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Bidirectional capital impropriation and capital investment of listed companies

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Abstract

Purpose – In recent decades, related party transactions have been assailed by scholars and regulation authorities since related parties of a listed company may "tunnel" its resources, damaging the interests of other stakeholders. One kind of "tunneling" is capital impropriation, which is common but harmful in an emerging market where investor protection is weak. In contrast, a listed company may also impropriate capitals from its controlling business group or related parties reported as accrued liabilities in the financial statement of the listed company, which can be regarded as the "supporting hand" from related parties. Thus, the capital impropriation may be bidirectional. In fact, the capital impropriation is a financing behavior with low cost, and it can provide necessary working capital for some firms and reduce that for the other. Since the working capital is an important part of the firm's stock of capital, which can relax firms' short-run financing constraints, it may significantly influence firms' capital investment behaviors. Therefore, how does the bilateral capital impropriation influences the capital investment of listed firms?

Design/methodology/approach – Using the data of Chinese listed firms in 2005 and 2006, this paper empirically investigates the effect of bidirectional capital impropriation on listed firms' capital investment efficiency.

Findings – Receivable items like accounting receivable or other accruals that related parties owe to the listed firms will reduce the capital expenditure of listed companies and reduce the sensitivity of investment-cash flow relation. Actually, capital impropriation by listed firms may stimulate their capital investments and increase the sensitivity of investment-cash since listed firms obtain capitals for future investments at a lower cost. In all, the bidirectional capital impropriation significantly affects the capital investment and sensitivity of investment-cash flow of listed firms, and different direction of capital impropriation will lead to different investment efficiency. It should also be noted that capital impropriation is not necessarily something negative since it may sometimes reduce the overinvestment.

Originality/value – The paper provides more evidence to the capital investment of listed companies and identifies the factors influencing its efficiency from the perspective of bidirectional capital impropriation.

Keywords Capital gains, Investments, Financial markets, Fraud

Paper type Research paper

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1. Introduction

In recent years, related party transactions, especially the capital embezzlement/impropriation by the large or controlling shareholders, are receiving more attention from scholars and regulation authorities. Owing to their origins as state-owned enterprises, most listed companies in China are closely connected with their state business groups who usually serve as the controlling shareholders or related parties, thus the related party transaction facilitates the large shareholders or the business groups to tunnel the listed companies (Chen and Wang, 2005). The "Deadline in June"[1] is aimed at solving the problem of tunneling listed firms by large shareholders such as capital embezzlements and illegal guarantees. Current researches focusing on capital embezzlement by large shareholders conclude that the capital impropriations are mainly through the non-arm's length transactions or other black box work, undermining the performance of listed companies and harming the interests of small shareholders. Indeed, capital impropriation by controlling shareholders is definitely harmful to listed firms, while they also get capitals from the controlling shareholders, like payables to related parties in their accounts, which means the capital impropriation is bidirectional and the net capital impropriation deducting the amount for normal trade can better proxy for the tunneling or the supporting incentive of controlling shareholders to listed firms. For the controlling shareholders, the incentive of "tunneling" and "supporting" may coexist, and the impact on listed companies is dramatically opposite. The misappropriation of funds is bound to affect corporate investment behavior, so how does bidirectional related capital impropriation influence the investment of listed firms? At present, this issue is not thoroughly studied.

This paper attempts to investigate the capital impropriation from the perspective of capital investment and investment-cash sensitivity; in other words the economic consequences for the bidirectional impropriation. The fund from related parties can be a capital source, and will listed firms use these capitals to support their long-term investments? How does it affect the investment efficiency or the investment-cash sensitivity? Using the data of Chinese listed firms in 2005 and 2006, we find that the funds impropriated by listed firms from their related parties can be a source of financing, and is the showcase of the efficiency of the internal capital market which significantly influences the capital investment of listed firms. The funds impropriated by listed firms from their related parties show the supporting role for the related parties, and is positively related to the capital investment for listed firms. In contrast, if listed firms are impropriated by their related parties, the impropriated fund is negatively related to the capital investment. In addition, the investment-cash sensitivity is increased when funds from related parties are impropriated by listed firms, and decreased otherwise. The bidirectional capital impropriation significantly influences the capital investment of listed firms.

