When do controlling shareholders expropriate? Controlling shareholder performance and cash transfer tunneling from listed firms in China

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Abstract

Studies on the expropriation of minority shareholders of publicly listed firms by their controlling shareholders focus on the publicly listed firm and treat the controlling shareholder as a black box, without providing any direct evidence of the incentives of controlling shareholders to expropriate at the micro level. We analyze pairs of Chinese publicly listed firms and their non-listed controlling shareholders or parents, and link the extent of expropriation of the publicly listed firm to the performance of its controlling shareholder. We document that publicly listed firms with underperforming controlling shareholders extend more intra-group loans to their parents. The market gives a lower valuation to the receivables generated by these loans, when the firm's controlling shareholder is underperforming, suggesting a higher probability of default. More generally, we document a positive relationship between the market value of one additional dollar of cash on the listed firm's balance sheet and the performance of its controlling shareholder. These findings help us understand the incentives of controlling shareholders, namely *when* and *why* the controlling shareholders expropriate, and establish the incentives of the controlling shareholder as a major determinant of the expropriation of listed firms in China.

Keywords: International corporate governance; Expropriation; Cash holdings; Intra-group loans; Pyramids; Tunneling

JEL classification: G15; G30; G34

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1. Introduction

There is widespread evidence that, in publicly listed companies with concentrated ownership, controlling shareholders can tunnel wealth away for their private benefit through related party transactions (see, for example, Bertrand, Mehta, and Mullainathan, 2002; Baek, Kang, and Lee, 2006; Cheung, Rau, and Stouraitis, 2006; Berkman, Cole, and Fu, 2009; Jiang, Lee, and Yue, 2010; and Peng, Wei, and Yang, 2011).

There is much less evidence, however, on the questions of *when* and *why* controlling shareholders engage in tunneling activity to expropriate the firms they control? This is an important question. Controlling shareholders can either systematically tunnel wealth away in *all* states of the world (for example, they can expropriate a constant percentage of the value of the firm every period), or only do so in particular states of the world (for example, if they need capital in order to overcome adverse economic shocks). Persuading minority shareholders to invest in these firms will likely require different forms of corporate governance mechanisms in these two cases. For example, Friedman, Johnson, and Mitton (2003) suggest that leverage may act as a mechanism that affects the degree of expropriation during macroeconomic shocks. However, the optimal amount of leverage to reduce expropriation in macroeconomic shocks is likely to be different from the optimal amount in other periods. Hence an analysis of the optimal type of governance mechanism in firms with controlling shareholders requires an analysis of when the incentives of the controlling shareholder affect the likelihood of expropriation. This latter analysis is the objective of this paper.

There is no direct evidence in the literature on the incentives of the controlling shareholders to expropriate at the *micro* level. Bae, Baek, Kang, and Liu (2012) suggest that the incentives of controlling shareholders to tunnel resources out of listed firms are a key channel through which corporate governance affects value, and that at the *macro* level, these incentives increase during economic crises, when the expected return on investment declines. Similar arguments have been advanced by Johnson, Boone, Breach, and Friedman (2000), Friedman, Johnson, and Mitton (2003), and Lemmon and Lins (2003). However, current studies that document the expropriation of minority shareholders of publicly listed firms at the micro level treat the controlling shareholder as a black box.

One of the reasons for the lack of micro level research on when controlling shareholders expropriate is the lack of data. The incentives of the controlling shareholders are difficult to identify and measure when these shareholders are individuals. In China, however, most publicly listed firms are controlled by other firms in pyramidal structures (in 80% of publicly

listed firms, the largest shareholder controls at least 40% of voting rights). Most controlling shareholders are non-listed state-owned enterprises (SOEs) whose operating performance can be measured.

We hypothesize that the managers of *under-performing* controlling parents have *higher* incentives to expropriate and tunnel resources out of the publicly listed subsidiaries they control (whereas the managers of *outperforming* controlling parents have *fewer* incentives to tunnel). This is because, in China, the performance of these non-listed and mostly state-owned controlling firms is extremely important for their managers, as documented by Cao, Lemmon, Pan, Qian, and Tian (2011). While these managers may not obtain direct pecuniary benefits, indirect benefits such as political promotions are linked to the operating performance of the non-listed firms they manage.

Our sample consists of 488 firms listed on the Shanghai and Shenzhen stock exchanges during 1999-2007 and their non-listed controlling shareholders (parents), representing 2,209 paired firm-year observations for listed firms and their parents. Our data allows us to directly link the magnitude of the expropriation of the publicly listed firm at the bottom of the pyramid to the operating performance of its parent higher up in the pyramid. We end our sample period in 2007 in order to avoid any contaminating effects from the global financial crisis. Numerous previous studies have suggested that the incentives of controlling shareholders to expropriate minority shareholders increase during macroeconomic shocks (Johnson, Boone, Breach and Friedman, 2000; Mitton, 2002; Friedman, Johnson, and Mitton, 2003; Lemmon and Lins, 2003; Baek, Kang, and Park, 2004; Bae, Baek, Kang, and Liu, 2012). To distinguish our findings from this literature, we want to ensure that our results are driven by shocks at the *firm* level rather than at the macroeconomic level. Therefore, we choose a period of continuing high growth for the Chinese economy in order to avoid any confounding effects.[1]

In the first part of the paper, we examine direct fund flows of intra-group loans extended from the publicly listed firm to its parent (controlling shareholder). We also examine how the stock market values these intra-group loans that appear on the publicly listed firm's balance sheet. Jiang, Lee, and Yue (2010) show that the performance of Chinese publicly listed firms that make more intra-group loans to their controlling shareholders deteriorates over the following year, which suggests that intra-group loans constitute a direct channel of tunneling.

[1] Although the Chinese economy did not experience a recession during the global crisis that started in 2008, its growth rate declined by 3-4 percentage points over the course of the crisis, to levels not seen before during the decade of the 2000s.

To illustrate our methodology, consider a hypothetical publicly listed firm *Subsidiary Inc.* that is majority-controlled by its non-listed parent and controlling shareholder *Parent Inc*. If *Parent Inc* wants to tunnel assets out of *Subsidiary Inc*, one way to do so is to have the subsidiary extend loans to the parent. We hypothesize that *Parent Inc* has larger incentives to expropriate when its own operating performance is poor. Therefore, we expect that when *Parent Inc* has poor performance it will receive more loans from *Subsidiary Inc*. Furthermore, these loans will be recorded as receivables on *Subsidiary Inc*'s balance sheet. If assets on the balance sheet of *Subsidiary Inc* are likely to be tunneled by its parent, we would expect that the market valuation of these assets is less than their book value on *Subsidiary Inc*'s balance sheet. In other words, the market will value $1 of receivables (owed by *Parent Inc*) on *Subsidiary Inc*'s balance sheet at less than $1 if these receivables are in greater danger of being tunneled away and are not likely to be repaid. Since we hypothesize that *Parent Inc* has larger incentives to tunnel when its own operating performance is poor, we expect the market valuation of $1 of receivables on *Subsidiary Inc*'s balance sheet to decline significantly when *Parent Inc* under-performs. Therefore, we expect a link between the operating performance of *Parent Inc* and the size or the market valuation of receivables (owed by *Parent Inc*) on *Subsidiary Inc*'s balance sheet. We emphasize that our analysis is not about documenting the presence of tunneling per se, a phenomenon that has been extensively documented in the existing literature. Instead, our emphasis is in documenting the *timing* of the tunneling, and in linking tunneling with the incentives of the controlling shareholder.

Our analysis on intra-group loans is sub-divided into two parts. The first part examines direct fund flows (through the intra-group loans) between publicly listed firms and their controlling shareholders, constituting a direct channel for tunneling. Specifically, we examine *when* the cash on the listed firm's balance sheet is diverted to the pockets of the controlling shareholder through intra-group loans from the publicly listed firm to its parent. Keeping the level of cash balances constant, we find that listed firms whose *controlling shareholders* exhibit poor operating performance (measured by the return on assets (ROA) and the cash flow-to-asset ratio), increase intra-group loans to their parents, relative to listed firms whose controlling shareholders exhibit good performance. For example, a publicly listed firm with one dollar of cash on its balance sheet in the current year and parent performance in the *bottom* quartile *increases* intra-group loans to its controlling shareholder by almost 4 cents next year. In contrast, a publicly listed firm whose parent performance is in the top quartile will increase intra-group loans to its controlling shareholder by less than 2 cents next year. Therefore,

publicly listed firms with under-performing parents extend twice as many loans to these parents compared to firms with parents that perform well.

We also examine the market valuation of the receivables generated by these loans. For this, we adapt the model estimated by Faulkender and Wang (2006) (originally to value cash holdings). The model controls for factors that are likely to be correlated with both stock returns and cash holdings, such as dividends, leverage, net financing, profitability, and firm size. We apply the Faulkender and Wang (2006) valuation methodology in order to measure the market value of one additional dollar of intra-group loans on the publicly listed firm's balance sheet. If minority investors believe that intra-group loans to under-performing parents represent tunneling, we would expect the loans to have higher default risk, and be discounted heavily. This is exactly what we find. The marginal value of intra-group loans to the listed firm's minority shareholders increases in the performance of the listed firm's parent. For the average Chinese publicly listed firm in our sample, whose parent has average performance, an additional dollar of intra-group loans extended to the parent is worth only 5 cents to the listed firm's minority shareholders. So, for the average Chinese firm, the market expects that a typical intra-group loan extended to its controlling shareholder will never be recovered. In contrast, for a firm whose parent performs in the top quartile, the market values one additional dollar of intra-group loans significantly higher, at $0.24.

It is possible that there is a correlation between the operating performance of the publicly listed subsidiary, the market valuation of receivables on its balance sheet, and the operating performance (ROA) of its non-listed parent, and it is this correlation that drives our results. Our regressions include a number of controls for the performance of the publicly listed subsidiary. While these controls are highly significant in all specifications, adding parent ROA has incremental explanatory power in the regressions (and improves the R^2), without affecting the magnitude or the significance of the coefficients of the subsidiary's performance proxies. Since our regressions also control for dividend payments, it is not clear why the parent's ROA has incremental explanatory power, unless there are other transfers apart from dividends between subsidiaries and parents, which is what we hypothesize.

Our findings suggest that the subsidiary provides the parent with needed funds in case the parent experiences financial difficulties. This is akin to the co-insurance argument for business groups, that suggests that funds are transferred to group affiliated firms that find themselves in financial difficulties (Khanna and Yafeh, 2005; Fisman and Wang, 2010; Jia, Shi, and Wang, 2013). In our case, the subsidiary is insuring the parent. As long as capital markets are imperfect, we show that there are flows of cash from subsidiaries to poorly

performing parents. We provide even stronger evidence than the previous studies that the operating performance of the controlling shareholder determines transfers from the publicly listed subsidiary to the non-listed parent.

Recent studies have challenged the idea that business groups are vehicles for the expropriation of minority shareholders (Khanna and Yafeh, 2007; Almeida, Park, Subrahmanyam, and Wolfenzon, 2011; or Siegel and Choudhury, 2012). In this light, it is plausible that our results may reflect the working of internal capital markets within business groups (Khanna and Palepu, 2000). We note however that we make no claims on whether group affiliation, on balance, is good or bad for firms. It is possible that there is both tunneling and propping inside business groups. What we try to identify is *when does the tunneling take place*? Overall, our findings provide strong evidence that controlling shareholders engage in tunneling when they are themselves under-performing. Our findings relate the timing of tunneling to the incentives of the controlling shareholder. Moreover, in the traditional view of business groups, the minority shareholders of one firm of the group at the bottom of the pyramid can protect themselves from potential expropriation by purchasing shares in *all* other firms in the group. In Chinese business groups, minority shareholders cannot protect themselves, because the firms at the top of the pyramids are not publicly listed. In that sense, the phenomenon that we study here is more akin to firms that do *not* belong to business groups, where funds may be transferred from the firm to the pockets of the individual controlling shareholder, rather than to the traditional view of business groups. Therefore, our findings do not appear to be unique to the Chinese setting.

Expropriation can occur through many channels, only one of which, albeit a very direct one, is intra-group loans. Many types of potentially harmful related party transactions remain common in the Chinese market. Many of these related party transactions are not disclosed with enough information to allow us to value them with accuracy. Nevertheless, we argue that the valuation of cash, may reflect the market's indirect assessment on these other channels of tunneling. To quote Myers and Rajan (1998), "anonymous, transportable assets, such as cash, bearer bonds, or commodities, are easier to steal than fixed assets". Since cash is the most liquid asset and its use is discretionary, its value is likely to be sensitive to the likelihood of expropriation (Dittmar and Mahrt-Smith, 2007).

