beta_1 \frac{CF_t}{K_t} + \beta_2 Control_t + e_t \quad (1)$$

Where $CAPX_t/K_t$ is the percentage of capital expenditure on fixed assets, CF_t/K_t is the

percentage of cash flow in the fixed assets, $Control_t$ includes other control variables of a firm's characteristics and e_t is the error term. Generally speaking, a firm is regarded as exhibiting cash flow sensitivity if there is a significantly positive relationship between capital expenditure and cash flow.

However, Gatchev et al., (2010) argue that results from a traditional single-equation framework may be difficult to interpret from an economic perspective mainly for two reasons. First, traditional regression models are unable to capture simultaneous and potentially offsetting effects between policy decisions, i.e. the interdependence problem. Second, most financial policies cannot be completed within a single year, giving rise to interdependence in financial decision making. Without accounting for these two potential effects, a traditional framework may suffer from omitted variables bias. Following this line of thought, Gatchev et al. (2010) developed a model reflecting the interdependent nature of financial policies subject to the constraint that sources of cash equal uses of cash. In this paper, we estimate the investment-of ownership discrimination in the Chinese capital market using the dynamic model of Gatchev et al. (2010). Therefore, the key advantage of the empirical model is that it provides a complete structure to identify firms' financial behavior when encountering cash flow shocks, which facilitates our analysis of the financing status and access to credit for firms of different ownership types.

We argue in the previous section that bank loans, including short-term and long-term loans, are the primary origins of ownership discrimination in financing, if it really exists. The reason is two-folds: on the one hand, we note that in China firms to a great extent rely on banks loans while corporate debts and other forms of external financing take up a much

smaller percentage; On the other hand, the state-owned background of the four dominated banks in China further intensify the probability that they bias towards state-owned banks. In order to examine the differences in their access to bank loans between SOEs and non-SOEs, we split the short-term liability into two parts: short-term bank loans ($SLOAN_t$, including short loans and loans maturing in less than one year) and other short-term liabilities ($OTHERSD_t$). Similarly, the long-term liability is split into long-term bank loans ($LLOAN_t$) and other long-term liabilities ($OTHERLD_t$). The ex post constraint that sources of funds must equal uses of funds can be expressed as⁵:

$$\begin{aligned} \Delta CASH_t + DIV_t + CAPX_t + ACQUI_t - \Delta SLOAN_t - \Delta LLOAN_t - \Delta OTHERSD_t \\ - \Delta OTHERLD_t - STKISSUE_t - ASSETSALES_t \equiv CF_t \end{aligned} \quad (2)$$

Firms are targeted as achieving desired levels of variables subject to available investment opportunities. By using the perfect foresight model to minimize the penalty for deviating from desired levels and costs associated with adjustments, we can obtain the following system of ten equations:

$$\begin{bmatrix} -CAPX_t \\ -ACQUI_t \\ ASSETSALES_t \\ STKISSUE_t \\ -DIV_t \\ \Delta SLOAN_t \\ \Delta LLOAN_t \\ \Delta OTHERSD_t \\ \Delta OTHERLD_t \\ -\Delta CASH_t \end{bmatrix}_{Ex\ post} = S[\tilde{CF}] + J \begin{bmatrix} -CAPX_{t-1} \\ -ACQUI_{t-1} \\ ASSETSALES_{t-1} \\ STKISSUE_{t-1} \\ -DIV_{t-1} \\ \Delta SLOAN_{t-1} \\ \Delta LLOAN_{t-1} \\ \Delta OTHERSD_{t-1} \\ \Delta OTHERLD_{t-1} \\ -\Delta CASH_{t-1} \end{bmatrix} + K \begin{bmatrix} MB_t \\ SIZE_t \\ ROE_t \\ DUMINDU \end{bmatrix} + \begin{bmatrix} -e_{CAPX,t} \\ -e_{ACQUI,t} \\ e_{ASSETSALES,t} \\ e_{STKISSUE,t} \\ -e_{DIV,t} \\ e_{\Delta SLOAN,t} \\ e_{\Delta LLOAN,t} \\ e_{\Delta OTHERSD,t} \\ e_{\Delta OTHERLD,t} \\ e_{\Delta CASH,t} \end{bmatrix}$$

⁵ Firms are not permitted to repurchase stocks in China, thus we omit the variable RP in the original model of Gatchev et al. (2010)

s.t.

$$\begin{aligned}i' S &= -1, \\i' J &= 0, \\i' K &= 0\end{aligned}\tag{3}$$

Where S, J and K are matrices of response coefficients. The matching of cash inflow and out flow is reflected by these three constraints. We control firm-level characteristics to exclude other factors that may affect financing and investment decisions. Table 1 provides a definition of the variables.

[Insert Table 1 Here]

The multi-equation model acknowledges the interdependent and intertemporal nature of financial decisions. We are basically interested in the investment-cash flow sensitivity, i.e. the coefficient of *CAPX* on *CF* in the first equation, and the financing behavior (financing-cash flow sensitivity) at the same time, i.e. the coefficients of $\Delta SLOAN$ and $\Delta SLOAN$ on *CF* in the sixth and seventh equations, which is expected to be negative since firms raise money in negative cash flow shocks.

We use an interaction term of *CF* and the ownership dummy, *SOE*, to examine the difference between SOEs and non-SOEs in the investment-cash flow sensitivity and financing-cash flow sensitivity. A significantly negative coefficient of the interaction term indicates a lower investment-cash flow sensitivity of non-SOEs compared with SOEs. As regards the financing behavior, we expect a significantly negative coefficient of the interaction term informing a higher incremental short-term and long-term bank loans of SOEs than non-SOEs when confronted with cash flow shocks. If we detect these results, we can

regard them as the evidence that SOEs have a more favorable status in the financial market to facilitate offsetting the shocks of cash flow fluctuation and maintaining the investment scales and opportunities; thereby confirming the existence of ownership discrimination.