The rest of the paper is organized as follows. Section 2 reviews the literature about related parties transactions and investment-cash sensitivity, and our hypothesis about bidirectional capital impropriation, capital investment and investment-cash sensitivity is presented in Section 3 and Section 4 describes sample and data. Empirical analysis appears in Section 5. Conclusions and suggestions are in Section 6.

2. Literature review

The investment behavior of firms is a heated issue among scholars and entrepreneurs. Modigliani and Miller (1958) suggest that if the capital market is fully competitive and

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investors can freely arbitrage, the capitals that firms require for long-term investment will be acquired from the capital market with no costs, no taxes and no transaction costs, which means the investment is unrelated to financing sources. However, the traditional Modigliani-Miller theory is challenged with the development of firm theory, information economy theory, agency theory and contracting theory in the field of capital structure. Empirical researches show that the capital market is not perfect and firms' investment is constrained by financing and internal funds. Fazzari *et al.* (1988) first prove the existence of investment-cash sensitivity and find that this sensitivity is greater for firms with heavier financing constraints. But Kaplan and Zingales (1997) and Cleary (1999) hold the opposite conclusion that investment-cash sensitivity is greater for firms with a lesser financing constraint problem. Feng (1999) suggests that Chinese firms face heavy financing constraint problems by using the Fazzari model; while Lian and Cheng (2007) find the investment-cash sensitivity is greater for firms with less financing constraint problems in China.

But how does the investment-cash sensitivity come out? There exist two theories, namely the free cash flow theory and information asymmetry theory. Oliner and Rudebusch (1992) suggest information asymmetry theory can explain the cause of investment-cash sensitivity better than the transaction cost theory. Vogt (1994) find both Jensen (1986) free cash flow and Myers and Majluf (1984) pecking order hypotheses are potential explanations for the investment-cash flow relationship. He and Ding (2001) prove the management opportunity hypothesis that the current self-restriction mechanism for management in Chinese listed firms is not generally effective. Management opportunity is the main incentive for higher retained earnings, instead of the "financing constraint". Rao and Wang (2006) suggest "overinvestment" is common for Chinese listed firms and it can be explained by the free cash flow hypothesis, while the "financing facilitate" that is opposite to the financing constraint following the information asymmetry hypothesis is also explanatory. Lian and Cheng (2007) find firms with fewer financing constraint problems tend to carry out overinvestment, which means the agency problem leads to investment-cash sensitivity; while firms with heavier financing constraint problems tend to do underinvestment, suggesting that the information asymmetry hypothesis is the cause. Besides, other scholars in China also investigate the investment-cash sensitivity from the perspective of ownership structure, concluding that as the control right of large shareholders increases, investment-cash sensitivity reduces (Zhang and Li, 2005; Rao and Wang, 2006), and this sensitivity also shows great differences for different ultimate shareholders (Zhang and Li, 2005). Management can significantly influence the investment-cash sensitivity; their over-confidence is positively related with capital investment level and investment-cash sensitivity (Zhi and Tong, 2007). Owing to the unique ownership structure and corporate governance in Chinese listed firms, over-confidence of management may lead to lower efficiency of capital allocation (Hao *et al.*, 2005).

However, most researches on investment-cash sensitivity fail to study the role of liquidity reserve. Luo *et al.* (2007), Zhi and Tong (2007), Gamba and Triantis (2008), Lins *et al.* (2008), and Campbell *et al.* (2008) all find that the cash-holding can be the liquidity reserve for future capital investment. Since cash-holding is the component of operating capitals which compete with capital investment for funds (Fazzari and Peterson, 1993), the operating capitals can significantly influence the capital investment behavior.