Consequently, in the second part of our paper, we assess the robustness of our previous findings by examining the size and market valuation of cash balances on the listed firm's balance sheet. We show that the *level* of cash holdings in publicly listed Chinese firms is positively related to the financial performance of their controlling shareholders, suggesting that

firms hold smaller cash reserves when their controlling shareholders have larger incentives to expropriate. The implied negative correlation between the incentives of the controlling shareholder to tunnel and the level of cash holdings is consistent with the similar correlation documented between cash holdings and the likelihood of political extraction (see for example, Stulz, 2005, or Caprio, Faccio, and McConnell, 2013).

Finally, as we did with intra-group loans, we examine whether the *value* of these cash holdings is affected by the performance of the listed firm's controlling shareholder. Our baseline results for China are in line with those reported for the U.S. by Faulkender and Wang (2006). Importantly, we find that – after controlling for its own firm-specific characteristics – the value of one additional dollar of cash on the publicly listed subsidiary's balance sheet is highly sensitive to the operating performance of *its non-listed controlling shareholder*. For an otherwise average Chinese publicly listed firm, the market value of one additional dollar of cash on its balance sheet increases from $0.47 for a firm whose non-listed *parent* has an ROA in the bottom quartile of parent operating performance to $0.66 for a firm whose *parent* has an ROA in the top quartile. Therefore, the difference in market value of an additional dollar of cash between a firm whose controlling shareholder is under-performing and a firm whose controlling shareholder is out-performing is $0.19, an increase of almost 50%. We obtain similar results when we use the cash-flow to assets ratio as our proxy for parent performance.

These results are robust to controls for the type of controlling shareholder (state-owned and controlled by the central or local government or not state-owned). They are also robust to different measures of stock returns and to an alternative methodology for estimating the value of cash holdings proposed by Pinkowitz, Stulz, and Williamson (2006). Our results are also not driven by a potential correlation between parent corporate governance (or competence) and parent performance because they hold for parent firms that have exhibited large swings in performance without changes in governance during our sample period.

We examine several alternative explanations behind our results that are derived from the literature on business groups. Our results do not appear to be driven by these alternative explanations. It is possible that the operating performance of the controlling shareholder is a proxy for the parent's ability to prop up the publicly listed firm under its control, if the latter experiences financial difficulties. In this alternative explanation, outperforming parents prop up their listed subsidiaries, leading investors to value the cash balances and intra-group loans at greater values than at subsidiaries controlled by poorly performing parents. If our results were indeed driven by this explanation, then we would expect our results to be stronger for smaller publicly listed subsidiaries that are more likely to be financially constrained (Hadlock

and Pierce, 2010), when the subsidiary is small relative to the size of its parent, or when it earns a smaller profit than its parent. Instead, we find the opposite of all these predictions. Our results are driven by publicly listed firms facing *fewer* financing constraints (where more funds can be tunneled away). We also find that the market value of one additional dollar of cash on the firm's balance sheet increases from virtually zero when the listed firm's size is *smaller* than that of its parent to $0.69 when the listed firm's size is 50% larger than its parent. Since parents are likely to find it easier to pledge assets in order to prop up smaller subsidiaries, this result is the opposite of what would be expected if cash valuations were affected by the ability of the parent to prop up its subsidiary.

Furthermore, we find that the market values cash in publicly listed subsidiaries controlled by the *central* government at $0.86 on average, and this figure declines to $0.64 for subsidiaries controlled by a *local* government, and to only $0.26 for *non-government* firms. Previous studies have found that tunneling is more severe among non-state-owned firms, and among state-owned firms, tunneling is more severe in local-government than in central-government controlled firms (see Jiang, Lee, and Yue, 2010 or Cheung, Rau, and Stouraitis, 2010). However, these findings are not predicted by the co-insurance hypothesis (for example, why should co-insurance be less prevalent in local government-controlled firms, and even less prevalent in non-government owned business groups?). On balance, we conclude that our results are more consistent with a tunneling hypothesis, whereby tunneling by the controlling shareholder depends not only on its own performance but also on the capacity of the listed firm to raise additional cash in the future, as proxied by its absolute and relative size.

Ultimately, we note that even if our results on the valuation of intra-group loans and cash balances are subject to alternative interpretations, the fact remains that publicly listed firms extend more (less) intra-group loans to their controlling shareholders when these shareholders are under- (over-) performing. Therefore, controlling shareholders are more likely to tunnel resources out of firms they control when these shareholders are themselves under-performing.

Our paper contributes to two general streams of literature. First, and more importantly, our study contributes to the literature on expropriation of minority shareholders. Numerous studies examine ways in which controlling shareholders tunnel wealth away for their private benefits or prop up their controlled firms (see, for example, Bertrand, Mehta, and Mullainathan, 2002; Baek, Kang, and Lee, 2006; Berkman, Cole, and Fu, 2009). A few studies examine how the financial position of *listed companies* affects the likelihood and extent of expropriation by controlling shareholders (see, for example, Cheung, Rau, and Stouraitis, 2006, 2010; or Peng, Wei, and Yang, 2011). However these studies do not examine the impact of *controlling*

shareholder performance and the incentives of the controlling shareholders to tunnel, with the exception of a few studies that focus on macroeconomic conditions (Bae, Baek, Kang, and Liu, 2012; Johnson, Boone, Breach and Friedman, 2000; Friedman, Johnson, and Mitton, 2003; Lemmon and Lins, 2003). We identify a more direct incentive at the micro level by relating the tunneling from the publicly listed firm to the financial incentives of its controlling shareholder. Our findings show that listed firms make more intra-group loans to their controlling shareholders, and the market perceives these loans as having higher default risk, when this controlling shareholder is under-performing. Therefore, our analysis helps us understand *why* (or *when*) the controlling shareholders expropriate. Therefore, we examine the question of *timing*. Finally, the second part of our paper contributes to a growing body of research on the market valuation of cash holdings, both in the U.S. and worldwide (see, for example, Faulkender and Wang, 2006; Pinkowitz, Stulz, and Williamson, 2006; Dittmar and Mahrt-Smith, 2007; Denis and Sibilkov, 2010). Unlike this literature, however, our aim is not to examine whether corporate governance affects the value of cash holdings. Instead, as above, our analysis focuses on timing, that is, *when* cash holdings are worth more.

Our paper is organized as follows. Section 2 discusses our data. Section 3 reports our empirical analysis of direct cash transfers through intra-group loans. Section 4 examines the robustness of our findings by analyzing cash holdings, which represent an indirect proxy for tunneling. Section 5 reports extensive robustness tests and tests alternative explanations behind our findings. Section 6 concludes.

2. Data

We obtain financial information, governance, and return data for China's listed firms from the China Stock Market and Accounting Research (CSMAR) database. We obtain financial information for controlling shareholders from the National Bureau of Statistics' (NBS) Annual Industrial Survey Database 1999-2007. The latter database provides non-consolidated balance sheet and income statement information for all industrial firms with total annual sales exceeding RMB5 million, so-called large- and medium-sized enterprises. The database is comprehensive, and has been used by Cull, Xu, and Zhu (2009), and Li, Yue, and Zhao (2009), among others. For each publicly listed firm, we match the financial information from CSMAR to that of its controlling shareholder (parent) from NBS. Our matching procedure results in a final sample of 488 firms listed in the Shanghai and Shenzhen stock exchanges during 1999-2007 and their non-listed controlling shareholders (parents), representing 2,209 paired firm-year observations for listed firms and their parents. Our sample appears evenly

spread around our sample period, with each of the 9 years in our sample containing between 8.5% and 12.5% of total sample observations.

We report descriptive statistics for our variables in Table 1. All financial variables are winsorized at the 1% and 99% levels in order to minimize the effect of outliers. The average 12-month excess return based on Carhart's (1997) four-factor model is 21.5%. Based on the averages, publicly listed firms in our sample hold 15.9% of their net assets in cash, and these cash holdings represent 14.1% of the listed firms' market value. The ratio of cash holdings to the listed firm's market value increases by 1% annually during our sample period. Intra-group loans (OREC) represent 4% of the listed firms' market value. About 80% of the publicly listed firms in our sample are SOEs (the firm's ultimate controller is the State-Owned Assets Supervision and Administration Commission SASAC), and the average percentage of shares held by the largest shareholder is 46%. On average, the return on assets of the controlling shareholders is 0.1% (median −0.2%). The mean cash flow of the controlling shareholder is 7.9% of net assets (median 6.7%).[2]

3. Intra-group loans and the performance of the controlling shareholder

If the cash on the listed firm's balance sheet is diverted to the pockets of the controlling shareholder, one common way to do so is through intra-group loans from the publicly listed firm to its parent. Jiang, Lee, and Yue (2010) show that these intra-group loans are recorded in the current assets portion of the listed firm's balance sheet as "other receivables" (*OREC*). These loans are unrelated to ordinary business transactions, and they are mostly made to related parties. Although they are technically a part of current assets, they are persistent, suggesting that they are essentially a permanent feature. Using hand-collected data not available to us, both Jiang, Lee, and Yue (2010) and Fan, Jin and Zheng (2010) trace a large proportion of the amounts recorded as "other receivables" in their sample directly to the controlling shareholders of Chinese listed firms. However, they find very high correlations between OREC and their hand-collected measure (well over 0.7), and their results are not affected when using one or the other. It is likely that the hand-collected measures significantly understate true intra-group loans because of the difficulty of tracing all the relationships between publicly listed firms,

[2] In results that we do not report in the table, we compare our publicly listed sample firms with the universe of Chinese publicly listed firms. Our sample firms are larger, have better operating performance (ROA) and larger capital expenditures, and their controlling shareholders hold a larger percentage of their stock capital compared to the mean and median firm in the Chinese market. They have a smaller share of intra-group loans and earn lower stock returns.

controlling shareholders and their affiliates. Therefore, we focus on the entire amount as recorded on the balance sheet.

The first part of our analysis in this section tests whether parent performance has incremental explanatory power for the amount of direct fund transfers (intra-group loans) extended by publicly listed firms to their parents. The second part of our analysis in this section examines whether minority shareholders anticipate this expropriation by discounting the market value of one additional dollar of intra-group loans on the publicly listed firm's balance sheet when these loans are extended to underperforming parents.

3.1. Parent performance and the level of intra-group loans from the listed firm to the parent

We hypothesize that under-performing parents have more incentives to expropriate cash from the publicly listed firms they control, since the operating performance of the parent firm is likely to have a significant influence on the promotion chances of its managers. Therefore, we begin our analysis by examining whether the performance of the listed firm's parent affects the level of intra-group loans from the listed firm to its parent. Since intra-group loans are direct fund flows and represent the most direct way for controlling shareholders to tunnel cash from the publicly listed company to their pockets, we examine the relationship between the amount of intra-group loans, cash holdings, and the operating performance of the controlling shareholder.

Table 2 reports estimates of two-way clustered regressions of the level of intra-group loans on the operating performance of the controlling shareholder.

$$\frac{\Delta \mathrm{OREC}_{i,t+1}}{\mathrm{M}_{i,t}} = \gamma_0 + \gamma_1 \frac{\Delta \mathrm{C}_{i,t}}{\mathrm{M}_{i,t}} + \gamma_2 \frac{\mathrm{C}_{i,t}}{\mathrm{M}_{i,t}} + \gamma_3 \mathrm{Log}(\mathrm{TA}_{i,t}) + \gamma_4 \mathrm{ROA}_{i,t} + \gamma_5 \text{Marketization Index}_{i,t}$$
$$+ \gamma_6 \text{Ownership by Largest Shareholder}_{i,t} + \gamma_7 \mathrm{PROA}_{i,t} + \gamma_8 \mathrm{PROA}_{i,t} \times \frac{\Delta \mathrm{C}_{i,t}}{\mathrm{M}_{i,t}} + \varepsilon_{i,t}$$

Our dependent variable is $\frac{\Delta \mathrm{OREC}_{i,t+1}}{\mathrm{M}_{i,t}}$, defined as the change in the ratio of other receivables to total assets from year *t* to year *t*+1, scaled by the firm's market capitalization. We regress this variable on listed firm cash balances $\frac{\mathrm{C}_{i,t}}{\mathrm{M}_{i,t}}$ and changes in cash balances $\frac{\Delta \mathrm{C}_{i,t}}{\mathrm{M}_{i,t}}$ (we measure cash holdings as cash plus short-term investments), and parent performance (*parent ROA* or $PROA_{i,t}$, defined as the return on total assets of parent company, net income over total assets; and *parent cash flow* or $PCF_{i,t}$, defined as the ratio of cash flow to net assets of parent company, where cash flow is operating income plus depreciation and amortization minus

interest minus taxes minus dividends). Since these variables are scaled by the same number, their coefficients can be interpreted as the dollar increase in intra-group loans in year *t*+1 that results from a certain level of cash balances and from a $1 increase in these cash balances in year *t*. Following Jiang, Lee, and Yue (2010), we also control for other factors that may affect the level of intra-group loans, namely the listed firm's size, ownership structure, and the marketization index developed by Fan, Wang, and Zhu (2009), which measures the development of the regional market in which the firm is registered. The rationale behind this specification is to test whether larger cash balances (and increases in these cash balances) on the balance sheet of the publicly listed firm in year *t* are associated with higher volume of intra-group loans from the listed firm to its parent in year *t*+1. Such a finding would suggest that cash generated by the listed firm is subsequently transferred from the listed firm to its controlling shareholder. More importantly for our purposes, we want to test whether the performance of the publicly listed firm's *parent* (controlling shareholder) also affects direct fund transfers from the subsidiary to the parent. Therefore, our emphasis is on the coefficient γ_8 of the interaction term between parent performance (*parent ROA* or *cash-flow*) and $\frac{\Delta C_{i,t}}{M_{i,t}}$.