To properly assess the benefits of the reform on the ownership discrimination, we test the multi-equation model by Gatchev et al. (2010) and employ the Diff-in-diff methodologies by introducing a dummy variable, *REF*, to indicate the pre-or-post periods of the observations. If the firm hasn't undergone the reform, the dummy variable equals one and zero otherwise. We further interact the term *CF*SOE* with *REF* to form a triple interaction term to detect the influence the reform on ownership discrimination. If the reform actually reduces the discrimination towards non-SOEs, we should detect a significantly positive coefficient of *CAPX* on *CF*SOE*RF*, offsetting the negatively significant coefficient on *CF*SOE*. In the meantime, the coefficients of $\Delta SLOAN$ and $\Delta SLOAN$ on *CF*SOE*RF* are both supposed to be positive, different sign with *CF*SOE*, indicating a reduction in SOEs' advantage of bank loans.⁶

2.2 Data and descriptive analysis

The annual financial data and firms' actual controller data of Chinese listed firms on Shanghai and Shenzhen stock markets are derived from the CSMAR database. The data of Split-share Structure reform comes from the "Split-share Structure Reform Dataset" of RESSET database. Both database are considered as the leading and most commonly used financial data and software provider in mainland China. The panel data set spans from 2002 to

⁶ In the regressions with interaction terms, all the variables in the interaction term are controlled in the regression. In addition, interactions of variables in the triple-interaction term are all included, i.e., *CF*, *SOE*, *REF*, *CF*SOE*, *CF*REF*, *SOE*REF* are all controlled.

2013 because the Chinese listed firms were not required to disclose actual controllers' information in their Annual Report until 2001 and the data available is relatively complete after 2002 for most listed firms. For a firm to be included in our sample, the firms must be normally operated without PT or ST issues and available information about the specific finishing time of the Reform. The data with missing values for the dependent and independent variables in our model specifications are deleted from the sample. In addition, the A shares for financial firms are excluded from our sample since their capital structure, financing and investment behaviors are typically quite different from non-financial firms. Since the change in cash flow and debt ratios and other variables covers the data from two periods and the lagged value of the variables are involved in the regressions, the effective data set used in the multi-equation analysis spans from 2004 to 2013. After deleting the outliers⁷, in total 14,696 valid observations are obtained.

To evaluate the ownership of the listed firms, we examine the “type of actual controllers” from the “Shareholder structure dataset” from the CSMAR database. Firms with state-owned shares as controllers or directly owned by central and local government institutions are regarded as State-owned Enterprises (SOEs) and other firms controlled by private shareholders, foreign entities, etc. as non-State-owned Enterprises (non-SOEs). We define a dummy variable *SOE* to indicate the ownership of the firm, which equals 1 when the firm is SOE in the specific year and 0 otherwise.

[Insert Table 2 Here]

⁷ To remove any possible outlier effects, we cannot winsorize the continuous variables in the regression because of the model requires the matching of cash inflow and outflow. Therefore, we directly delete the outliers of the continuous variables at the 0.5st and 99.5th percentiles.

Table 2 provides a descriptive analysis of the dependent and independent variables. We scale the variables by total assets for normalization. The full sample consists of 2,403 firms, including 777 SOEs and 1,305 non-SOEs for the entire sample period and 321 firms that switch ownership in certain years during the period. Among these firms, 245 firms only experience one change in their ownership, and the other 76 firms change more than once. More interestingly, 43 out of the 321 firms underwent a change from SOEs to non-SOEs in the year of Split-share Structure Reform.

As is shown in Table 2, the percentage of capital expenditure in terms of total assets varies significantly between different firms ranging from 0 to 50.574% with an average of 3.479%. The average cash flow divided by total assets is positive with a mean of 2.241%. The market book ratio averages 1.802, with a minimum of 0.389 and a maximum of 10.265. Basically speaking, our summary statistics are similar to those presented in prior research.

As we discussed in the previous section, we mainly focus on the difference in financial accessibility and financing behaviors of the two types of firms, SOEs and non-SOEs. Panel B of Table 2 reports the summary statistics of the two sub-samples. By conducting descriptive analysis separately and mean comparison tests of the capital expenditure and cash flow etc., we briefly gauge the different characteristics and financing behaviors across firms of different ownership. The numbers reported in the brackets in the last columns are the paired t-test and results for the differences between two types of firms. The percentage of capital expenditure in total assets for non-SOEs is significantly larger than that of the SOEs, suggesting a more proactively managed investment programs of non-SOEs and higher aspiration to expend capital spending, which is usually expected to be favorably received by the market if the firms

are under good conditions (McConnell and Muscarella, 1985; Chung et al., 1998). However, the cash flows of non-SOEs are lower than SOEs by 0.766% in total assets, which is significant at 1% level. And the fluctuation of the non-SOE cash flows are higher than that of the SOEs. As for the size of incremental short-term and long-term financing, non-SOEs exhibit a mean of 0.564% for long-term bank loans and 0.667% for short-term bank loans respectively which are both lower than SOEs, and is significant at 1% for the long-term loans. However, for other forms of capital market financing channels, including tradable financial debts, corporate loans etc., the difference between SOEs and non-SOEs are not prominent. In contrary to the debt financing behaviors, the asset sales of non-SOEs are significantly higher than SOEs. We justify this evidence as the manifestation of inferior financing conditions for non-SOEs, thereby having to sale assets to pull through cash flow exhaustion. The difference in the leverage of these two types of firms shown in the table is in line with the empirical results from the existing literature regarding Chinese enterprises. From the perspective of the firm size, SOEs is significantly larger than non-SOEs but the cash dividends are not significantly higher than that of the latter. Moreover, the non-SOEs exhibit a significantly higher market-book ratio (*MB*), implying more prosperous and favorable growing opportunities of these firms. Overall, we can tentatively infer from the results that during the time periods from 2003 to 2013, SOEs generally underperform non-SOEs while have more privileged access to financial market, especially in terms of bank loans. However the evidence from summary statistics may not be treated as conclusive since the static debt ratios cannot be simply regarded as the effects of discrimination, as elaborated in the previous sections. Concrete evidence will further be provided in the empirical part of the next section. Given the

fact that SOE productivities, efficiencies and employment increased substantially in the Split-share Structure Reform (Cull and Xu, 2003; Liao, et. al, 2014), the gap between the two groups of firms in their financing behaviors will further be examined by incorporating the reform time nodes in the next section.

3. Empirical results

3.1 Do non-State-owned Enterprises suffer from ownership discrimination?

Our focus of analysis is the comparison of investment-cash flow sensitivity of SOEs and non-SOEs and the evolution of the differences in post-and-after reform era. Before incorporating the ownership indicator, we firstly carry out the multi-equation model for the full sample as a pilot investigation into the investment-cash flow sensitivity for all the Chinese listed firms.