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The operating capitals are significantly affected by the corporate governance, and in an emerging market this is evidently shown as capital impropriation by related parities. Although a part of capital transfers between listed firms and related parties are legal, there are still many related parties tunneling the listed firms as "ATM" (Wang and Xiao, 2005)[2] to satisfy their capital needs. Related capital impropriation is not just the capital impropriation by large shareholders to listed firms, it also includes when that listed firm impropriates the funds from controlling shareholders and related parties, which means the capital impropriation is bidirectional. While the former is a kind of tunneling by controlling shareholders, the latter can be regarded as the supporting[3] to the listed firms by related parties (Zhou and Zhang, 2008). Tang *et al.* (2005), Ma *et al.* (2005), and Li *et al.* (2008) also empirically investigate the relation of control right and capital impropriation from the tunneling aspect, but their analysis just shows the determinants of capital impropriation and fails to mention the influence of bidirectional capital impropriation on firms operating and investing behaviors. Zhou and Zhang (2008) examine the influence of bidirectional capital impropriation on earnings quality and find that bidirectional impropriation really matters to accounting earnings; if the funds of listed firms are impropriated by controlling shareholders, the quality of accounting earnings for listed firms will be much lower. However, their research does not include the influence on capital investment behavior.

3. Hypotheses

The operating capital and capital investment are competitive for funds (Fazzari and Peterson, 1993). Receivable and other short-term assets, like accounting receivable, note receivables and inventory, will exhaust firms' available funds and actually backlog funds for extension and enlargement. Therefore, firms usually take steps to accelerate the liquidity for receivables and inventory, such as assets securitization, cash discounts, and inventory management and so on, in order to recycle available funds for long-term operation like purchasing equipment and other long-term investments. Thus, operating capitals backlog available funds for investment in fixed assets. Owing to the high costs of external financing, firms should rely on the available cash flow to invest (namely the investment-cash sensitivity). Various receivable items occupy some cash flows and thus influence the investment-cash sensitivity. In contrast, various payables can provide firms with funds as a kind of financing channel and offer some cash flows for long-term investment, affecting the investment-cash sensitivity. The existence of investment-cash sensitivity is due to the market imperfection and higher external financing costs, thus restricting the capital investment. But if firms can get funds from related parties with lower cost (even zero cost), they can undertake more projects and invest for the long-term. However, if their funds are impropriated by large shareholders or other related parties, it will significantly affect their current and/or long-term operations and investments.

In China, related party transaction is a common phenomenon, and occurs more frequently to listed firms with business groups. Large shareholders usually take advantage of their controlling position to tunnel the listed firms by assets replacement, assets transfer, and illegal guarantee or direct capital embezzlement (Chen and Wang, 2005). The balance sheet in annual reports indicates that there is a huge amount of receivables and payables among related parties, suggesting severe capital impropriation between listed firms and related parties though party of them are normal

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operating requirement. Firms may use the related parties' funds as their capitals for investment, which means the funds impropriated among related parties can be a source of financing. Capital impropriation among related parties does not just refer to the capital impropriation by large shareholders to listed firms, it also includes the situation when a listed firm impropriates the funds from controlling shareholders and related parties, thus the capital impropriation is bidirectional. The former is a kind of tunneling by controlling shareholders and the latter can be thought of as supporting the listed firms by related parties (Zhou and Zhang, 2008).

Receivables from related parties, like capital embezzlement, will occupy some funds for other use, restricting the capital investment of listed firms. Higher external financing costs force firms to rely on their internal cash flows, however receivable items retain a part of those internal capitals, thus the investment-cash flow will be significantly affected. In contrast, if listed firms impropriated some capitals from their related parties, it will provide them with more funds for other uses and alleviate the pressure from operating assets on capitals, lowering the long-term investment pressure, supporting the capital investment, and affecting the investment-cash sensitivity. Therefore, we propose that:

H1. Capital impropriation by related parties will negatively affect the capital investment of listed firms; while capital impropriation from related parties by listed firms will stimulate their capital investment.

H2. Capital impropriation by related parties will lower the investment-cash sensitivity; while capital impropriation from related parties by listed firms will increase the sensitivity.