Column 1 reports results of the baseline specification, which excludes parent performance. In row 7, the coefficient of the level of cash holdings is significantly positive, which suggests that publicly listed firms with larger cash balances in year *t* subsequently increase their intra-group loans to their controlling shareholders in year *t*+1, thus transferring part of the cash to their controlling shareholder. In row 6, the coefficient of the change in cash holdings $\frac{\Delta C_{i,t}}{M_{i,t}}$ is also positive, suggesting that publicly listed firms that have experienced increases in their cash balances increase intra-group loans to their parents. Also in line with expectations, in row 9, publicly listed firms with better performance extend more intra-group to their parents. This finding is in line with Cheung, Rau and Stouraitis (2006) or Peng, Wei, and Yang (2011), who show that publicly listed firms with better performance are more likely subject to tunneling. Overall, the results of the baseline specification appear in line with expectations.

Our main interest in this study is on whether the performance of the publicly listed firm's parent has incremental explanatory power for the size of direct fund transfers. We hypothesize that outperforming controlling shareholders have fewer incentives than underperforming shareholders to expropriate cash from the listed firm's balance sheet. Therefore, we hypothesize that the coefficient of the interaction term γ_8 is negative, indicating that the

marginal increase of intra-group loans from the listed firm to its parent is decreasing in the listed firm's parent performance.

In columns 2-3, we measure parent performance by the parent's return on assets (ROA). When we add parent performance in the specifications, the coefficients of the level and change of cash holdings in rows 6-7 retain both their magnitude and their statistical significance. As conjectured however, the coefficient of the interactions between the change in cash holdings and parent performance in row 2 has a negative sign and is statistically significant. This suggests that, for a given level of cash balances, publicly listed firms with increases in cash and whose parents have poor performance increase intra-group loans to their parents more than listed firms whose parents have good performance. For example, based on coefficients in column 3, a publicly listed firm with average cash balances in year *t* (representing 14.1% of market capitalization; see Table 1) whose parent performs on the cut-off for the bottom 25% quartile compared to other parents (*Parent ROA*=−2.1%) *increases* intra-group loans to its controlling shareholder the following year (*t*+1) by almost 4 cents [= (0.024×14.1%) + 0.024 + (−0.017)×(−2.1%) + (−0.428)×(−2.1%)]. In contrast, a publicly listed firm whose parent performance is on the cut-off for the top 25% quartile (*Parent ROA*=+2.3%) increases intra-group loans to its controlling shareholder by less than 2 cents [= (0.024×14.1%) + 0.024 + (−0.017)×2.3% + (−0.428)×2.3%)]. Therefore, publicly listed firms with under-performing parents extend more than twice as many loans to these parents compared to firms with parents that perform well. The results suggest that firms whose controlling shareholders perform poorly may suffer more tunneling because they make more intra-group loans to their parents.

In robustness tests that we do not report in the table for brevity, we include interaction terms between the level of cash balances (rather than changes in cash balances) and parent ROA. As in Table 2, the coefficient of this interaction term is negative, suggesting that publicly listed firms with large cash balances *and* underperforming parents extend more intra-group loans to their parents. Overall, the results in this section confirm that the performance of the controlling shareholder is a major determinant of direct fund transfers from the publicly listed subsidiary to the parent. Publicly listed firms extend more intra-group loans to their controlling shareholders when their controlling shareholders are underperforming.

We note that, in the traditional view of business groups or pyramids, the minority shareholders of one firm of the group at the bottom of the pyramid can protect themselves from potential expropriation by purchasing shares in *all* other firms in the group. For example, Khanna and Palepu (2000) state that "Indian business groups are collections of publicly traded firms in a wide variety of industries, with a significant amount of common ownership and

control, usually by a family" (p. 867). The structure of Korean business groups (chaebols) is similar. Baek, Kang, and Lee (2006) "define a chaebol as a business group that has at least two listed member firms" (p. 2425). In contrast, in Chinese business groups, minority shareholders cannot protect themselves, because the firms at the top of the pyramids (like in our sample) are not publicly listed. In fact, most business groups in China control only a single publicly listed firm. Less than 4% of the publicly listed firms in our sample share common controlling shareholders.[3] The minority shareholders of the publicly listed firm have no way to protect themselves from the potential expropriation except by discounting the value of the asset ex ante, because they cannot purchase shares in non-listed firms of the group. Consequently, any transfer from the listed subsidiary to the non-listed parent without a corresponding quid pro quo constitutes expropriation, irrespective of how the parent intends to use the funds. In that sense, the phenomenon that we study here is more akin to firms that do not belong to business groups, where funds may be transferred from the firm to the pockets of the individual controlling shareholder, rather than to the traditional view of business groups.

3.2. Parent performance and the market valuation of intra-group loans from the listed firm to the parent

In this section, we examine the relationship between intra-group loans and controlling shareholder performance from a different angle. The market may assign a higher market valuation to one dollar of other receivables (intra-group loans) on the balance sheet of a listed firm whose controlling shareholder is *not* likely to expropriate compared to a listed firm whose controlling shareholder is likely to do so. In this section, we examine whether the parent's performance affects the market valuation of one additional dollar of other receivables (intra-group loans) on the publicly listed firm's balance sheet. Because of the higher default risk of these intra-group loans to the controlling shareholder, we expect that investors discount them heavily.

In order to estimate the market valuation of intra-group loans, we adapt the model of Faulkender and Wang (2006), originally developed to estimate the market valuation of cash holdings (the model has also been used in studies by Dittmar and Mahrt-Smith (2007) and Denis and Sibilkov (2010)). Our rationale behind using the cash valuation model for the valuation of other receivables (OREC) is that OREC are current assets. Theoretically, they can

[3] There are 69 firm-year observations in our sample where two publicly listed firms share the same controlling shareholder and 9 firm-year observations where three firms share the same controller (overall, 3.5% of our sample). We have eliminated these observations and re-estimated the regressions, and we obtain qualitatively similar (even more significant) results.

be converted into cash within the current fiscal year, and can be used to finance investment. So, it is plausible that they are valued in the same way as cash. Our main interest is to examine whether the market valuation of *OREC* also depends on the financial performance of the listed firm's controlling shareholder. We test whether a change in intra-group loans from the publicly listed firm to its parent leads to a change in the listed firm's market value. More specifically, we estimate the following model (for comparison purposes, we retain the exact notation of Faulkender and Wang (2006))

$$\begin{aligned} r_{i,t} - R^{B}_{i,t} = {} & \gamma_0 + \gamma_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \gamma_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \gamma_4 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \gamma_5 \frac{C_{i,t-1}}{M_{i,t-1}} + \gamma_6 L_{i,t} \\ & + \gamma_7 \frac{NF_{i,t}}{M_{i,t-1}} + \gamma_8 \frac{C_{i,t-1}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_9 L_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} \\ & + \gamma_{10} \frac{\Delta OREC_{i,t}}{M_{i,t-1}} + \gamma_{11} \frac{OREC_{i,t-1}}{M_{i,t-1}} + \gamma_{12} \frac{OREC_{i,t-1}}{M_{i,t-1}} \times \frac{\Delta OREC_{i,t}}{M_{i,t-1}} \\ & + \gamma_{13} PROA_{i,t} + \gamma_{14} PROA_{i,t} \times \frac{\Delta OREC_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t} \end{aligned}$$

The change in the publicly listed firm's market value is measured by the excess return for firm *i* in fiscal year *t* less the return of its benchmark portfolio ($r_{i,t} - R^{B}_{i,t}$). The benchmark portfolios are constructed following Carhart's (1997) four-factor model. We construct the portfolios and their loadings for the Chinese market using data for the universe of publicly listed firms in China. The model examines returns in excess of the benchmark portfolios to control for risk-related factors that may impact a firm's return and discount rate. To control for idiosyncratic firm characteristics that may affect the cross-sectional variation of firm returns, we control for factors that are likely to be correlated with both stock returns and cash holdings ($C_{i,t}$), such as dividends ($D_{i,t}$), leverage ($L_{i,t}$), net financing ($NF_{i,t}$), earnings before interest and extraordinary items ($E_{i,t}$), and total assets excluding cash ($NA_{i,t}$). All explanatory variables except leverage are scaled by lagged market value of equity ($M_{i,t-1}$). Since stock returns can also be expressed as $\frac{\Delta M_{i,t}}{M_{i,t-1}}$, the estimated coefficients from this regression can be interpreted as the dollar change in the firm's market value that results from a one dollar change in the explanatory variable. Therefore, the estimated coefficient of the term $\frac{\Delta C_{i,t}}{M_{i,t-1}}$ can be interpreted as the dollar change in the listed firm's market value that results from a one dollar increase in the cash balances on the firm's balance sheet. Similarly, the estimated coefficient of the term

$\frac{\Delta OREC_{i,t}}{M_{i,t-1}}$ can be interpreted as the dollar change in the listed firm's market value that results from a one dollar increase in the intra-group loans on the firm's balance sheet.[4]

Coefficients γ_1 to γ_9 are from the original Faulkender and Wang (2006) model. In particular, the coefficients of the interaction terms γ_8 and γ_9 – measuring the impact of the level of existing cash holdings and leverage on the market value of an additional dollar of cash – are the main focus of interest there. In contrast, our main interest is to examine whether – in addition to the variables that have been shown to affect the valuation of one additional dollar of cash in the previous literature – the valuation of other receivables (intra-group loans) also depends on the financial performance of the listed firm's *controlling shareholder*. This would proxy for the direct motivation of the controlling shareholder to expropriate the minority shareholders of the publicly listed firm. Therefore, we expand the model to include proxies for other receivables (coefficients γ_{10} to γ_{12}), as well as parent firm performance (coefficient γ_{13}), and interact the parent performance with annual changes in other receivables (coefficient γ_{14}).[5] To measure the financial performance of the controlling shareholder, we use *parent* ROA and *parent* cash flow as in the previous section. As before, the estimated coefficient of the term $\frac{\Delta OREC_{i,t}}{M_{i,t-1}}$ can be interpreted as the dollar change in the listed firm's market value that results from a one dollar increase in the intra-group loans on the firm's balance sheet. We hypothesize that outperforming controlling shareholders have fewer incentives than underperforming shareholders to expropriate cash from the listed firm's balance sheet. Therefore, we hypothesize that the coefficient of the interaction term γ_{14} is positive, indicating that the marginal value of intra-group loans (*OREC*) to the listed firm's minority shareholders is increasing in the listed firm's parent performance. The sign of coefficient γ_{14} is our main interest here.

The results are reported in Table 3. Although we do discuss coefficient values in order to make the discussion of our results more intuitive, our real emphasis is on differences between samples, without putting much weight on the value of the coefficient itself.

[4] Theoretically, the model is cast in terms of *unexpected* changes in cash. However, Faulkender and Wang (2006), and Dittmar and Mahrt-Smith (2007) who estimate this model, do not find any differences in their results between realized changes and unexpected changes (the latter estimated using a variety of models) in robustness tests. Hence they use realized changes in their models in order to demonstrate their results. We follow them in focusing on realized changes in cash. In addition, we note that the original Faulkender and Wang (2006) model includes additional terms for R&D and interest expenses. Since our sample contains missing values for these two variables for most of the firms, we do not include them.

[5] We do not include the interaction between leverage and change in OREC in the reported results because it is difficult to compute meaningful t-statistics in a two-way clustering procedure. The magnitude of the coefficients is not affected if the interaction is included.

For comparison purposes, column 1 reports the baseline Faulkender and Wang (2006) cash valuation model – without including other receivables or parent performance. The results for cash valuation in China are in line with the results for the U.S. For a firm with zero cash and zero debt in column 1, we find that the value of an additional dollar of cash to the firm is worth \$1.681 (row 11). The equivalent figure for the U.S. from Faulkender and Wang (2006), Table II, Model II is in the same ballpark, \$1.466. These values exceed one because firms with zero cash holdings will need to raise external financing in order to pursue investment opportunities, and so incur direct and indirect transactions costs. Such costs are likely to be higher in China – where banks are state-owned, capital is rationed, and capital markets are less developed – than in the U.S.