Table 3 reports the results of the multi-equation regression of Gatchev et al. (2010) for the full sample. We mainly examine the coefficients of capital expenditure (*CAPX*), the bank loans (*SLOAN* and *LLOAN*) and other sources of financing on cash flow shocks as well as firm characteristics, i.e. firm size and market-to-book ratio. Therefore, for brevity only these core results of interest are presented⁸. Each equation has the same structure with eleven explanatory variables: cash flow, market-to-book, size, and eight lagged dependent variables. Each row of Table 3 reports the coefficients and t-values for the regressions of each explained variable pertaining to cash flow, firm size and market book ratio. The model is estimated under the constraints in equation (3) that the sum of the cash flow coefficients equals one and

⁸ The full results of the multi-equation regression are available from the authors on request.

the sum of all other coefficients equals zero across all equations.

As documented by existent literature, there is a significantly positive investment-cash flow sensitivity on the whole. The sensitivity is 0.051, indicating that when the firm experience 1% positive (negative) cash flow shocks in total assets, the capital expenditure increases (decreases) by 0.051%. Moreover, the coefficients of incremental short-term loans and long-term loans are -0.319 and -0.109 separately, both significant at 1% level, suggesting an increase in bank-lending when firms run into negative cash flow shocks. The same is true of other financing channels. Finally, the coefficients of dividends relative to firm size are significantly positive for both types of firms, which is in line with the intuition that larger firms tend to release more dividends to shareholders.

[Insert Table 3 Here]

As discussed in the previous sections, in the event of cash flow shocks, both types of firms have two choices: adjusting investment behaviors by abandoning current investments or adjusting financing decisions by resorting to banks for loan expansions. Most firms prefer the second channel as to the protection of investment programs and the relief of negative impacts on the growing opportunities and bank loans are generally deemed as the most reliable and favorable sources of financing for Chinese listed firms. Therefore we can reasonably expect a lower investment-cash flow sensitivity when subject to cash flow shocks for the type of firms with preferable financial accessibility. We introduce an interaction term of ownership dummy (*SOE*) with cash flow (*CF*) and carry out the multi-equation model of Gatchev et al. (2010). We conjecture that SOEs have significantly lower investment-cash flow sensitivity compared

with non-SOEs, thus the coefficient of the interaction term in the first equation of the model should be negative. Results are reported in Table 4.

[Insert Table 4 Here]

Table 4 is reported exactly in the same format as Table 3 except for the new column of interaction part. We show in Table 4 that the coefficient of capital expenditure on cash flow is -0.011, significantly negative at 5% level. Since we control for firm size, growth opportunities and use multi-equation model with constraints to deal with other financial and investment factors that may confound the correlation between investment and cash flow, the significant impacts of ownership on the sensitivity cannot be explained by the firms' fundamentals. Therefore, we can draw the tentative conclusion that SOEs are more privileged in their access to credit in the capital market.

More interestingly, the multi-equation model not only provides evidence of the extent to which firms adjust investment as cash flow fluctuates (the first channel), but also facilitates understanding of the financing behaviors (the second channel). By examining the coefficients of short-term and long-term bank lending ($\Delta SLOAN$ and $\Delta LLOAN$ separately) on cash flow, we are able to capture the means through which the firms finance for the mitigation of cash flow shocks. Basically speaking, both types of firms tend to increase financing when it runs into negative cash flow shocks and redeem debts when cash flow increases, thus the cash flow should have a negative influence on incremental short-and-long term loans, which is also reflected in Table 3. However, there are significantly negative coefficients of short-term and long-term bank lending on the interaction term, which are -0.148 and -0.033 separately,

indicating that SOEs are prone to raise more debts in the occasions of cash flow fluctuations. In comparison, non-SOEs are less likely to smoothly seek bank loans and faced with greater friction, thereby making it difficult to maintain current investment levels through the second channel: adjusting for financing strategies in response to cash flow fluctuations. They have no option but to revisit the first option; i.e., change the investment scales or abandon investment opportunities, resulting in higher investment-cash flow sensitivity. We interpret these results as a further evidence of ownership discrimination: the higher availability and flexibility of SOEs in raising debt ratios help smoothen the effects on investments, i.e., higher financing-cash flow sensitivity serves to offset their investment-cash flow sensitivity. In the meantime, the coefficient of incremental cash holding on the interaction term is significantly negative, suggesting that the SOEs are less proactive in their cash holding management in cases of cash flow fluctuations probably as a result of more friendly and convenient external financing environment.

The SOEs' better accessibility of external financing may well be attributed to the advantaged political networks. Welfare-oriented state-led lending of banks and other forms of potential government involvement enable SOEs to more easily obtain access to credit from banks (especially state-owned banks) (see also Behr etc., 2013), issue bonds and shares to cater for their current investment. Ownership discrimination hinders the external financing of non-SOEs, exacerbates the investment environment in emerging private firms and inhibits innovation, capital accumulation, and consequently the growth rate of the Chinese economy.

3.2 Does split-share structure reform relieve ownership discrimination?

As is illustrated in the introduction part, although the evidence in the previous section strongly favors the existence of ownership discrimination, it is unwise to overlook the effect of policy background here, which is presumed to be the underlying driving force for the discrimination. Only by discussing ownership discrimination imbedded in institutional change can we uncover the influence exerted by financing background on a firms' financing and investment behaviors, as well as the role played by policies in enhancing market efficiency and fairness in firms' external financing.

Consistent with this line of thought, it is natural and necessary to examine whether the ownership discrimination is effectively relieved or eliminated by the privatization and marketization reforms. In this regard, we examine the most important reform in the Chinese capital market, the Split-share Structure Reform. Note that throughout our empirical investigation in this section, the focus is on assessing the effects of the reform (REF) on the significantly difference between SOEs and Non-SOEs in their investment-cash flow sensitivity (the significantly negative $CF*SOE$ in Table 5). As such, we interact the time dummy variable with the $SOE*CF$ term and construct a triple interaction term, $CF*SOE*REF$ to investigate whether the reform changes the ownership effects on the firms. Recall that the coefficient of investment on $SOE*CF$ is negative in Table 5. We can therefore infer that the coefficient of investment on $CF*SOE*REF$ is significantly positive as a result of declined "SOE Privilege" after the reform.

[Insert Table 5 Here]

Table 5 illustrates ample evidence of the contribution of the split-share structure reform in reducing the market resource misallocation and improving financing fairness between the two types of firms. The coefficient of the triple interaction term, $CF*SOE*REF$ can be regarded as depicting the effects of the reform on the “SOE Privilege”. Consistent with our expectation, the coefficient of the interaction term is 0.022, significant at 5% level. These results suggest that despite the fact that state ownership can reduce the investment-cash flow sensitivity of the SOEs (manifested in Table 4 as a negative coefficient on $CF*SOE$), this advantageous status is undermined after the reform. To further confirm this preliminary conclusion, we continue to focus on the seventh and eighth regression equations in the model and account for the coefficients of long-term and short-term debt bank loans on the triple interaction term. From column (1) we can see that the coefficients of $\Delta SLOAN$ on $CF*SOE*REF$ is 0.044, significant at 5% level. The sign is opposite to that of $CF*SOE$, suggesting a decline in the gap between SOEs and non-SOEs in their access to bank loans when cash flow fluctuates. The coefficients of long-term bank loans on $CF*SOE*REF$ is also positive, though not significant. On the whole, we interpret the results as supportive evidence of the Split-share Reform as catalyst in softening ownership discrimination and thus ameliorating the biased external financing environment, especially for short-term bank loans.