4. Sample and data

4.1. Model specification

Current researches on investment-cash sensitivity are usually based on the Vogt (1994) model, indicating that corporate cash flow, growth opportunity and financing restriction are key determinants for capital investment. Since this paper investigates the sensitivity from capital impropriation, our model is set as follows:

$$I_t/K_{t-1} = \alpha + \beta_1 \times (CF_{t-1}/K_{t-1}) + \beta_2 \times Grow_{t-1} + \beta_3 \times (Dept_{t-1}/K_{t-1}) + \beta_4 \times (\mathrm{Re}lTran_t/K_{t-1}) \times CF_{t-1} + \varepsilon \quad (1)$$

where I_t/K_{t-1} is the capital investment; $\mathrm{CF}_{t-1}/K_{t-1}$ is the cash flow; Grow_{t-1} is the growth opportunity; $\mathrm{Debt}_{t-1}/K_{t-1}$ is the debt ratio and $\mathrm{RelTran}_t/K_{t-1}$ proxy for the bidirectional capital impropriation.

4.2. Variables

Current researches on capital investment have different definitions of capital investment[4]. Vogt (1994) uses the Compustat 128 items as the capital investment, while Pindado and Torre (2004) and Pawlin and Renneboog (2005) use the increase of net fixed assets plus depreciations. In China, Hao *et al.* (2005) use the change of fixed assets, and projects undergoing, Tong and Lu (2005) use the change of fixed assets, long-term investment and projects undergoing, while He and Ding (2001) use the change of fixed assets, Rao and Wang (2006) use the change of long-term assets, Zhang and Li (2005) use the cash expenditure in cash flow statement on purchase of

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fixed assets, intangible assets and other assets. In order to avoid the measurement biases for different capital investment measures, we use four investment measures: I_1 is the increase of fixed assets plus depreciation; I_2 is the change in fixed assets and projects undergoing; I_3 is the change of long-term investment, fixed assets and projects undergoing; I_4 is the cash expenditure in cash flow statement on purchase of fixed assets, intangible assets and other assets. All capital investment measures are standardized by total assets at year beginning.

The related parties are based on the definition in "Corporate Accounting Principle No. 36 – Related Party Disclosure". The types of capital impropriation among related parties are various, and are shown by several accounts in annual reports. While in order to facilitate research, some papers use the "other account receivable" and "other account payable" to proxy for the real capital impropriation by related parties (Rao and Wang, 2006; Zhang and Li, 2005), actually this measure is rough and biased since other receivables and payables not only include the transaction among related parties but also other transactions, further related capital impropriation is not just shown in other receivables/payables. In order to better proxy for the related capital impropriation, we collect the data from the accounts regarding the related capital impropriations in annual reports manually for 2005 and 2006, including the following 22 receivable/payable accounts (Table I).

By adding up these 11 receivable items we obtain the sum of related party receivables for the current year (RelRec, related receivables). We sum up those 11 payable items to have cumulated related party payable for the current year (RelPay, related payables). Thus, the net receivable/payable (RelNet) is calculated by deducting RelPay from RelRec. All these three variables are standardized by beginning total assets.

We use the cash flow from operation at the year beginning to proxy for the cash following Rao and Wang (2006), Zhang and Li (2005), Pindado and Torre (2004), and Pawlin and Renneboog (2005). Though some researches use the cash flow from operation at year end (He and Ding, 2001; Tong and Lu, 2005; Rao and Wang, 2006; Zhi and Tong, 2007), the beginning data are more reasonable since the investment decision for the current year is predetermined in the previous year, and the available cash flow is the key reference for capital investment (Pawlin and Renneboog, 2005).

Fazzari *et al.* (1988), Vogt (1994), and other researches in the USA use the Tobins' Q to proxy for the growth potential, and some researchers in China also choose the measure. However, due to the un-circularity of all stock in the Chinese stock market, Tobins' Q is obviously not a better proxy for growth potential. Rao and Wang (2006)

Receivable accounts	Payable accounts
Account receivable	Account payable
Note receivable	Note payable
Other receivable	Advance receivable
Advance payable	Other payable
Prepaid expense	Dividend payable
Dividend receivable	Interest payable
Interest receivable	Short-term debt
Short-term investment	Long-term debt due in one year
Long-term investment	Long-term debt
Other long-term assets	Long-term payable
Other assets	Other debts

Table I. Related capital impropriation items

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find the growth of revenue can proxy for the growth potential better in China. Thus, we use the growth of revenue in our paper and Tobins' Q as a robust test.