However, the average Chinese firm has both some cash holdings and some debt. A firm with existing cash holdings has less need to raise external financing and incur transactions costs, suggesting a negative relationship between the value of an additional dollar of cash and existing cash balances. When a firm with debt increases its cash balances, the probability of default declines and part of the benefits accrue to debtholders, suggesting in addition, a negative relationship between the value of an additional dollar of cash and debt levels. Based on average values from Table 1, for the average Chinese firm in our sample, one additional dollar of cash is worth \$0.65 [= \$1.681 + (−1.161×14.1%) + (−1.930×44.8%)] to its shareholders. The equivalent value in the U.S. is \$0.94 (Faulkender and Wang, 2006), indicating a lower likelihood of expropriation for the average U.S. firm. Overall, the signs and magnitudes of the coefficients in our Chinese sample are qualitatively similar to those estimated in the U.S. by Faulkender and Wang (2006).

Our main interest in the current study is to examine the incentives of the controlling shareholder to expropriate. Therefore, our focus is on the incremental explanatory power of parent performance for the value of other receivables (intra-group loans), and not on the baseline cash valuation model. In columns 2-5, we show that parent performance has significant incremental explanatory power for the value of other receivables (intra-group loans) in China.

In columns 2-5, the coefficients of the interaction terms between parent ROA or cash flow and $\frac{\Delta \mathrm{OREC}_{i,t}}{\mathrm{M}_{i,t-1}}$ are positive (rows 2 and 4), indicating that the marginal value of intra-group loans to the listed firm's minority shareholders is increasing in the performance of the listed firm's parent. The differences are striking. Based on estimates from column 2, for a firm with average levels of intra-group loans on its balance sheet (4% of the firm's market capitalization;

see Table 1) whose parent performs in the top quartile (*parent ROA*=+2.3%), the market values one additional dollar of intra-group loans at \$0.24 [=−0.084 + (3.193×4%) + (8.634×2.3%)]. In contrast, for the average Chinese listed firm in our sample with a parent with average performance (*parent ROA*=0.1%; see Table 1), an additional dollar of intra-group loans is worth only 5 cents [=−0.084 + (3.193×4%) + (8.634×0.1%)] to its shareholders. So, for the average Chinese firm, the market expects that intra-group loans extended to its controlling shareholder represent expropriation and are almost completely non-recoverable.

In column 3, the results are qualitatively similar when we use parent cash flow as our measure of parent performance. Finally, in columns 4-5, our results are robust to controls for the presence of state-owned (SOE) controlling shareholders. In unreported tests, we obtain qualitatively similar results when scaling OREC by total assets.

We note that although the market valuation of one additional dollar of intra-group loans is very sensitive to the incentives of the listed firm's parent (as proxied by the parent's operating performance), even for firms whose parents perform well, three-quarters of the face value of an intra-group loan is not expected to be paid back. Intra-group loans constitute a form of significant expropriation of minority shareholders. These results appear in line with anecdotal evidence about the low recovery rates behind intra-group loans in China. For example, Jiang, Lee and Yue (2010) discuss an example of how the publicly listed firm Feng Hua Co. made a RMB52.2 million intra-group loan to Beijing Hanqi, a non-listed firm sharing the same controlling shareholder, in 2002. Two years later, the entire amount of the loan was written-off, because in the meantime, Beijing Hanqi had gone bankrupt. Our inferences appear consistent with those made by various government agencies in China (China Securities Regulatory Commission, the State Council, and several Ministries), who have placed significant restrictions limiting the use of intra-group loans during 2001-2006 (see Jiang, Lee, and Yue (2010) for details of these regulations).

One concern behind our findings is that in business groups there may be a correlation between the operating performance of the publicly listed subsidiary, the market valuation of intra-group loans on its balance sheet, and the operating performance (ROA) of its non-listed parent, and it is this correlation that drives our results. We note that our regressions include a number of controls for the performance of the publicly listed subsidiary. These controls are highly significant in all specifications. Adding parent ROA has incremental explanatory power in the regressions (and improves the R^2), without affecting the magnitude or the significance of the coefficients of the subsidiary's performance proxies (for example, compare columns 1-2 in Table 3). Since our regressions control for dividend payments, it is not clear why the

parent's ROA has incremental explanatory power, unless there are other non-dividend related transfers between subsidiaries and parents, which is what we hypothesize.[6]

Our results appear to fit a logical pattern. Firms with underperforming controlling shareholders extend more intra-group loans to their parents. The market values one additional dollar of such an intra-group loan – by a publicly listed firm whose controlling shareholder is underperforming – at a significantly lower amount than an intra-group loan by a listed firm whose parent is performing well. Therefore, the performance of the parent appears very significant in explaining both the magnitude of the direct fund transfers from listed subsidiary to non-listed parent, as well as the market's estimate of the value of the resulting receivables on the listed firm's balance sheet. In other words, publicly listed firms are subject to more tunneling in periods when their controlling shareholders are underperforming.

4. Parent performance and listed firm cash holdings

Tunneling of cash from a firm's balance sheet to the pockets of its controlling shareholders can occur through many different channels, only one of which, albeit a very direct one, is intra-group loans. Other types of related party transactions through which tunneling may occur include transfers of fixed assets between subsidiary and parent, purchases of goods and services (which may affect operating expenses) or the provision of loan guarantees that may materialize in the future. Unlike intra-group loans, many of these other types of related party transactions are not always disclosed with enough information to allow us to value them with accuracy. However, we could argue that the valuation of *cash balances*, may also reflect the market's *indirect assessment* on these other channels of expropriation. This proxy measures the *ex ante* likelihood that investors place on the event of the assets later being expropriated. Since cash is the most liquid asset and its use is discretionary, its value is likely to be sensitive to the likelihood of expropriation (Dittmar and Mahrt-Smith, 2007).[7] Consequently, we also assess the robustness of our previous findings by examining, an indirect channel of

[6] In addition, dividend payments are relatively rare among Chinese firms, and even among those firms that do pay dividends payout ratios are low. Consequently, dividend payments are not a significant channel for transferring funds from subsidiaries to parents.

[7] The literature on cash holdings has addressed the cost and benefits associated with holding cash, along dimensions such as managerial agency costs (Harford, 1999; Pinkowitz, Stulz, and Williamson, 2006; Dittmar and Mahrt-Smith, 2007; Harford, Mansi, and Maxwell, 2008; or Kalcheva and Lins, 2007), costly external financing (Kim, Mauer, and Sherman, 1998; Harford, 1999; Opler, Pinkowitz, Stulz, and Williamson, 1999; Almeida, Campello, and Weisbach, 2004; Faulkender and Wang, 2006; Pinkowitz and Williamson, 2006; or Denis and Sibilkov, 2010), taxes (Foley, Hartzell, Titman, and Twite, 2007), and investment risk (Duchin, 2010).

expropriation, namely the size and market valuation of cash balances on the listed firm's balance sheet.

Our use of cash holdings as a proxy for expropriation in the second part of our study offers both advantages and disadvantages. The advantage (relative to intra-group loans) is that cash holdings may reflect additional – and possibly much more extensive – avenues of expropriation compared to intra-group loans. The disadvantage is that intra-group loans represent direct fund flows, whereas cash holdings are only an indirect proxy for expropriation. Therefore, we report our analysis of cash holdings as complementary robustness tests to the analysis of intra-group loans. In addition, we conduct an additional long series of robustness tests, in order to verify that our results on cash holdings do reflect tunneling and not alternative explanations.

4.1. Parent performance and the level of listed firm cash holdings

We begin by examining whether the performance of the listed firm's parent affects the level of cash holdings in publicly listed firms. If cash can be tunneled away by the controlling shareholders, through intra-group loans or other related party transactions, then firms may prefer to keep less of it on their balance sheets when they perceive the likelihood of tunneling to be high (or alternatively, these firms may hold less cash because part of it has *already* been tunneled away). Table 4 reports estimates of two-way clustered regressions of cash holdings on the operating performance of the controlling shareholder

$$\mathrm{Log}\left(1+\frac{\mathrm{C_{i,t}}}{\mathrm{NA_{i,t}}}\right)=\gamma_0+\gamma_1\mathrm{Log}(\mathrm{TA_{i,t}})+\gamma_2\mathrm{L_{i,t}}+\gamma_3\frac{\mathrm{NWC_{i,t}}}{\mathrm{NA_{i,t}}}+\gamma_4\mathrm{MB_{i,t}}+\gamma_5\frac{\mathrm{CF_{i,t}}}{\mathrm{NA_{i,t}}}+\gamma_6\frac{\mathrm{CapEx_{i,t}}}{\mathrm{TA_{i,t}}}$$
$$+\gamma_7\mathrm{Ownership\ by\ Largest\ Shareholder_{i,t}}+\gamma_8\mathrm{PROA_{i,t}}+\varepsilon_{i,t}$$

The dependent variable is the natural logarithm of one plus the ratio of cash and equivalents to net assets, total assets, and market capitalization respectively. In columns 1-3, we measure parent performance by the parent's return on assets (ROA), and in columns 4-6, by the parent's cash flow. We control for other characteristics of the publicly listed firm that may affect the level of cash holdings, namely firm size, leverage, net working capital, cash flow, growth opportunities (market-to-book ratio), capital expenditures, and the percentage of shares held by the controlling shareholder.

In all specifications, we find a statistically significant and positive relation between the performance of the controlling shareholder and the level of cash holdings on the publicly listed

firm's balance sheet, after controlling for other factors that have been shown to affect the liquidity needs of firms in previous research. Therefore, publicly listed firms whose controlling shareholders have lower *a priori* incentives to expropriate (controlling shareholders with good operating performance) appear to hold more cash. In contrast, publicly listed firms whose controlling shareholders have larger incentives to expropriate (controlling shareholders with poor operating performance) appear to hold less cash.[8]

The implied negative correlation between the likelihood of expropriation (which we proxy by controlling shareholder performance) and the level of cash holdings is consistent with the correlation documented in previous studies between cash holdings and the likelihood of political extraction. Stulz (2005) argues that the likelihood of political extraction may affect the investment policy of firms and that firms may become more opaque, in order to shield themselves from the extraction. Using worldwide data, Caprio, Faccio, and McConnell (2013) show that cash balances held by firms are negatively correlated with proxies for political corruption.

4.2. Parent performance and the market value of listed firm cash holdings

As was the case with intra-group loans, the market may assign a higher valuation to one dollar of cash holdings of a listed firm whose controlling shareholder is *not* likely to expropriate compared to a listed firm whose controlling shareholder is likely to do so. As before, we hypothesize that under-performing parents have more incentives to expropriate cash from the publicly listed firms they control. In Table 5, we examine whether the controlling shareholder's performance has incremental explanatory power for the market valuation of one dollar of cash on the publicly listed firm's balance sheet. We estimate the baseline Faulkender and Wang (2006) cash valuation model (See Table 3, column 1), and we add interactions between *parent performance* (*PROA*) and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$

$$r_{i,t} - R^{B}_{i,t} = \gamma_0 + \gamma_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \gamma_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \gamma_4 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \gamma_5 \frac{C_{i,t-1}}{M_{i,t-1}} + \gamma_6 L_{i,t}$$
$$+ \gamma_7 \frac{NF_{i,t}}{M_{i,t-1}} + \gamma_8 \frac{C_{i,t-1}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_9 L_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}}$$
$$+ \gamma_{10} PROA_{i,t} + \gamma_{11} PROA_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t}$$

[8] The proxies for publicly listed firm characteristics appear with the expected signs. Publicly listed firms with higher leverage, net working capital (excluding cash), and capital expenditures hold less cash. Firms with larger cash flows hold more cash.

Our main interest here is on the coefficient of the interaction term γ_{11} between parent performance and change in cash.

In line with our evidence on intra-group loans, we obtain very strong results that parent performance has significant incremental explanatory power for the value of cash holdings in China. Column 1 presents results where the performance of the controlling shareholder is measured by parent return on assets (ROA). The results in row 2 show that having a controlling shareholder with better performance substantially and significantly increases the market value of a dollar of cash on the publicly listed firm's balance sheet, as suggested by the significant and positive coefficient on the interaction between *Parent ROA* and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$. The results are also economically significant. For example, in column 1, assuming average parent performance, the market value of an additional dollar of cash on the listed firm's balance sheet is \$0.56 [= \$1.517 + (−0.977×14.1%) + (−1.834×44.8%) + (4.401×0.1%)]. This value increases from \$0.47 for a firm whose parent's ROA is at the cut-off for the bottom 25% quartile (*Parent ROA*=−2.1%) to \$0.66 for a firm whose parent's ROA is at the cut-off for the top 25% quartile (*Parent ROA*=+2.3%). Therefore, controlling for other factors that may affect the value of cash holdings, the difference in value of an additional dollar of cash between a firm whose controlling shareholder is under-performing and a firm whose controlling shareholder is out-performing is \$0.19. This amount represents an increase of almost 50% in the value of cash holdings. In column 3, the coefficient of the interaction between the second measure of parent performance *Parent cash flow* and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$ in row 4 is positive but insignificant at conventional levels but this interaction is significant in the remaining columns.