Why is the “SOE Privilege” undermined after the reform? The empirical results are intuitive in the context of the marketization process of the Chinese transition economy. We propose in the introduction part that the reasons may lie in both parties: the credit supplier (dominated by major banks in China) and also the credit demander (the firms). The DiD results by introducing the interaction term of the discrimination indicator, $CF * SOE$, with

the dummy variable indicating the specific finishing time of Split-Structure Reform, provide helpful insight into the effects on the firm side. More specifically, the reform promotes the concrete incentive of corporate governance and risk management. Tradable shareholders more actively take part in the firms' operation. The assumption of "SOEs never fail", which used to be taken for granted by banks, is broken. Institutionally speaking, the intervention by the government can be considered as an implicit subsidy and insurance for the SOEs' adoption of social responsibilities (Stiglitz, 1993; Calomiris and Himmelberg, 1993; Faccio et al., 2006). Boyreau-Debray and Wei (2005) attribute the mis-allocation of capital in China's government-dominated financial system to the government's active interference in the functioning of the capital market. In this context, the "SOE tag" tends to fade out after the reform and the "paternalistic love" of four major banks towards SOEs are undermined. Meanwhile, from the perspective of the four major State-owned banks, they underwent a large wave of Share Structure Reform almost at the same period as that of the listed firms. The commercialization of these banks enable them to allocate loans more efficiently, thus improving the financing environment for Non-SOEs. The introduction of strategic investors that are concerned about the long-term operation and capable of implementing effective governance highly improves banks' credit allocation efficiency. The reduced "policy lending" quota enables the banks to allocate debts towards private firms with high growing opportunities. The Split-share Structure Reform in China, despite arousing mixed opinions and evidence with respect to its effect on the development of the Chinese market, proves to reduce ownership discrimination, undermining market frictions and improving pricing abilities of the capital market. These findings also add to the arguments by Liet al. (2011) that

commercialization and marketization process liberate the chase of credit towards ensure higher-returns and lower-risks projects.

4. Robustness tests

4.1 Negative cash flow shocks

To this point, we have investigated the presence of ownership discrimination by examining the differences in investment-cash flow sensitivity for SOEs and non-SOEs. A potential problem, which is also referred to by Gatchev et al. (2010), lies in the implicit assumption that a firm's reaction to cash flow (whether positive or negative) is symmetrical. However, the direction of cash flow shocks may exert different effects on an investment. Our proxy for ownership discrimination is more about firms' accessibility to external funds when confronted with negative cash flow shocks than about retiring capital. Therefore, in this section, a robustness check is performed by restricting the sample to observations of firms undergoing negative cash flow shocks ($CF < 0$). The methodology employed is the same as elaborated in the second section.

Table 6 reports the results of the robustness check. As illustrated in Panel A, results for subsamples of firms segmented based on their ownership presents different investment-cash flow sensitivity. The interaction of ownership dummy and negative cash flow shocks is negatively correlated with investment, significant at 5% level, suggesting a lower sensitivity for SOEs. And the coefficients of $\Delta SLOAN$ and $\Delta LLOAN$ on the interaction term is -0.062 and -0.147 separately, both significant at 1% level. These results are basically consistent with the results in Table 5. The conspicuous difference in the negative cash-flow

sensitivity between two types of firms convincingly confirms the existence of ownership discrimination. As for the Split-share Structure Reform, from Panel B we can see that the coefficient of investment on the triple interaction term is 0.082, significantly positive at 1% level and opposite to the sign of that on $SOE*CF$. The results of negative cash flow shocks subsample further confirm our findings that the reform plays a positive role in eliminating discrimination in the capital market and foster the vigor of booming non-SOEs.

[Insert Table 6 Here]

4.2 Insolvency risks and ownership discrimination

In the previous section, we find significantly different investment-cash flow sensitivity for firms of different ownership and the difference is reduced after the Split-share Structure Reform. We interpret these patterns as the manifestation of ownership discrimination in the capital market and the privatization reform remarkably improves the financing fairness of the capital market. One may concern that the differences and changes in investment-cash flow sensitivity are not actually generated by ownership discrimination: Do banks allocate money to SOEs instead of non-SOEs because they are better-operated and suffer from less risks? Although we find supportive evidence from the financing behaviors exhibited in the multi-equation model, here we further confirm the mechanism based on the Altman insolvency risk predictor (Altman, 1968). Altman proposes the Z-score as the combined output of a credit-strength test to gauge firms' likelihood of bankruptcy. We divide the full sample into two subsamples based on the Z-score annually and conduct the regressions with interaction terms for each group. Table 7 shows the results of two subsamples, Low Z-score

Group and High Z-score Group. Panel A shows that the difference in investment-cash flow sensitivity exists only in the High Z-score Group whereas in the Low Z-score Group, the difference is insignificant. We can therefore infer that banks are unwilling to allocate loans to the risky firms on the edge of bankruptcy, no matter whether they are SOEs or non-SOEs. The discrimination, in definition, is imposed among healthy firms, i.e. SOEs unfairly enjoy priority in their access to external financing than non-SOEs even though they are both normally operated without high insolvency risks. The results shown in Panel A further confirm the existence of ownership discrimination. When it comes to the effects of the reform, we could see from Panel B in Table 7 that the Split-share Structure Reform takes effect only on the High Z-score Group. That's probably because the reform is supposed to motivate banks to competitively allocate credits to SOEs and non-SOEs, thus the benefits of better external financing environment should be applied only for non-SOEs in good conditions. On the whole, the regression results illustrated in Table 7 helps rule out the possibility of insolvency risk-driven differences in investment-cash flow sensitivity between two types of firms and further confirms our conclusions.