Fazzari *et al.* (1988) suggest the debt leverage will significantly influence the capital investment due to financial constraint. Tong and Lu (2005) also find the debt ratio significantly affects the investment-cash sensitivity. Thus, we also control for the debt ratio in our regression by using the total debt ratio at the year beginning. Since Inds is the industrial dummy (after dropping the finance industry, there are 11 dummy variables for 12 industries which is defined by the China Securities Regulatory Commission).

4.3. Sample and data

We use the data of listed firms from 2005 to 2006, dropping firms in finance and real estate industries, firms without related transactions data, firms whose leverage exceeds 100 percent, firms whose growth rate exceeds 100 percent range and firms whose capital investment level is higher than 1. Therefore, our final sample is 2,050, with 1,022 in year 2006 and 1,028 in year 2005.

The related capital impropriation data are taken manually from the annual reports of Chinese listed firms and other financial data are from CSMAR and Wind databases.

5. Empirical analysis

5.1. Descriptive statistics

Table II shows the descriptive statistics. The average capital investment of sample firms in 2005 and 2006 is about 7 percent, while the cash flow from operation at previous year is just 5.48 percent on average. The ratio of related party receivables to assets is about 3.87 percent, much higher than the related payables 2.37 percent, which suggests that related parties tend to impropriate capital from listed firms rather than support them as the net receivable/payables is 1.51 percent on average.

	n	Mean	SD	Min	Median	Max
I_1	2,050	0.0677	0.1183	−0.4806	0.0357	0.8221
I_2	2,050	0.0739	0.1247	−0.5617	0.0432	0.8524
I_3	2,050	0.0782	0.1301	−0.5661	0.0509	0.8611
I_4	2,050	0.0724	0.0828	0	0.0444	0.7626
CF/K	2,050	0.0548	0.0803	−0.4475	0.0542	0.5627
Grow (%)	2,050	17.0773	28.1527	− 100	16.7750	98.0181
Debt/K (%)	2,050	0.4943	0.1858	0.0081	0.5077	0.9964
RelRec/K	2,050	0.0387	0.0823	0	0.0087	0.8465
RelPay/K	2,050	0.0237	0.0510	0	0.0049	0.5768
RelNet/K	2,050	0.0151	0.0926	−0.5768	0.0009	0.8340

Notes: I_1 is the increase of fixed asset plus depreciation; I_2 is the change of fixed asset, and projects undergoing; I_3 is the change of long-term investment, fixed assets and projects undergoing; I_4 is the cash expenditure in cash flow statement on purchasing of fixed assets, intangible assets and other assets; all capital investment measures are standardized by total assets at year beginning; K is the total asset at year beginning; CF is the cash flow from operation at year beginning; grow is the revenue growth at previous year; debt is the debt ratio at year beginning; RelRec is the sum of related receivables; RelPay is the sum of related payables; RelNet is the net of receivables and payables

Table II.
Descriptive statistics

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Table III compares the capital investment between firms with net related receivables and firms with net related payables. The comparison of all four investment measures shows that the capital investments for firms with net related receivables, which means related parties impropriate the funds from listed firms, are significantly less than firms with net related payables, which means firms get funds from their related parties. The comparison for unit variables suggests that capital impropriation by related parties will significantly reduce the long-term capital investment for listed firms, which may lead to worse performance. However, if related parties support the listed firms by supplying more funds via receivables accounts, the listed firms can finance with fewer costs and can easier obtain capital for further investment, which may benefit them in the long run.

5.2. Regress analysis

Table IV shows the results for the influence of related receivables/payables on capital investment. The first four columns show the effects for related receivables using four investment proxies and the last four columns are for related payables.

The related receivables are the capitals impropriated by related parties, and will reduce the available cash flows from the operation of listed firms, leading to lower capital investment, which is shown by the negative coefficients of related receivables (RelRec), significantly in 0.01 levels. The related payables are capitals supported by related parties to the listed firms by allowing longer payment, which will increase the cash flow for listed firms and promoting their capital investment. The effect is evidently shown by the positive coefficients for related payables (RelPay), significantly for three investment proxies while I_4 is not significant, as expected. Generally speaking, the results in Table IV support our *H1*.