In analysis that we do not report in the tables for brevity, we replace parent ROA and parent cash flow with their industry-adjusted measures (correlation between the adjusted and the un-adjusted measures is 0.92-0.93), and with parent cash holdings, and we obtain similar results (the value of the publicly listed firm's cash holdings is increasing in the size of its parent's cash holdings). We also use alternative measures of stock returns and alternative methodologies for estimating the market value of cash holdings. We estimate stock returns using Fama and French (1993) size and book-to-market portfolios, 12-month market-adjusted cumulative abnormal returns (CARs), and 12-month buy-and-hold excess returns (BHARs) and obtain almost identical results. Furthermore, we vary the variables that we include in the value of cash regressions, and our results are not sensitive to the exact variables included. We also estimate the value of cash holdings using Tobin's Q and the market-to-book ratio as proxies for firm value, following the methodology by Pinkowitz, Stulz, and Williamson (2006)

(also used by Dittmar and Mahrt-Smith (2007) and Kalcheva and Lins (2007)) and again obtain qualitatively similar results. Furthermore, we also estimate the regressions with firm fixed effects. We obtain qualitatively similar (although slightly weaker) results. The original Faulkender and Wang (2006) model does not include firm fixed effects, so for comparability with their results, we do not include the fixed effects in the reported specifications.

4.3. Market value of cash holdings and type of controlling shareholder

In this section, we examine whether our results are sensitive to the type of controlling shareholder by including additional interaction terms of the form $SOE \times \frac{\Delta C_{i,t}}{M_{i,t-1}}$ for the presence of state-owned enterprise (SOE) controlling shareholders, and for SOE parents controlled by the central or a local government. In Table 5, column 3, row 2, our results on the interaction terms between parent performance and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$ strikingly increase in significance when we control for the presence of state-owned controlling shareholders. For example, based on the magnitude of the coefficients in column 3, the market value of an additional dollar of cash on the listed firm's balance sheet for a firm whose parent ROA is at the top 25% quartile relative to a firm whose parent ROA is at the bottom 25% quartile increases by \$0.24 [= (5.369×2.3%) − (5.369×(−2.1%))]. We obtain similarly strong results when we use parent cash flow as a proxy for parent performance (column 4).

Furthermore, the type of controlling shareholder also has significant incremental explanatory power for the value of cash holdings. In columns 3-4, the interaction term between a dummy variable indicating that the parent is a state-owned enterprise (SOE) and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$ in row 6 is highly statistically significant. Investors value one dollar of cash on the balance sheet of an SOE more highly than a non-SOE firm, implying a lower likelihood of expropriation in SOE-controlled listed firms. In column 3, assuming parent ROA in the top quartile, the market value of an additional dollar of cash for an average SOE firm is \$0.80 [= \$1.250 + (−0.948×14.1%) + (−1.891×44.8%) + (5.369×2.3%) + (0.412×1)], compared to only \$0.39 for a non-SOE firm.

Chinese SOEs are not homogeneous. There are institutional reasons why local governments in China may have significant autonomy from the center, and hence more control over local judicial authorities that may allow them more freedom to expropriate. Cheung, Rau, and Stouraitis (2010) compares the market reaction to the announcement of related party transactions in central versus local government SOEs. They find that related party transactions between central government controlled publicly listed SOEs and their controlling shareholders

do not result in expropriation. In contrast, they find that related party transactions between publicly listed firms controlled by the local government and their controlling shareholders are likely to represent expropriation of minority shareholders on average. Jiang, Lee, and Yue (2010), using data on intra-group loans in China, also find that tunneling is more severe among non-state-owned firms, and when comparing local and central government controlled state-owned firms, tunneling is more severe in local government controlled firms.

This evidence suggests that the type of SOE may also matter in tunneling. We investigate the relationship in column 5. We find that the coefficient of the interaction term between central government controlled SOE and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$ is almost twice as large as that between local government controlled SOE and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$. These results present an interesting comparison. Assuming average parent performance, the market value of an additional dollar of cash for an SOE firm controlled by the *central* government is \$0.86 [= \$1.273 + (−1.011×14.1%) + (−1.955×44.8%) + (5.641×0.01%) + (0.596×1)]. This is only slightly lower than the average U.S. firm (based on Faulkender and Wang (2006)), which is likely to have better corporate governance than the average Chinese SOE controlled by the central government. In contrast, the market value of an additional dollar of cash for an average SOE firm controlled by the *local* government declines to \$0.64, and that for a non-SOE firm, further declines to only \$0.26. For firms whose parents perform in the top quartile, each of the three values is \$0.12 higher, and for those whose parents perform in the bottom quartile it is \$0.12 lower. Therefore, for SOEs controlled by the central government whose parent performance is in the top 25% quartile, the market values one additional dollar of cash almost at par (\$0.98), suggesting the absence of expropriation, whereas for non-SOE firms whose parents perform poorly, the market values one additional dollar of cash at only 14 cents, suggesting a significant degree of expropriation.

Our results suggest that investors value one additional dollar of cash more highly in firms controlled by central government SOEs compared to firms controlled by local government SOEs. The difference in the likelihood of expropriation between central and local government SOEs, and non-state owned firms is in line with the evidence reported by Cheung, Rau, and Stouraitis (2010) and Jiang, Lee, and Yue (2010). These findings also provide support to our conjecture that the market value of cash holdings in our sample is driven by tunneling considerations.

Overall, our results suggest that the motivation of the controlling shareholder (as proxied by its operating performance) has significant explanatory power for the market

valuation of cash holdings on the listed firm's balance sheet across all types of Chinese firms. Our main results are robust to controls for the type of the controlling shareholder.

4.4. Does parent performance proxy for parent firm corporate governance?

Pinkowitz, Stulz, and Williamson (2006), Kalcheva and Lins (2007), and Dittmar and Mahrt-Smith (2007) show that the value of cash holdings is positively related to proxies for corporate governance. An alternative explanation for our results is that the operating performance of the parent firm is correlated with its corporate governance, so that under-performing parent firms are those with poor corporate governance. If this is the case, then parent performance does not capture the motivation of the parent firm but its corporate governance. Consequently, under-performing parents do not expropriate the publicly listed firms they control because they need the cash but because they are subject to bad corporate governance. Alternatively, the managerial "competence" of publicly listed firms and their controlling shareholders may be correlated, and under-performing controlling shareholders (and the publicly listed firms they control) may be those with less competence.

We conduct two robustness tests. First, in analysis that we do not report in the table for brevity, we replicate our results after including controls for corporate governance variables, namely the proportion of independent non-executive directors on the publicly listed firm's board, CEO duality (the firm's CEO and Chairman being the same person), and for CEO/Chairman with political connections to the central/local government, and our results are qualitatively similar. In addition, we include interactions between the value of cash holdings and the corporate governance variables which are not statistically significant.

In our second robustness test, we eliminate from the sample parent firms that *do not* exhibit large changes in performance during our sample period and we estimate our model in the sub-sample of parent firms with large changes in performance. Parent firms with large changes in performance are those whose ROA (or cash flow) move from the top two quartiles of our parent sample (above median) to the bottom two quartiles (below median) or vice versa. Changes in corporate governance are rare in the Chinese market and we verify that these firms have not exhibited changes in ownership structure while their performance changes.

We report the results in Table 5, columns 6-7. According to the parent ROA criterion, the sample size reduces to less than half the original (column 6), and according to the parent cash flow criterion the sample size reduces to less than one quarter of the original sample (column 7). Across all specifications, however, the market value of an additional dollar of cash

is significantly positively related to the parent's performance, in line with the evidence reported in all previous specifications.

Therefore, our results do not appear to be driven by a potential correlation between parent corporate governance (or parent managerial "competence") and parent operating performance but hold for parent firms which experienced large swings in performance without concurrent changes in corporate governance. Overall, the motivation of the controlling shareholder to expropriate – proxied by its operating performance – appears very significant in explaining the value that minority shareholders assign to a dollar of cash on the listed firm's balance sheet.

5. More robustness tests: Business groups, co-insurance, and alternative explanations

Recent studies have challenged the idea that business groups are vehicles for the expropriation of minority shareholders (Khanna and Yafeh, 2007; Almeida, Park, Subrahmanyam, and Wolfenzon, 2011; Siegel and Choudhury, 2012). Since, according to this literature, there are benefits to group affiliation, one potential alternative explanation behind our results is that they merely reflect the working of internal capital markets within business groups and do not reflect expropriation (Khanna and Palepu, 2000). For example, the co-insurance argument behind business groups suggests that funds are transferred to group affiliated firms that find themselves in financial difficulties (Khanna and Yafeh, 2005; Fisman and Wang, 2010; Jia, Shi, and Wang, 2013). Our results are in line with the co-insurance argument only for the controlling shareholder. For these shareholders, we provide even stronger evidence than the previous studies that the operating performance of the controlling shareholder determines transfers from the publicly listed subsidiary to the non-listed parent. For example, Jia, Shi, and Wang (2013) show that Chinese publicly listed firms provide loans and guarantees to their non-listed parents when the latter find themselves in extremely severe financial difficulties. Our study shows that the effect is more widespread than the very small sample with parents in extreme distress in the previous study.

However, the flip side of the co-insurance argument could be damaging to our hypothesis. In this argument, the positive relationship between parent performance and the market valuation of the publicly listed firm's cash holdings does not reflect transfers from the publicly listed subsidiary to its non-listed parent. Instead it reflects implicit guarantees of assistance from the non-listed parent to the publicly listed subsidiary. For example, when the parent performs well, it has adequate funds to assist the subsidiary if the latter faces difficulties, and

hence, cash on the subsidiary's balance sheet is valued at "fair" value. When the parent performs poorly, it cannot assist the subsidiary if the latter faces difficulties, and hence cash on the subsidiary's balance sheet is valued at less than "fair" value. The market values the cash on the publicly listed subsidiary's balance sheet higher when the parent has greater ability to prop up the subsidiary.

If our results are mainly driven by a potential propping up explanation, we argue that it is plausible that the following are also true:

1. The sensitivity of the value of cash on the publicly listed subsidiary's balance sheet to the performance of its non-listed parent should be higher in *smaller* publicly listed subsidiaries. These subsidiaries are more likely to be financially constrained and face more difficulty in raising external financing through debt and equity (Hadlock and Pierce, 2010). Furthermore, it is more feasible for non-listed parents to assist their smaller subsidiaries. Numerous studies find that cash holdings are more valuable for firms facing financing constraints (see, for example, Faulkender and Wang, 2006, or Pinkowitz and Williamson, 2006). This is because cash holdings allow constrained firms to invest in positive net present value (NPV) projects (Denis and Sibilkov, 2010).
2. The sensitivity of the value of cash on the publicly listed subsidiary's balance sheet to the performance of its non-listed parent should be higher in subsidiaries that are small *relative to the size of their parents*. In contrast, if subsidiaries are larger than their parents it will be more difficult for their parents to implicitly guarantee their subsidiaries' cash holdings. For example, if the subsidiary has assets of $2 billion and the parent has assets of only $1 billion, it is more difficult for the parent to pledge assets in order to help its subsidiary (and even if it does so, they will make a small difference to the performance of the subsidiary). Jia, Shi, and Wang (2013) report that outstanding related party transactions in Chinese listed firms represent, on average, almost 20% of total assets annually. Overall, if the size of the publicly listed firm is small relative to its parent, then the parent has higher ability to pledge assets in order to prop up its subsidiary, and the market valuation of the cash on the subsidiary's balance sheet should be higher. In contrast, when the size of the publicly listed firm is large relative to its parent, then the parent is less likely to be able to pledge assets in order to assist the subsidiary, and hence, the market valuation of cash on the subsidiary's balance sheet should be lower.

3. By a similar argument, the value of cash on the publicly listed subsidiary's balance sheet should be higher in subsidiaries whose EBIT is smaller *relative to the EBIT of their parents*. In contrast, if subsidiaries have larger EBIT than their parents it will be more difficult for their parents to help them. For example, if the subsidiary has an EBIT of $2 million and the parent has an EBIT of only $1 million, it is more difficult for the parent to assist the subsidiary (and even if it does so, any transfer will make a small difference to the performance of the subsidiary). The same argument holds when both EBITs are negative. Again, if the subsidiary's EBIT exhibits *losses* of $2 million and the parent's EBIT exhibits losses of only $1 million, any transfer by the parent will make a small difference to the performance of the subsidiary (in addition to the parent being practically unable to help), and therefore, the value of the subsidiary's cash holdings should be less sensitive to the performance of the parent.