[Insert Table 7 Here]

5. Conclusion

In this paper, we re-examines the widely discussed presence and effect of ownership discrimination from a new perspective: investment-cash flow sensitivity and evaluate the effects of the most prominent privatization reform in China, the Split-share Structure Reform, on the discrimination. Despite widely documented, the supporting evidence of the ownership

discrimination by previous studies is not convincing. We argue that the investment-cash flow sensitivity serves as a more reliable evidence of financial accessibility of firms with different ownership structure. We apply the multi-equation model by Gatchev et al. (2010) to the Chinese capital market and explored the difference in cash flow sensitivity between SOEs and Non-SOEs, and obtained some interesting conclusions.

First, we detect significant differences in the investment-cash flow sensitivity for SOEs and non-SOEs, proving the existence of discrimination in financing. The monopoly of resources and stronger political network combines to place SOEs in a dominant position concerning capital market financing. Furthermore, the multi-equation model also provides interesting results pertaining to the different financing behavior in the face of cash flow fluctuations. The evidence further verify our conclusions.

Second, the Split-share Structure Reform is proved to bridge the gap between SOEs and non-SOEs in accessibility to the financial market. Before the reform, SOEs enjoy prioritization of access to bank loans to offset cash flow shocks, while the preeminence in external financing is significantly reduced following the reform. The evidence suggests that the reform plays a positive role in eliminating the ownership discriminating in the capital market and pushes Chinese capital market into a new period of “fast track” development.

Clarifying the existence of ownership discrimination, as well as its impact on corporate investment and financing decisions is of practical importance in deepening financial system reform in China. Enterprises of different ownership faced a “discriminatory” fate with respect to the financing channels and prioritization of access to credit. Ownership discrimination

impedes the development of the capital market, leading to the inefficiency of allocation of credit. Our work provides concrete evidence of the positive role played by the reform in improving the financing environment for the burgeoning non-SOEs. Our investigation into the existence of ownership discrimination in the pre-and-post-reform periods will not only enrich our understanding of the influence exerted by policy changes on the financing environment, but will also contribute to evaluation of the widely debated impact of the reform on market efficiencies. In this respect, the evidence in the paper should be of great relevance to researchers and policymakers interested in the fairness of capital allocation in a typical transition economy.

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Table 1: Definition of the variables

This table provides a brief introduction of the variables in the model and empirical analysis according to equation (3). All the variables are divided by total assets as a means of standardization following the practice of Gatchev et al. (2010).

Variables	Description
CASH	The cash and cash equivalents in the financial statement of cash flows divided by total assets
LLOAN	The long-term bank loans in the Balance Statement divided by total assets
SLOAN	The short-term bank loans in the Balance Statement divided by total assets, including short-term bank loans and the long term loans maturing in less than one year.
OTHERLD	The short-term liabilities in the Balance Statement other than the long-term bank loans divided by total assets
OTHERSD	The long-term liabilities in the Balance Statement other than the short-term bank loans divided by total assets
STKISSUE	Sale of common and preferred stock divided by total assets
DIV	Dividends per share multiplied by the shares divided by total assets
ASSETSALES	The sales of assets divided by total assets
CAPX	(The increase of fixed assets + The increase of construction in process + The increase of intangible assets + The increase of deferred tax assets) divided by the total assets
ACQUI	Acquisitions divided by total assets
SIZE	The log value of total assets
MB	(Market value of equity - Book value of equity + Book value of total assets) divided by book value of total assets
NWC	(Total current assets - Cash and equivalents) - (Total current liabilities - Debt in current liabilities) divided by total assets
CF	(Operating income before depreciation - Net interest expense - Cash taxes - Change in net working capital) divided by total assets
SOE	A dummy variable indicating the ownership of the firm. For state-owned firms: SOE=1 and 0 otherwise
REF	A dummy variable which equals 1 when the firm has already undergone the Split-share Structural Reform and 0 otherwise

Table 2: Descriptive analysis of variables

This table provides a summary statistics of the main variables in the paper, including the capital expenditure, cash flow, channels of external financing, etc. The sample size, mean value, standard deviation and minimum and maximum values are reported. All the values are divided by total assets of the specific firm in the year, which is in line with the definition in Table 1. Panel A reports the summary statistics of the whole sample, including SOEs and Non-SOEs. Panel B divides the sample into two groups based on the ownership. Mean comparison tests are conducted for each variable with the t-values listed in the last column. *** denotes test statistic significance at the 1% level; ** denotes test statistical significance at the 5% level; * denotes test statistical significance at the 10% level (* p<0.10 ** p<0.05 *** p<0.01).

Panel A. Summary Statistics of the full sample

Variable	Obs.	Mean	Std. Dev.	Min	Max
CAPX	14,696	3.479	4.791	0.000	50.574
CF	14,696	2.241	14.239	-122.893	282.778
ACQUI	14,696	0.688	3.210	0.000	100.791
ASSETSALES	14,696	0.766	3.281	0.000	139.883
EQUI	14,696	2.753	12.041	0.000	323.659
DIV	14,696	2.464	2.244	0.000	53.734
ΔSLOAN	14,696	0.662	8.938	-313.162	47.833
ΔLLOAN	14,696	0.752	6.329	-143.648	80.865
ΔOTHERSD	14,696	2.153	9.718	-187.182	70.065
ΔOTHERLD	14,696	0.151	2.358	-84.333	142.119
ΔCASH	14,696	-0.150	11.768	-102.070	271.895
MB	14,696	1.802	1.302	0.389	10.265
SIZE	14,696	0.214	0.011	0.180	0.251
SOE	14,696	0.499	0.500	0.000	1.000
ROE	14,696	6.453	8.216	-15.058	21.285

Panel B. Descriptive analysis of ownership sub-samples and the differences

Variables	Non-SOEs (N=7369)		SOEs (N=7327)		Non-SOEs – SOEs	T-Statistics
	Mean	Std. Dev	Mean	Std. Dev		
CAPX	3.633	4.887	3.326	4.688	0.307***	(3.886)
CF	1.859	16.415	2.625	11.636	-0.766***	(-3.261)
ACQUI	0.858	3.685	0.518	2.636	0.340***	(6.430)
ASSETSALLES	0.829	3.549	0.702	2.987	0.127**	(2.341)
EQUI	3.743	15.371	1.757	7.156	1.986***	(10.033)
DIV	2.460	2.267	2.468	2.220	-0.008	(-0.223)
ΔSLOAN	0.667	8.142	0.657	9.674	0.010	(0.067)
ΔLLOAN	0.564	5.592	0.942	6.987	-0.378***	(-3.621)
ΔOTHERSD	2.168	9.670	2.137	9.767	0.031	(0.192)
ΔOTHERLD	0.136	2.053	0.166	2.630	-0.030	(-0.763)
ΔCASH	-0.755	14.420	0.459	8.241	-1.215***	(-6.264)
MB	1.904	1.412	1.699	1.172	0.205***	(9.558)
SIZE	0.210	0.009	0.217	0.011	-0.007***	(-38.631)
ROE	6.606	7.889	6.299	8.531	0.307**	(2.267)