Table V shows the influence of net receivables/payables (RelNet) on capital investment. By reducing the related payables from related receivables, we obtain the net receivable/payables and use this net value to proxy for the actual capital impropriation by related parties.

	n	I_1	I_2	I_3	I_4
Mean					
RelNet >0	1,157	0.0531	0.0593	0.0639	0.0645
RelNet <0	893	0.0865	0.0929	0.0968	0.0826
Difference		-0.0334	-0.0336	-0.0329	-0.0181
T		6.40^{**}	6.10^{***}	5.72^{***}	4.93^{***}
Median					
RelNet >0	1,157	0.0315	0.0354	0.0423	0.0380
RelNet <0	893	0.0444	0.0556	0.0632	0.0541
Difference		-0.0129	-0.0202	-0.0209	-0.0161
χ^2		13.02^{***}	21.05^{***}	21.88^{***}	25.34^{***}

Notes Significance at: $^{*}0.10$, $^{**}0.05$, and $^{***}0.01$ levels; I_1 is the increase of fixed asset plus depreciation; I_2 is the change of fixed asset, and projects undergoing; I_3 is the change of long-term investment, fixed assets and projects undergoing; I_4 is the cash expenditure in cash flow statement on purchasing of fixed assets, intangible assets and other assets; all capital investment measures are standardized by total assets at year beginning; RelRec is the sum of related receivables; RelPay is the sum of related payables; RelNet is the net of receivables and payables

Table III.
Net related receivables/payable and capital investment

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	I_1		I_2		I_3		I_4	
CF/K	0.1807	(5.27)***	0.2221	(6.50)***	0.2384	(6.61)***	0.1690	(7.63)***
Grow	0.0572	(6.14)***	0.0635	(6.58)***	0.0606	(5.80)***	0.0508	(8.65)***
Debt/K	0.0070	(0.48)	−0.0362	(−2.36)**	−0.0371	(−2.26)**	−0.0267	(−2.94)***
RelRec/K	−0.1179	(−4.08)***	−0.0738	(−2.61)**	−0.0986	(−3.34)***	−0.0798	(−4.95)***
RelPay/K								
Inds	*Control*		*Control*		*Control*		*Control*	
n	2,050		2,050		2,050		2,050	
R^2	0.1098		0.1296		0.1268		0.1455	
	I_1		I_2		I_3		I_4	
CF/K	0.1939	(5.77)***	0.2301	(6.90)***	0.2492	(7.13)***	0.1782	(8.10)***
Grow	0.0635	(6.88)***	0.0695	(7.33)***	0.0674	(6.52)***	0.0531	(8.94)***
Debt/K	−0.0080	(−0.56)	−0.0512	(−3.40)***	−0.0538	(−3.34)***	−0.0315	(−3.50)***
RelRec/K								
RelPay/K	0.2704	(2.79)***	0.3551	(3.43)***	0.3662	(3.84)***	0.0068	(0.18)
Inds	*Control*		*Control*		*Control*		*Control*	
n	2,050		2,050		2,050		2,050	
R^2	0.1166		0.1478		0.1431		0.1396	

Notes: Significance at: *0.10, **0.05, and ***0.01 levels; I_1 is the increase of fixed asset plus depreciation; I_2 is the change of fixed asset, and projects undergoing; I_3 is the change of long-term investment, fixed assets and projects undergoing; I_4 is the cash expenditure in cash flow statement on purchasing of fixed assets, intangible assets and other assets; all capital investment measures are standardized by total assets at year beginning; K is the total asset at year beginning; CF is the cash flow from operation at year beginning; grow is the revenue growth at previous year; debt is the debt ratio at year beginning; RelRec is the sum of related receivables; RelPay is the sum of related payables; Inds are the industry dummy variables; White-adjusted t-statistics considering the heteroscedasticity are in the parentheses; variance inflation factors (VIF) for regressions are lower than 5