In the remaining of this section we provide direct tests for these hypotheses in turn.

5.1. Market value of cash holdings and the size of the publicly listed firm

The first alternative hypothesis that we examine is that the sensitivity of the value of cash on the publicly listed subsidiary's balance sheet to the performance of its non-listed parent should be higher in *smaller* publicly listed subsidiaries. These subsidiaries are more likely to be financially constrained and face more difficulty in raising external financing through debt and equity. Furthermore, it is more feasible for non-listed parents to assist their smaller subsidiaries.

Table 6 reports results of our cash valuation model where we classify publicly listed firms into constrained and unconstrained sub-samples based on median size (total assets). Hadlock and Pierce (2010) argue that firm size is a good proxy for financing constraints, because larger firms can obtain financing more easily from capital markets and banks. [9]

Our results are the opposite of the predictions above. For large firms that do not face financing constraints in column 1, we find that the coefficient of the interaction between parent

[9] Hadlock and Pierce (2010) find that firm size and age are most closely related to financial constraints. Most Chinese firms have been carved out of pre-existing state-owned enterprises before the firms go public. Thus the founding year of the listed firm disclosed in its annual report is not a good proxy for firm age. Hence we do not use firm age as criterion for classifying firms into constrained and unconstrained. Other studies use dividend payouts to classify firms into constrained and unconstrained subsamples (see, for example, Faulkender and Wang, 2006). In China, since relatively few of the listed firms pay dividends, and paying dividends is likely to be more correlated with corporate governance rather than with financial constraints, the dividend payout is not a good proxy either. Finally, some studies use credit ratings as a measure of financial constraints (see, for example Faulkender and Wang, 2006). Chinese firms do not have publicly traded debt and therefore they are not assigned ratings.

performance and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$ is significantly positive. In contrast, among small and financially constrained firms in column 2, we *do not* find a significant relationship between the value of an additional dollar of cash and parent performance (see row 2).

Controlling shareholders are more likely to expropriate surplus cash from larger financially unconstrained firms, which are more able to raise additional cash from external markets in the future. This result is more consistent with the expropriation hypothesis than by a potential propping up explanation.

5.2. Market value of cash holdings and the relative size of the publicly listed firm

Our second alternative hypothesis is that the sensitivity of the value of cash on the publicly listed subsidiary's balance sheet to the performance of its non-listed parent should be higher in subsidiaries that are small *relative to the size of their parents* (if subsidiaries are larger than their parents, it will be more difficult for their parents to implicitly guarantee their subsidiaries' cash holdings).

We examine this hypothesis in Table 7. In Columns 1-2, we report regressions where we replace parent performance with the relative size of the publicly listed firm relative to its parent (the ratio of total assets of the listed firm divided by the total assets of its parent). The results are the exact opposite of the predictions of the propping up hypothesis above. In row 2, the *larger* the size of the publicly listed firm relative to its parent, the *larger* the market valuation of one additional dollar of cash on its balance sheet. In column 1, for an otherwise average firm, the market value of one additional dollar of cash on its balance sheet increases from virtually zero when the listed firm's size is *smaller* than that of its parent to $0.69 when the listed firm's size is 50% larger than its parent.

The results continue to hold when we control for the impact of SOE firms in column 2. Also in line with evidence reported earlier, cash on the balance sheet of SOEs is valued more highly by the market, suggesting less likelihood of expropriation among SOE firms. The magnitude of the coefficient of the interaction between SOE and $\frac{\Delta C_{i,t}}{M_{i,t-1}}$ is on the same order as before, suggesting a $0.33 higher valuation for the cash on an SOE's balance sheet.

In the remaining columns, we divide our sample in two sub-samples based on the median ratio of total assets of the listed firm divided by the total assets of its parent across our entire sample. In columns 3-5, where we estimate our value of cash regressions in the sub-sample of publicly listed subsidiaries which are large relative to their non-listed parents, the market value of cash on the subsidiary's balance sheet is very sensitive to the parent's ROA (see row 4). In

contrast, in the sub-sample of small subsidiaries, in columns 6-8, the value of cash shows no sensitivity whatsoever to the parent's ROA (the coefficients are not statistically significant in row 4). Again, the ability to prop up does not appear significant in affecting the market valuation of cash in our sample. Instead, the relative size of parent and subsidiary may proxy for the relative power of the controlling shareholder to expropriate the subsidiary. The larger the subsidiary relative to the parent, the more able it is to resist demands for expropriation.

5.3. Market value of cash holdings and the relative size of the publicly listed firm's profitability

Using similar arguments as before, our third alternative hypothesis suggests that the value of cash on the publicly listed subsidiary's balance sheet should be higher in subsidiaries whose absolute operating profits are smaller *relative to the operating profits of their parents*. In contrast, if parents have lower operating profits than their subsidiaries, it will be more difficult for parents to help their subsidiaries. We examine two measures of operating profitability, EBIT and cash flow.

Our results are reported in Table 8. In column 1, we estimate regressions in the sub-sample of observations where both the subsidiary's and the parent's EBIT are positive. The coefficient in row 2 indicates that the larger the subsidiary's EBIT relative to the parent's (that is, the more difficult it is for the parent to provide assistance to the subsidiary), the larger the market valuation of a dollar of cash on the subsidiary's balance sheet. The result in column 2 is even more striking. Here we estimate the regression in the subsample of observations where both the subsidiary's and the parent's EBIT's are negative. The positive coefficient in row 2 suggests that the larger the *losses* that the subsidiary is making relative to the parent's losses, the larger the market valuation of a dollar of cash on the subsidiary's balance sheet! In other words, as it gets less feasible for the non-listed parent to assist its loss-making publicly listed subsidiary financially, the market's valuation of an additional dollar of cash on the subsidiary's balance sheet increases. Thus the co-insurance argument does not appear to be valid here either.

In column 3, we include a dummy variable that is equal to one if the subsidiary's EBIT exceeds the parent's. While the coefficient in this specification is not statistically significant, more importantly, it is not significantly negative as the co-insurance argument would predict. In the remaining columns, we replace EBIT with cash flow. The results are mostly insignificant, with the exception of column 6. The coefficient in row 8 suggests that when the subsidiary's cash flow exceeds that of its parent, the market value of one additional dollar of cash on the subsidiary's balance sheet is higher. Overall, our results are the opposite of what would be expected by the co-insurance argument.

Therefore, although we cannot conclude that co-insurance is not present in our sample in other ways, our analysis suggests that it cannot be the *main* driving force behind our results. Our results are more consistent with an expropriation hypothesis, whereby the expropriation by the controlling shareholder depends not only on its own performance but also on the capacity of the listed firm to raise additional cash in the future, as proxied by its absolute and relative size.

In addition, the relative size of the publicly listed firm relative to its parent may be a proxy for the parent's *power* to expropriate. This is because, for example, publicly listed firms that are larger than their parents can build the same political connections that may protect them from expropriation. Hence in a market where large controlling shareholders (state-owned or not) are dominant and exercise effective control, their percentage ownership in the publicly listed firm may not be a good proxy for their relative power.

Furthermore, we note that some of the evidence reported in Section 4.3 on differences in how that market values cash in SOEs controlled by the central government, local governments or non-government firms, while consistent with an expropriation hypothesis, is not predicted by the co-insurance hypothesis (for example, why should co-insurance be less prevalent in local government-controlled firms, and even less prevalent in non-government owned business groups?).

5.4. Parent investment and cash valuation

Fan, Jin, and Zheng (2014) analyze the internal capital markets in industrial groups, and find that the capital expenditures of the parent firms in China are sensitive to both their own cash flow and to the cash flow of the publicly listed firms they control. Therefore, an alternative motivation for the parents in our sample might be to raise cash from the publicly listed firms lower down the pyramid in order to cover their own investment needs higher up the pyramid. We note that this transfer would still constitute expropriation of the value of the investors in the publicly listed subsidiary. In untabulated results, we estimate our cash valuation model after replacing parent performance with parent capital expenditures (the change in the parent's fixed assets scaled by total assets from year t to year t+1) and the interaction term $Parent\ CapEx_{t+1} \times \frac{\Delta C_{i,t}}{M_{i,t-1}}$. The coefficient of this interaction term shows whether an increase in the parent's capital expenditures next year influences the market valuation of an additional dollar of cash on the publicly listed firm's balance sheet this year. However, none of the coefficients is statistically significant in explaining the market valuation of cash holdings, while

the remaining coefficients are not affected. The results are similarly insignificant when we use alternative windows for estimating the change in the parent's capital expenditures. We also estimate capital expenditures as the percentage change in fixed assets (without scaling) and the results continue to be insignificant. Consequently, our results are not driven by controlling shareholders who raise cash in order to cover their own investment needs.

6. Conclusions

Studies on the expropriation of minority shareholders of publicly listed firms by their controlling shareholders focus on the publicly listed firm and treat the controlling shareholder as a black box, without providing any direct evidence of the incentives of controlling shareholders to expropriate at the micro level. We analyze pairs of Chinese publicly listed firms and their non-listed controlling shareholders or parents, and link the extent of expropriation of the publicly listed firm to the performance of its controlling shareholder. First, we document that publicly listed firms with underperforming controlling shareholders extend more intra-group loans to their parents. Second, we show that the market gives a lower valuation to the receivables generated by these loans, when the firm's controlling shareholder is underperforming, suggesting a higher probability of default. More generally, we document a positive relationship between the market value of one additional dollar of cash on the listed firm's balance sheet and the performance of its controlling shareholder. Extensive robustness tests suggest that our results capture tunneling rather than alternative explanations. These findings help us understand the incentives of controlling shareholders, namely *when* and *why* the controlling shareholders expropriate, and establish the incentives of the controlling shareholder as a major determinant of the expropriation of listed firms in China. The phenomenon that we study is more akin to firms that do not belong to business groups, where funds may be transferred from the firm to the pockets of the individual controlling shareholder, rather than to the traditional view of business groups.

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Table 1

Descriptive statistics

The table reports descriptive statistics for a sample of 488 firms listed in the Shanghai and Shenzhen stock exchanges during 1999-2007 and their non-listed controlling shareholders (parents), representing 2,209 paired firm-year observations for listed firms and their parents. We obtain financial information, governance, and return data for the listed firms from the China Stock Market and Accounting (CSMAR) database, and for the controlling shareholders (parents) from the National Bureau of Statistics (NBS) Annual Industrial Survey Database. Unless explicitly stated, variables refer to the publicly listed firm. All financial variables are winsorized at the 1% and 99% levels.

Variable	Definition	Obs	Mean	Median
		(1)	(2)	(3)
(1) CAR_t (FF4)	12-month excess return using as benchmark Carhart's (1997) four-factor model and estimated using data for the universe of Chinese firms.	2209	0.215	0.047
(2) C_t/TA_t	Cash plus short-term investments (*C*) scaled by total assets (*TA*).	2209	0.159	0.134
(3) C_{t-1}/M_{t-1}	Cash plus short-term investments (*C*) scaled by market value of equity (*M*).	2209	0.141	0.105
(4) $\Delta C_t/M_{t-1}$	Changes in cash plus short-term investments from year *t-1* to *t*, scaled by lagged market value of equity.	2209	0.011	0.003
(5) $OREC_t/M_t$	"Other receivables" defined as inter-corporate loans from listed firms to their parents (*OREC*) following the definition of Jiang, Lee, and Yue (2010), scaled by market value of equity.	2205	0.040	0.015
(6) $\Delta OREC_t/M_{t-1}$	Change in other receivables from year *t-1* to *t*, scaled by lagged market value of equity.	2204	0.000	0.000
(7) $\Delta E_t/M_{t-1}$	Change in earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits (*E*) from year *t-1* to *t* scaled by lagged market value of equity.	2209	0.003	0.001
(8) $\Delta NA_t/M_{t-1}$	Change in net assets from year *t-1* to *t*, where net assets are defined as total assets minus cash holdings (*NA*), scaled by lagged market value of equity.	2209	0.040	0.022
(9) $\Delta D_t/M_{t-1}$	Change in common dividends from year *t-1* to *t* scaled by lagged market value of equity.	2209	0.001	0.000
(10) NF_t/M_{t-1}	Net financing, defined as net equity plus net debt issues (*NF*) scaled by lagged market value of equity.	2209	0.019	0
(11) NWC_t/NA_t	Net working capital excluding cash (*NWC*) scaled by net assets.	2209	-0.104	-0.030
(12) CF_t/NA_t	Operating income plus depreciation and amortization minus interest minus taxes minus dividends (*CF*) scaled by net assets.	2209	0.014	0.011
(13) $Capex_t/TA_t$	Capital expenditure is measured as the change in fixed assets from year *t-1* to *t* (*Capex*) scaled by total assets.	2209	0.057	0.035
(14) MB_t	Market value of equity divided by book value of equity.	2209	3.205	2.452
(15) $Log(TA_t)$	The natural logarithm of total assets.	2209	21.318	21.214
(16) L_t	The ratio of short- plus long-term debt to total assets.	2209	0.448	0.446

(17) ROA_t	The return on total assets (net income over total assets).	2209	0.033	0.036
(18) *Parent* ROA_t	The return on total assets of the listed firm's non-listed parent company.	2209	0.001	-0.002
(19) *Parent* CF_t	The ratio of cash flow to net assets of the parent company, where cash flow is operating income plus depreciation and amortization minus interest minus taxes minus dividends.	2003	0.079	0.067
(20) SOE	Dummy variable, which equals to 1 if the firm's ultimate controller is the State-Owned Assets Supervision and Administration Commission (SASAC), and 0 otherwise.	2204	0.791	1
(21) Ownership by largest shareholder	The percentage of shares held by the largest shareholder.	2205	46.467	46.890
(22) Marketization index	Measures the development of the regional market in which the firm is registered and has been estimated by Fan, Wang and Zhu (2009).	2209	6.398	6.200

Table 2

Parent firm performance, cash holdings, and the transfer of intra-group loans

The table reports the impact of parent firm performance on the relation between listed firm cash holdings and other receivables Sample characteristics, data sources, and variable definitions are reported in Table 1. Intercepts are estimated but not reported for brevity. Two-dimensional clustered ordinary least squares regressions follow Petersen (2009). Standard errors and *t* values in parentheses are computed following Froot (1989) and Williams (2000) by allowing for heteroskedasticity and any type of correlation for observations of the same firm but assuming independence for observations across firms. *, **, *** denote significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests.