Table 3: The investment-cash flow sensitivity of all firms

This table provides an overall preview of the investment and financing behaviors of all the firms when they are confronted with cash flow shocks. The multi-equation regression of Gatchev et al. (2010) for the full sample is estimated. For brevity only the results of interest are presented, including the coefficients of all the dependent variables on cash flow (*CF*), market-to-book ratio (*MB*), firm size (*SIZE*) and firm performance (*ROE*) etc. For each row in the table, the coefficients and t-values of the specific dependent variable is reported. As several explained variables in the model have a minus sign, their signs for the coefficients and t-values have been adjusted accordingly in the table to make the results more intuitive. The Adjusted R-squares for the different equations are reported in the last column. Coefficients are reported with t-statistics in parentheses. *** denotes test statistical significance at the 1% level; ** denotes test statistical significance at the 5% level; * denotes test statistical significance at the 10% level (* p<0.10 ** p<0.05 *** p<0.01).

Dependent variables	Independent variables						Adjusted R ²
	CF	MB	SIZE	ROE	INDU	N	
CAPX	0.051*** (21.66)	-0.002*** (-6.53)	-0.029 (-0.91)	0.032*** (7.66)	Control	14,696	0.367
ACQUI	0.040*** (20.21)	0.000 (0.64)	0.054** (1.99)	0.017*** (4.74)	Control	14,696	0.025
ASSETSALES	-0.045*** (-22.22)	0.002*** (9.47)	-0.247*** (-8.82)	0.009** (2.49)	Control	14,696	0.029
EQUI	0.017** (2.53)	-0.004*** (-5.33)	-0.970*** (-10.27)	-0.026** (-2.13)	Control	14,696	0.031
DIV	0.043*** (35.50)	0.000 (-1.34)	0.192*** (11.49)	0.033*** (15.47)	Control	14,696	0.240
ΔSLOAN	-0.319*** (-67.15)	0.001 (1.06)	0.500*** (7.63)	0.075*** (8.88)	Control	14,696	0.078
ΔLLOAN	-0.109*** (-29.52)	0.002*** (5.09)	0.641*** (12.56)	0.029*** (4.46)	Control	14,696	0.046
ΔOTHERSD	-0.004 (-0.88)	-0.001** (-2.22)	0.632*** (10.03)	0.021*** (2.63)	Control	14,696	0.028
ΔOTHERLD	-0.042*** (-29.09)	0.000 (0.20)	-0.001 (-0.07)	-0.012*** (-4.73)	Control	14,696	0.060
ΔCASH	0.365*** (57.03)	0.001* (1.93)	0.337*** (3.81)	0.015 (1.30)	Control	14,696	0.206

Table 4: Ownership discrimination towards Non-State-owned Enterprises

This table exhibits the results of the baseline model in the paper. We introduce an interaction term of ownership dummy (*SOE*) with cash flow (*CF*) and carry out the multi-equation model of Gatchev et al. (2010). For brevity only the results of interest are presented, including the coefficients of all the dependent variables on the interaction term (*CF*SOE*), cash flow (*CF*), ownership dummy (*SOE*) and the control variables of firm characteristics. We mainly focus on the results of the interaction term reported in the second column. For each row in the table, the coefficients and t-values of the specific dependent variable is reported. As several explained variables in the model have a minus sign, their signs for the coefficients and t-values have been adjusted accordingly in the table to make the results more intuitive. The Adjusted R-squares for the different equations are reported in the last column. Coefficients are reported with t-statistics in parentheses. *** denotes test statistical significance at the 1% level; ** denotes test statistical significance at the 5% level; * denotes test statistical significance at the 10% level (* p<0.10 ** p<0.05 *** p<0.01).

Dependent variables	Independent variables							N	Adjusted R ²
	SOE*CF	CF	SOE	MB	SIZE	ROE	INDU		
CAPX	-0.011** (-2.20)	0.056*** (19.49)	-0.002** (-2.35)	-0.002*** (-6.52)	0.006 (0.18)	0.032*** (7.49)	Control	14,696	0.366
ACQUI	-0.025*** (-6.31)	0.051*** (21.08)	-0.003*** (-5.57)	0.000 (0.56)	0.119*** (4.12)	0.017*** (4.72)	Control	14,696	0.024
ASSETSALES	-0.009** (-2.09)	-0.043*** (-17.57)	0.002*** (2.77)	0.002*** (9.35)	-0.269*** (-9.11)	0.010*** (2.83)	Control	14,696	0.028
EQUI	-0.300*** (-21.85)	0.129*** (15.77)	-0.008*** (-3.90)	-0.004*** (-5.71)	-0.716*** (-7.32)	-0.014 (-1.13)	Control	14,696	0.073
DIV	-0.004 (-1.64)	0.046*** (30.95)	-0.002*** (-6.46)	0.000 (-1.38)	0.232*** (13.13)	0.032*** (14.90)	Control	14,696	0.235
ΔSLOAN	-0.148*** (-15.41)	-0.267*** (-46.66)	0.006*** (4.16)	0.000 (0.84)	0.495*** (7.22)	0.087*** (10.32)	Control	14,696	0.095
ΔLLOAN	-0.033*** (-4.32)	-0.098*** (-21.89)	0.004*** (3.30)	0.002*** (5.10)	0.601*** (11.19)	0.033*** (4.99)	Control	14,696	0.048
ΔOTHERSD	0.210*** (22.82)	-0.076*** (-13.98)	-0.004*** (-2.73)	-0.001** (-1.99)	0.594*** (9.07)	0.007 (0.87)	Control	14,696	0.038
ΔOTHERLD	0.002 (0.71)	-0.043*** (-24.82)	0.001*** (3.12)	0.000 (0.45)	-0.023 (-1.11)	-0.012*** (-4.63)	Control	14,696	0.059
ΔCASH	-0.237*** (-18.36)	0.450*** (58.42)	0.008*** (4.37)	0.001* (1.72)	0.324*** (3.52)	0.031*** (2.76)	Control	14,696	0.223

Table 5: Ownership discrimination and Split-Share Structure Reform

This table illustrates the effects of the Split-share Structural Reform on the ownership discrimination by introducing the time dummy variable of the finishing time of the reform (*REF*) with the *SOE*CF* term and construct a triple interaction term, *CF*SOE*REF*. The results of the multi-equation regressions are reported. For each sub-period, we conduct the regressions of the SOEs and non-SOEs separately. For the limited space here only the core results are presented, including the coefficients of all the dependent variables on the interaction terms, *CF*SOE*REF*, *CF*SOE*, *SOE*REF*, *CF*REF* and cash flow (*CF*), ownership dummy (*SOE*) and the reform time dummy (*REF*). For each row in the table, the coefficients and t-values of the specific dependent variable is reported. As several explained variables in the model have a minus sign, their signs for the coefficients and t-values have been adjusted accordingly in the table to make the results more intuitive. The Adjusted R-squares for the different equations are reported in the last column. Coefficients are reported with t-statistics in parentheses. *** denotes test statistical significance at the 1% level; ** denotes test statistical significance at the 5% level; * denotes test statistical significance at the 10% level (* p<0.10 ** p<0.05 *** p<0.01).