	$\Delta OREC_{t+1}/M_t$ (1)	$\Delta OREC_{t+1}/M_t$ (2)	$\Delta OREC_{t+1}/M_t$ (3)	$\Delta OREC_{t+1}/M_t$ (4)	$\Delta OREC_{t+1}/M_t$ (5)
Parent characteristics					
(1) *Parent* ROA_t		-0.018 (-0.89)	-0.017 (-0.81)		
(2) *Parent* $ROA_t \times \Delta C_t/M_t$			-0.428 (-1.82)*		
(3) *Parent* CF_t				-0.020 (-1.39)	-0.015 (-1.05)
(4) *Parent* $CF_t \times \Delta C_t/M_t$					-0.342 (-2.30)**
(5) SOE		-0.001 (-0.44)	-0.001 (-0.44)	-0.002 (-0.69)	-0.002 (-0.61)
Listed firm characteristics					
(6) Δ Ct/Mt	0.022 (1.92)*	0.022 (1.92)*	0.024 (2.11)**	0.022 (1.85)*	0.053 (2.95)***
(7) C_t/M_t	0.023 (2.77)***	0.023 (2.81)***	0.024 (2.84)***	0.022 (2.53)**	0.023 (2.63)***
(8) $Log(TA_t)$	-0.000 (-0.03)	0.000 (0.01)	-0.000 (-0.00)	-0.000 (-0.16)	-0.000 (-0.19)
(9) ROA_t	0.089 (5.87)***	0.095 (5.91)***	0.093 (5.81)***	0.119 (7.04)***	0.116 (6.83)***
(10) Marketization index	-0.000 (-0.46)	-0.000 (-0.40)	-0.000 (-0.42)	-0.000 (-0.40)	-0.000 (-0.43)
(11) Ownership by largest shareholder	-0.000 (-0.36)	-0.000 (-0.43)	-0.000 (-0.43)	-0.000 (-0.61)	-0.000 (-0.62)
Observations	2490	2480	2480	2254	2254
Adj. R^2	0.034	0.035	0.036	0.040	0.042
F	4.396	4.318	4.286	4.458	4.497

Table 3

Parent firm performance and the value of intra-group loans

The table reports estimates of the impact of parent firm performance on the value of listed firm other receivables, following the model of Faulkender and Wang (2006). Sample characteristics, data sources, and variable definitions are reported in Table 1. Intercepts are estimated but not reported for brevity. Two-dimensional clustered ordinary least squares regressions follow Petersen (2009). Standard errors and *t* values in parentheses are computed following Froot (1989) and Williams (2000) by allowing for heteroskedasticity and any type of correlation for observations of the same firm but assuming independence for observations across firms. *, **, *** denote significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests.

	(1)	(2)	(3)	(4)	(5)
Parent characteristics					
(1) *Parent* ROA_t		1.040 (5.77)***		1.104 (4.60)***	
(2) *Parent* $ROA_t \times \Delta OREC_t/M_{t-1}$		8.634 (3.30)***		9.426 (2.79)***	
(3) *Parent* CF_t			0.946 (4.93)***		1.009 (4.37)***
(4) *Parent* $CF_t \times \Delta OREC_t/M_{t-1}$			3.033 (2.26)**		3.092 (1.73)*
(5) SOE				0.031 (2.10)**	0.045 (2.40)**
(6) $SOE \times \Delta OREC_t/M_{t-1}$				0.302 (0.58)	0.048 (0.08)
Listed firm characteristics					
(7) $\Delta C_t/M_{t-1}$	1.681 (6.35)***	1.897 (8.68)***	1.834 (7.35)***	1.912 (8.03)***	1.850 (6.80)***
(8) $\Delta E_t/M_{t-1}$	2.461 (6.26)***	2.221 (7.27)***	2.260 (7.20)***	2.202 (6.81)***	2.242 (6.64)***
(9) $\Delta NA_t/M_{t-1}$	1.082 (5.00)***	0.877 (4.57)***	0.797 (4.38)***	0.870 (4.67)***	0.785 (4.70)***
(10) $\Delta D_t/M_{t-1}$	0.793 (1.11)	0.578 (0.81)	0.589 (0.89)	0.602 (0.80)	0.530 (0.77)
(11) C_{t-1}/M_{t-1}	0.619 (2.86)***	0.593 (2.92)***	0.585 (2.96)***	0.605 (2.98)***	0.600 (2.99)***
(12) L_t	0.313 (1.97)*	0.506 (2.50)**	0.538 (2.55)**	0.506 (2.47)**	0.537 (2.53)**
(13) NF_t/M_{t-1}	0.217 (1.99)**	0.323 (2.77)***	0.441 (3.25)***	0.340 (2.96)***	0.471 (4.16)***
(14) $C_{t-1}/M_{t-1} \times \Delta C_t/M_{t-1}$	-1.161 (-1.67)*	-1.207 (-1.85)*	-0.864 (-1.29)	-1.290 (-1.89)*	-0.949 (-1.38)
(15) $L_t \times \Delta C_t/M_{t-1}$	-1.930 (-2.68)***	-2.516 (-4.19)***	-2.759 (-4.57)***	-2.492 (-3.95)***	-2.741 (-4.36)***
(16) $\Delta OREC_t/M_{t-1}$		-0.084 (-0.30)	-0.354 (-1.47)	-0.319 (-0.95)	-0.407 (-0.83)
(17) $OREC_{t-1}/M_{t-1}$		-1.510 (-3.04)***	-1.593 (-2.87)***	-1.500 (-3.01)***	-1.579 (-2.83)***
(18) $OREC_{t-1}/M_{t-1} \times \Delta OREC_t/M_{t-1}$		3.193 (2.67)***	3.079 (3.50)***	3.156 (2.27)**	3.074 (2.95)***
Observations	2208	2205	2001	2200	1997
Adj. R^2	0.183	0.219	0.232	0.218	0.231
F	55.907	36.437	44.875	40.850	43.961

Table 4

Parent firm performance and cash holdings

The table reports the effect of parent company performance on the listed firm's level of cash holdings. Sample characteristics, data sources, and variable definitions are reported in Table 1. Intercepts are estimated but not reported for brevity. Two-dimensional clustered ordinary least squares regressions follow Petersen (2009). Standard errors and *t* values in parentheses are computed following Froot (1989) and Williams (2000) by allowing for heteroskedasticity and any type of correlation for observations of the same firm but assuming independence for observations across firms. *, **, *** denote significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests.

	$\log(1+C_t/NA_t)$	$\log(1+C_t/TA_t)$	$\log(1+C_t/M_t)$	$\log(1+C_t/NA_t)$	$\log(1+C_t/TA_t)$	$\log(1+C_t/M_t)$
	(1)	(2)	(3)	(4)	(5)	(6)
Parent performance						
(1) *Parent* ROA_t	0.265 (2.67)***	0.185 (3.04)***	0.101 (2.88)***			
(2) *Parent* CF_t				0.122 (2.10)**	0.085 (2.36)**	0.036 (1.74)*
Listed firm characteristics						
(3) $Log(TA_t)$	-0.008 (-1.37)	-0.005 (-1.51)	0.002 (0.86)	-0.006 (-1.12)	-0.004 (-1.24)	0.003 (1.27)
(4) L_t	-0.365 (-9.65)***	-0.228 (-9.76)***	-0.090 (-6.38)***	-0.375 (-9.23)***	-0.235 (-9.48)***	-0.093 (-6.11)***
(5) NWC_t/NA_t	-0.087 (-6.78)***	-0.052 (-6.47)***	-0.031 (-6.09)***	-0.086 (-6.48)***	-0.051 (-6.19)***	-0.030 (-5.60)***
(6) MB_t	0.001 (0.36)	-0.000 (-0.15)	-0.008 (-12.22)***	0.002 (0.76)	0.000 (0.28)	-0.008 (-11.16)***
(7) CF_t/NA_t	0.301 (16.78)***	0.197 (18.62)***	0.105 (14.29)***	0.307 (16.00)***	0.200 (17.86)***	0.105 (13.54)***
(8) $Capex_t/TA_t$	-0.058 (-1.83)*	-0.030 (-1.41)	-0.041 (-2.94)***	-0.056 (-1.67)*	-0.029 (-1.28)	-0.039 (-2.68)***
(9) Ownership by largest shareholder	0.000 (1.27)	0.000 (1.30)	0.000 (0.36)	0.000 (1.04)	0.000 (1.07)	-0.000 (-0.01)
Observations	2204	2204	2204	2000	2000	2000
Adj. R^2	0.307	0.311	0.376	0.309	0.312	0.372
F	37.15	37.86	50.13	34.18	34.58	44.79

Table 5

Parent firm performance and the value of cash holdings

The table reports estimates of the impact of parent firm performance on the value of listed firm cash holdings, following the model of Faulkender and Wang (2006). Sample characteristics, data sources, and variable definitions are reported in Table 1. Intercepts are estimated but not reported for brevity. Two-dimensional clustered ordinary least squares regressions follow Petersen (2009). Standard errors and *t* values in parentheses are computed following Froot (1989) and Williams (2000) by allowing for heteroskedasticity and any type of correlation for observations of the same firm but assuming independence for observations across firms. *, **, *** denote significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests.

	All firms	All firms	All firms	All firms	All firms	Parents with large changes in performance	
	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parent characteristics							
(1) *Parent* ROA_t	1.224 (4.60)***		1.288(4.17)***		1.331(4.44)***	1.002 (1.32)	
(2) *Parent* $ROA_t \times \Delta C_t/M_{t-1}$	4.401 (3.23)***		5.369(6.48)***		5.641(7.59)***	9.001 (2.26)**	
(3) *Parent* CF_t		1.116 (4.60)***		1.186(4.29)***			1.019 (1.89)*
(4) *Parent* $CF_t \times \Delta C_t/M_{t-1}$		1.203 (1.40)		1.311(2.08)**			15.066 (1.66)*
(5) SOE			0.032(4.59)***	0.052(7.70)***			
(6) SOE $\times \Delta C_t/M_{t-1}$			0.412(3.41)***	0.179(1.07)			
(7) Local SOE					0.012(2.14)**		
(8) Central SOE					0.105(3.63)***		
(9) Local SOE $\times \Delta C_t/M_{t-1}$					0.381(2.44)**		
(10) Central SOE $\times \Delta C_t/M_{t-1}$					0.596(2.16)**		
Listed firm characteristics							
(11) $\Delta C_t/M_{t-1}$	1.517 (5.68)***	1.425 (4.63)***	1.250(4.52)***	1.326(5.01)***	1.273(3.74)***	1.499 (2.22)**	0.087 (0.04)
(12) $\Delta E_t/M_{t-1}$	2.398 (7.04)***	2.481 (6.52)***	2.377(6.71)***	2.456(6.12)***	2.378(6.84)***	2.135 (4.74)***	1.930 (2.77)***
(13) $\Delta NA_t/M_{t-1}$	1.016 (4.58)***	0.901 (4.24)***	1.010(4.66)***	0.887(4.50)***	1.016(4.46)***	1.187 (1.90)*	1.307 (2.12)**
(14) $\Delta D_t/M_{t-1}$	0.631 (0.90)	0.640 (0.99)	0.578(0.80)	0.540(0.85)	0.433(0.61)	0.181 (0.10)	2.639 (2.18)**
(15) C_{t-1}/M_{t-1}	0.561 (2.66)***	0.564 (2.70)***	0.567(2.67)***	0.579(2.74)***	0.556(2.59)**	0.552 (1.34)	0.601 (1.35)
(16) L_t	0.362 (2.10)**	0.381 (2.17)**	0.363(2.09)**	0.381(2.15)**	0.379(2.10)**	0.252 (1.20)	0.209 (1.37)
(17) NF_t/M_{t-1}	0.267 (2.60)**	0.414 (3.13)***	0.313(3.31)***	0.460(4.85)***	0.328(4.19)***	0.484 (0.84)	-0.658 (-0.83)
(18) $C_{t-1}/M_{t-1} \times \Delta C_t/M_{t-1}$	-0.977 (-1.55)	-0.653 (-1.01)	-0.948(-1.43)	-0.707(-1.04)	-1.011(-1.62)	-2.09(-3.33)***	-1.767 (-1.22)
(19) $L_t \times \Delta C_t/M_{t-1}$	-1.834 (-2.31)**	-2.150(-2.71)***	-1.891(-2.22)**	-2.188(-2.68)***	-1.950 (-2.11)**	-1.172 (-1.10)	-0.548 (-0.14)
Observations	2208	2004	2203	2000	2209	1063	507
Adj. R^2	0.193	0.205	0.193	0.205	0.196	0.200	0.157
F	61.519	60.939	72.491	73.808	62.144	23.156	8.122

Table 6

Parent firm performance, the value of cash holdings, and financial constraints

The table reports estimates of the impact of parent firm performance on the value of listed firm cash holdings following the model of Faulkender and Wang (2006). Sample characteristics, data sources, and variable definitions are reported in Table 1. Constrained firms have total assets less than the sample median. Intercepts are estimated but not reported for brevity. Two-dimensional clustered ordinary least squares regressions follow Petersen (2009). Standard errors and *t* values in parentheses are computed following Froot (1989) and Williams (2000) by allowing for heteroskedasticity and any type of correlation for observations of the same firm but assuming independence for observations across firms. *, **, *** denote significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests.

	Financially unconstrained / Large publicly listed firms	Financially constrained / Small publicly listed firms
	CAR_t (FF4)	CAR_t (FF4)
	(1)	(2)
Parent performance		
(1) *Parent* ROA_t	1.832 (2.31)**	2.076 (1.71)*
(2) *Parent* $ROA_t \times \Delta C_t/M_{t-1}$	13.025 (6.77)***	7.234 (0.97)
Listed firm characteristics		
(3) $\Delta C_t/M_{t-1}$	0.610 (1.39)	1.402 (1.17)
(4) $\Delta E_t/M_{t-1}$	3.154 (3.20)***	2.328 (6.29)***
(5) $\Delta NA_t/M_{t-1}$	0.945 (2.20)**	0.539 (0.59)
(6) $\Delta D_t/M_{t-1}$	-1.846 (-0.90)	1.968 (0.87)
(7) C_{t-1}/M_{t-1}	0.564 (1.56)	0.666 (1.29)
(8) L_t	0.574 (1.42)	0.327 (0.93)
(9) NF_t/M_{t-1}	0.600 (3.54)***	1.008 (1.18)
(10) $C_{t-1}/M_{t-1} \times \Delta C_t/M_{t-1}$	-1.155 (-1.37)	0.006 (0.00)
(11) $L_t \times \Delta C_t/M_{t-1}$	-0.614 (-0.61)	-0.949 (-0.51)
Observations	720	529
Adj. R^2	0.309	0.153
F	26.125	7.925

Table 7

Parent firm performance, the value of cash holdings, and the relative size of subsidiaries

The table reports estimates of the impact of parent firm performance on the value of listed firm cash holdings, following the model of Faulkender and Wang (2006). Sample characteristics, data sources, and variable definitions are reported in Table 1. *Parent TA* is the parent firm's total assets. Intercepts are estimated but not reported for brevity. Two-dimensional clustered ordinary least squares regressions follow Petersen (2009). Standard errors and *t* values in parentheses are computed following Froot (1989) and Williams (2000) by allowing for heteroskedasticity and any type of correlation for observations of the same firm but assuming independence for observations across firms. *, **, *** denote significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests.

	All firms	All firms	TA/Parent TA>median			TA/Parent TA<median		
	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent characteristics								
(1) TA_t/*Parent* TA_t	-0.19 (-3.85)***	-0.185(-3.65)***						
(2) TA_t/*Parent* TA_t ×	1.280 (4.12)***	1.291(2.83)***						
(3) *Parent* ROA_t			1.071 (1.65)	1.156 (1.71)	1.165 (1.75)	1.595 (1.52)	1.644 (1.60)	1.852 (1.62)
(4) *Parent* $ROA_t \times \Delta C_t/M_{t-1}$			6.354 (2.14)*	8.134 (2.81)**	7.975 (2.92)**	2.211 (0.31)	2.726 (0.38)	4.057 (0.53)
(5)SOE		-0.005(-1.41)		0.045 (2.36)**			0.019 (0.49)	
(6)SOE × $\Delta C_t/M_{t-1}$		0.332(1.95)*		0.811 (2.59)**			0.177 (0.28)	
(7)Local SOE					0.037 (1.75)			-0.019 (-0.42)
(8)Central SOE					0.742 (1.81)			0.169 (0.27)
(9)Local SOE × $\Delta C_t/M_{t-1}$					0.095 (1.64)			0.120 (1.72)
(10) Central SOE × $\Delta C_t/M_{t-1}$					0.990 (2.36)**			0.639 (0.96)
Listed firm characteristics								
(11) $\Delta C_t/M_{t-1}$	-0.161 (-0.65)	-0.375(-0.98)	2.428 (3.74)***	2.046 (2.85)**	2.160 (3.02)**	0.875 (2.03)*	0.739 (1.07)	0.549 (0.90)
(12) $\Delta E_t/M_{t-1}$	2.462 (6.50)***	2.443(6.38)***	2.472 (7.17)***	2.443 (7.19)***	2.483 (7.23)***	2.329 (2.31)**	2.322 (2.28)*	2.272 (2.23)*
(13) $\Delta NA_t/M_{t-1}$	1.068 (5.00)***	1.067(4.99)***	1.249 (1.49)	1.264 (1.59)	1.261 (1.59)	0.779 (2.25)*	0.770 (2.22)*	0.763 (2.17)*
(14) $\Delta D_t/M_{t-1}$	0.776 (1.10)	0.782(1.09)	-0.138 (-0.12)	-0.265 (-0.22)	-0.362 (-0.31)	1.317 (0.78)	1.341 (0.81)	1.084 (0.68)
(15) C_{t-1}/M_{t-1}	0.603 (2.84)***	0.601(2.84)***	0.581 (1.49)	0.589 (1.49)	0.588 (1.44)	0.547 (1.63)	0.556 (1.66)	0.523 (1.59)
(16) L_t	0.326 (2.04)**	0.327(2.02)**	0.261 (0.91)	0.259 (0.90)	0.255 (0.90)	0.477 (1.43)	0.475 (1.42)	0.533 (1.48)
(17) NF_t/M_{t-1}	0.224 (2.22)**	0.247(2.70)***	0.015 (0.02)	0.059 (0.09)	0.079 (0.12)	0.404 (0.85)	0.430 (0.93)	0.459 (1.05)
(18) $C_{t-1}/M_{t-1} \times \Delta C_t/M_{t-1}$	-1.042 (-1.64)	-0.947(-1.46)	-0.974 (-0.95)	-0.995 (-1.08)	-1.081 (-1.15)	-0.674 (-0.67)	-0.679 (-0.63)	-0.689 (-0.62)
(19) $L_t \times \Delta C_t/M_{t-1}$	-2.06 (-3.24)***	-2.165(-3.23)***	-3.271 (-2.12)*	-3.533 (-2.29)*	-3.705 (-2.44)**	-0.832 (-1.00)	-0.824 (-0.97)	-0.593 (-0.62)
Observations	2203	2198	1,105	1,102	1,105	1,099	1,097	1,099
Adj. R^2	0.185	0.184	0.191	0.192	0.194	0.193	0.193	0.200
F	44.932	73.341						

Table 8

Parent firm performance, the value of cash holdings, and the subsidiary's relative profitability

The table reports estimates of the impact of parent firm performance on the value of listed firm cash holdings, following the model of Faulkender and Wang (2006). Sample characteristics, data sources, and variable definitions are reported in Table 1. Intercepts are estimated but not reported for brevity. Two-dimensional clustered ordinary least squares regressions follow Petersen (2009). Standard errors and *t* values in parentheses are computed following Froot (1989) and Williams (2000) by allowing for heteroskedasticity and any type of correlation for observations of the same firm but assuming independence for observations across firms. *, **, *** denote significance levels of 10%, 5%, and 1%, respectively, in two-tailed tests.

	$EBIT_t>0$ and *Parent* $EBIT_t>0$	$EBIT_t<0$ and *Parent* $EBIT_t<0$	All firms	$CF_t>0$ and *Parent* $CF_t>0$	$CF_t<0$ and *Parent* $CF_t<0$	All firms
	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)	CAR_t (FF4)
	(1)	(2)	(3)	(4)	(5)	(6)
Parent characteristics						
(1) $EBIT_t$/*Parent* $EBIT_t$	-0.178 (-0.87)	-0.359 (-1.20)				
(2) $EBIT_t$/*Parent* $EBIT_t \times \Delta C_t/M_{t-1}$	4.940 (2.14)**	10.850 (1.70)*				
(3) dum($EBIT_t$>*Parent* $EBIT_t$)			-0.057 (-1.26)			
(4) dum($EBIT_t$>*Parent* $EBIT_t$) $\times \Delta C_t/M_{t-1}$			-0.014 (-0.03)			
(5) CF_t/*Parent* CF_t				-0.180 (-2.03)**	0.007 (0.03)	
(6) CF_t/*Parent* $CF_t \times \Delta C_t/M_{t-1}$				0.522 (0.64)	-0.479 (-0.15)	
(7) dum(CF_t>*Parent* CF_t)						0.029 (1.09)
(8) dum(CF_t>*Parent* CF_t) $\times \Delta C_t/M_{t-1}$						1.097 (2.28)**
(9)SOE	0.087 (2.02)**	0.733 (2.95)***	0.001 (-0.03)	-0.013 (-0.26)	0.172 (1.80)*	-0.001 (-0.04)
(10)SOE $\times \Delta C_t/M_{t-1}$	-0.030 (-0.06)	5.036 (2.13)**	0.334 (2.13)**	0.502 (0.93)	1.406 (0.96)	0.331 (2.16)**
Listed firm characteristics						
(11) $\Delta C_t/M_{t-1}$	6.696 (3.31)***	-15.766 (-1.75)*	1.497 (5.59)***	0.154 (0.11)	-1.517 (-0.21)	0.652 (5.83)***
(12) $\Delta E_t/M_{t-1}$	4.734 (4.63)***	2.364 (1.82)*	2.453 (6.25)***	3.294 (5.88)***	1.942 (2.07)**	2.480 (6.03)***
(13) $\Delta NA_t/M_{t-1}$	1.058 (2.94)***	1.414 (0.64)	1.072 (4.93)***	0.994 (3.86)***	-0.165 (-0.20)	1.063 (5.10)***
(14) $\Delta D_t/M_{t-1}$	-0.784 (-0.57)	-0.962 (-0.09)	0.873 (1.21)	0.011 (0.01)	4.899 (1.03)	0.796 (1.10)
(15) C_{t-1}/M_{t-1}	0.745 (4.86)***	0.480 (0.57)	0.616 (2.85)***	0.380 (2.23)**	1.009 (1.18)	0.521 (2.55)**
(16) L_t	0.282 (2.06)**	0.460 (1.17)	0.315 (1.97)*	0.267 (2.20)**	0.411 (0.92)	0.295 (1.88)*
(17) NF_t/M_{t-1}	-0.106 (-0.24)	1.773 (0.30)	0.243 (2.60)**	0.279 (0.82)	-0.383 (-0.07)	0.129 (0.72)
(18) $C_{t-1}/M_{t-1} \times \Delta C_t/M_{t-1}$	-2.692 (-1.98)**	-1.642 (-0.33)	-1.105 (-1.62)	-0.289 (-0.19)	1.727 (0.29)	-0.173 (-0.25)
(19) $L_t \times \Delta C_t/M_{t-1}$	-2.954 (-1.80)*	-2.113 (-0.31)	-2.032 (-2.79)***	-1.076 (-0.72)	2.076 (0.45)	-2.375 (-2.32)**
Observations	709	57	2211	1119	89	2211
Adj. R^2	0.217	-0.040	0.182	0.213	0.003	0.184
F	15.723	20.921	72.361	21.556	1.640	68.585