Dependent variables	Independent variables								N	Adjusted R ²
	SOE*CF*REF	SOE*CF	SOE*REF	CF*REF	CF	REF	SOE	CONTROL		
CAPX	0.022** (2.24)	-0.013* (-1.89)	0.004*** (2.85)	-0.059*** (-9.29)	0.060*** (17.16)	-0.005*** (-4.80)	-0.003*** (-2.90)	YES	14,696	0.379
ACQUI	-0.001 (-0.09)	-0.020*** (-3.60)	0.003** (2.48)	-0.021*** (-4.26)	0.040*** (14.54)	0.002* (1.90)	-0.004*** (-5.57)	YES	14,696	0.044
ASSETSALES	0.021*** (2.62)	-0.018*** (-3.14)	-0.006*** (-5.18)	0.004 (0.77)	-0.030*** (-10.52)	0.006*** (7.86)	0.004*** (4.26)	YES	14,696	0.052
STKISSUE	0.375*** (13.55)	-0.344*** (-17.90)	0.011*** (2.84)	-0.310*** (-17.53)	0.209*** (21.57)	-0.004 (-1.48)	-0.020*** (-7.15)	YES	14,696	0.100
DIV	-0.012** (-2.43)	0.002 (0.69)	0.001 (1.19)	-0.021*** (-6.83)	0.036*** (21.49)	-0.001*** (-2.78)	-0.002*** (-3.81)	YES	14,696	0.304
ΔSLOAN	0.044** (2.25)	-0.138*** (-10.27)	-0.002 (-0.84)	0.046*** (3.68)	-0.241*** (-35.55)	-0.005*** (-2.60)	0.006*** (2.94)	YES	14,696	0.128

Δ LOAN	0.018 (1.19)	-0.024** (-2.28)	-0.003 (-1.36)	-0.014 (-1.49)	-0.074*** (-14.05)	0.007*** (4.72)	0.003** (2.04)	YES	14,696	0.054
Δ OTHERSD	-0.162*** (-9.05)	0.194*** (15.64)	-0.004 (-1.50)	0.478*** (38.78)	-0.164*** (-26.23)	-0.012*** (-5.43)	0.002 (0.98)	YES	14,696	0.077
Δ OTHERLD	0.001 (0.20)	-0.001 (-0.23)	-0.000 (-0.68)	0.028*** (8.58)	-0.033*** (-19.06)	-0.001* (-1.76)	0.001** (1.97)	YES	14,696	-0.004
Δ CASH	0.287*** (10.54)	-0.299*** (-15.86)	-0.004 (-1.22)	-0.335*** (-19.50)	0.531*** (55.79)	0.021*** (7.74)	0.004 (1.57)	YES	14,696	0.223

Table 6: Robustness tests with subsample of negative cash flow shocks

This table reports the regression results for the robustness tests. The subsample is restricted to negative cash flow shocks. The ownership discrimination and privatization reform effects in Table 4 and Table 5 are re-examined here in Panel A and Panel B separately. For brevity we only list the core results here. Coefficients are reported with t-statistics in parentheses. *** denotes test statistical significance at the 1% level; ** denotes test statistical significance at the 5% level; * denotes test statistical significance at the 10% level (* p<0.10 ** p<0.05 *** p<0.01).

Panel A. Differences of Investment-cash flow sensitivity between SOEs and Non-SOEs

Dependent variables	Independent variables						INDU	N	Adjusted R ²
	SOE*CF	CF	SOE	MB	SIZE	ROE			
CAPX	-0.035** (-2.58)	0.060*** (7.71)	-0.007*** (-4.45)	-0.001* (-1.83)	-0.162* (-1.74)	0.015*** (2.88)	Control	4,115	0.365
ACQUI	-0.013 (-1.48)	0.019*** (3.75)	-0.004*** (-3.79)	0.000 (0.40)	0.120* (1.95)	0.005 (1.37)	Control	4,115	0.040
ASSETSALES	-0.023** (-2.13)	-0.042*** (-6.94)	-0.001 (-0.47)	0.001*** (3.32)	-0.241*** (-3.30)	0.009** (2.31)	Control	4,115	0.076
STKISSUE	0.089** (2.47)	-0.457*** (-22.09)	0.005 (1.21)	-0.002 (-1.37)	-0.291 (-1.17)	0.021 (1.52)	Control	4,115	0.006
DIV	-0.014*** (-2.61)	0.023*** (7.42)	-0.003*** (-5.20)	0.000 (-0.90)	0.272*** (7.26)	0.008*** (3.85)	Control	4,115	0.212
ΔSLOAN	0.006 (1.12)	-0.022*** (-6.96)	0.002*** (3.07)	0.000 (0.09)	-0.032 (-0.84)	0.000 (0.18)	Control	4,115	0.084
ΔLLOAN	-0.062*** (-2.79)	-0.094*** (-7.44)	-0.003 (-1.36)	0.006*** (6.24)	1.401*** (9.22)	0.010 (1.14)	Control	4,115	0.055

Δ OTHERSD	-0.147*** (-6.00)	-0.115*** (-8.17)	-0.006** (-2.36)	0.002* (1.79)	0.655*** (3.88)	0.018* (1.88)	Control	4,115	0.057
Δ OTHERLD	0.175*** (7.38)	-0.032** (-2.39)	0.014*** (5.13)	-0.003*** (-2.97)	0.089 (0.54)	-0.014 (-1.59)	Control	4,115	-0.007
Δ CASH	0.100*** (3.52)	0.135*** (8.28)	0.024*** (7.41)	0.005*** (4.36)	1.352*** (6.89)	0.016 (1.47)	Control	4,115	0.164

Panel B. The effects of Split-share Structural Reform on the ownership discrimination

Dependent variables	Independent variables							CONTROL	N	Adjusted R ²
	SOE*CF*REF	SOE*CF	SOE*REF	CF*REF	CF	REF	SOE			
CAPX	0.082*** (2.86)	-0.055*** (-2.76)	0.014*** (4.39)	-0.092*** (-5.28)	0.081*** (9.02)	-0.015*** (-6.95)	-0.011*** (-4.81)	YES	4,115	0.371
ACQUI	0.009 (0.48)	-0.008 (-0.58)	0.002 (0.94)	-0.042*** (-3.66)	0.025*** (4.29)	-0.003* (-1.81)	-0.004** (-2.52)	YES	4,115	0.044
ASSETSALES	-0.016 (-0.70)	-0.003 (-0.21)	-0.007*** (-2.78)	-0.019 (-1.39)	-0.033*** (-4.70)	0.008*** (4.88)	0.002 (1.02)	YES	4,115	0.093
STKISSUE	-0.184** (-2.41)	0.189*** (3.54)	-0.019** (-2.21)	0.248*** (5.02)	-0.474*** (-19.96)	0.027*** (4.35)	0.007 (1.16)	YES	4,115	0.016
DIV	0.008 (0.67)	-0.014* (-1.79)	0.003*** (2.65)	-0.026*** (-3.68)	0.024*** (6.87)	-0.004*** (-5.12)	-0.004*** (-4.13)	YES	4,115	0.219
ΔSLOAN	0.096* (1.84)	-0.177*** (-4.86)	0.005 (0.88)	-0.045 (-1.40)	-0.092*** (-5.67)	-0.009** (-2.23)	-0.007* (-1.83)	YES	4,115	0.089
ΔLLOAN	0.131*** (2.80)	-0.095*** (-2.91)	-0.001 (-0.16)	-0.095*** (-3.28)	-0.058*** (-4.00)	0.002 (0.57)	-0.003 (-0.72)	YES	4,115	0.065
ΔOTHERSD	-0.081 (-1.62)	0.163*** (4.68)	-0.021*** (-3.69)	0.335*** (10.20)	-0.085*** (-5.46)	0.020*** (4.81)	0.018*** (4.64)	YES	4,115	0.071
ΔOTHERLD	-0.006 (-0.54)	0.002 (0.25)	-0.000 (-0.20)	0.033*** (4.63)	-0.025*** (-7.07)	0.002*** (2.63)	0.001 (0.99)	YES	4,115	0.002
ΔCASH	-0.158*** (-2.63)	0.155*** (3.71)	-0.036*** (-5.52)	0.076** (2.07)	0.101*** (5.44)	0.044*** (9.85)	0.036*** (7.64)	YES	4,115	0.193

Table 7: Insolvency risks and ownership discrimination

This table reports the robustness test of dividing the sample into two subsamples based on the Altman Z-score. Results are reported separately for the High and Low Z-score Groups. For brevity we only list the core results here. Coefficients are reported with t-statistics in parentheses. *** denotes test statistical significance at the 1% level; ** denotes test statistical significance at the 5% level; * denotes test statistical significance at the 10% level (* p<0.10 ** p<0.05 *** p<0.01).

Panel A. Investment-cash flow sensitivity for firms of high and low insolvency risks

Dependent variables	Independent variable					
	High Z-score Group			Low Z-score Group		
	SOE*CF	CONTROL	Adjusted R ²	SOE*CF	CONTROL	Adjusted R ²
CAPX	0.014** (2.39)	Control	0.330	0.005 (0.63)	Control	0.387
ACQUI	0.026*** (4.82)	Control	0.027	0.028*** (4.34)	Control	0.025
ASSETSALES	-0.020*** (-3.39)	Control	0.022	0.008 (1.39)	Control	0.042
STKISSUE	-0.453*** (-24.14)	Control	0.202	0.051*** (2.67)	Control	0.040
DIV	0.001 (0.37)	Control	0.241	0.010*** (3.11)	Control	0.216
ΔSLOAN	-0.130*** (-11.00)	Control	0.109	-0.162*** (-10.15)	Control	0.098
ΔLLOAN	-0.028*** (-3.42)	Control	0.038	-0.030** (-2.24)	Control	0.061
ΔOTHERSD	0.232*** (18.00)	Control	0.010	0.138*** (10.33)	Control	0.092
ΔOTHERLD	0.002 (0.63)	Control	-0.136	0.005 (0.94)	Control	0.132
ΔCASH	0.357*** (20.31)	Control	0.360	-0.052*** (-2.83)	Control	0.116

Panel B. The effects of Split-share Structure Reform for two types of firms

Dependent variables	Independent variable							
	High Z-score Group				Low Z-score Group			
	SOE*CF*REF	SOE*CF	CONTROL	Adjusted R ²	SOE*CF*REF	SOE*CF	CONTROL	Adjusted R ²
CAPX	-0.021* (-1.71)	0.015* (1.79)	Control	0.340	0.005 (0.63)	0.013 (1.11)	Control	0.412
ACQUI	-0.013 (-1.18)	0.029*** (3.71)	Control	0.041	0.028*** (4.34)	0.028*** (3.08)	Control	0.093
ASSETSALES	0.054*** (4.28)	-0.045*** (-5.18)	Control	0.039	0.008 (1.39)	0.013 (1.54)	Control	0.090
STKISSUE	0.610*** (16.34)	-0.587*** (-22.65)	Control	0.304	0.051*** (2.67)	0.082*** (3.00)	Control	0.043
DIV	0.023*** (2.89)	-0.007 (-1.21)	Control	0.269	0.010*** (3.11)	0.012*** (2.64)	Control	0.363
ΔLOAN	-0.005 (-0.27)	-0.011 (-0.89)	Control	0.051	-0.030** (-2.24)	-0.040** (-2.09)	Control	0.074
ΔOTHERSD	-0.277*** (-10.63)	0.279*** (15.45)	Control	0.040	0.138*** (10.33)	0.099*** (5.32)	Control	0.116
ΔOTHERLD	0.012** (1.97)	-0.010** (-2.32)	Control	-0.085	0.005 (0.94)	0.005 (0.61)	Control	0.005
ΔSLOAN	0.060** (2.39)	-0.141*** (-8.13)	Control	0.125	-0.162*** (-10.15)	-0.126*** (-5.57)	Control	0.185
ΔCASH	-0.442*** (-12.22)	0.476*** (18.96)	Control	0.391	-0.052*** (-2.83)	-0.083*** (-3.17)	Control	0.133 0.412