Table IV.
Influence of related capital impropriation on capital investment

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	I_1		I_2		I_3		I_4	
CF/K	0.1742	(5.12)***	0.2115	(6.18)***	0.2279	(6.37)***	0.1708	(7.68)***
Grow	0.0575	(6.17)***	0.0627	(6.50)***	0.0602	(5.79)***	0.0520	(8.83)***
Debt/K	0.0050	(0.35)	−0.0359	(−2.39)**	−0.0376	(−2.33)**	−0.0295	(−3.28)***
RelNet/K	−0.1728	(−4.79)***	−0.1644	(−4.32)***	−0.1869	(−5.10)***	−0.0637	(−3.83)***
|RelNet/K| (RelNet > 0)								
|RelNet/K| (RelNet < 0)								
Inds	*Control*		*Control*		*Control*		*Control*	
n	2,050		2,050		2,050		2,050	
R^2	0.1212		0.1419		0.1403		0.1445	
	I_1		I_2		I_3		I_4	
CF/K	0.1554	(4.10)***	0.2020	(4.92)***	0.2073	(4.81)***	0.1449	(5.54)***
Grow	0.0586	(5.32)***	0.061133	(5.25)***	0.0619	(4.70)***	0.0479	(7.08)***
Debt/K	0.0112	(0.74)	−0.0307	(−1.94)*	−0.0422	(−2.39)**	−0.0333	(−3.06)***
RelNet/K								
|RelNet/K| (RelNet > 0)	−0.1026		−0.0617		−0.091		−0.0668	
|RelNet/K| (RelNet < 0)	(−3.72)***		(−2.32)**		(−3.17)***		(−3.74)***	
Inds	*Control*		*Control*		*Control*		*Control*	
n	1,157		1,157		1,157		1,157	
R^2	0.1258		0.1433		0.1434		0.1569	

(*continued*)

Table V.
Influence of net related capital impropriation on capital investment

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	I_1		I_2		I_3		I_4	
CF/K	0.2220	(3.31)***	0.2608	(4.11)***	0.2877	(4.28)***	0.2044	(4.93)***
Grow	0.0579	(3.54)***	0.0709	(4.31)***	0.0614	(3.49)***	0.0530	(4.93)***
Debt/K	−0.0156	(−0.57)	−0.0684	(−2.32)**	−0.0601	(−1.94)*	−0.0305	(−1.85)*
RelNet/K								
|RelNet/K|								
(RelNet > 0)								
|RelNet/K|	0.2208		0.3331		0.3641		0.0388	
(RelNet < 0)	(1.65)*		(2.29)**		(2.82)***		(0.76)	
Inds	*Control*		*Control*		*Control*		*Control*	
n	893		893		893		893	
R^2	0.1082		0.1375		0.1338		0.1361	

Notes: Significance at: *0.10, **0.05, and ***0.01 levels; I_1 is the increase of fixed asset plus depreciation; I_2 is the change of fixed asset, and projects undergoing; I_3 is the change of long-term investment, fixed assets and projects undergoing; I_4 is the cash expenditure in cash flow statement on purchasing of fixed assets, intangible assets and other assets; all capital investment measures are standardized by total assets at year beginning; K is the total asset at year beginning; CF is the cash flow from operation at year beginning; grow is the revenue growth at previous year; debt is the debt ratio at year beginning; RelRec is the sum of related receivables; RelPay is the sum of related payables; RelNet is the net of related receivables and payables; Inds are the industry dummy variables; White-adjusted t-statistics considering the heteroscedasticity are in the parentheses; VIF for regressions are lower than 5

Table V.

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Since the net related receivable/payables is the capital impropriation to the listed firms, it will reduce available funds for normal operation and investment plans, significantly affecting the cash investment level as shown by the negative sign for the coefficient of RelNet. In all four regressions coefficients for RelNet is significantly negative in 0.01 levels, by dividing the sample into two groups according to the sign of RelNet, we get positive RelNet which means related parties impropriate capitals from listed firms, while negative RelNet means listed firms obtain capitals from related parties. In regressions for the first group where RelNet is positive, net receivables/payables are significantly negatively related with capital investment. And for the other group where RelNet is negative, coefficients for RelNet are significantly positive[5]. Again, except for the regression for I_4, results for other investment proxy are consistent with the above. Results above show that related capital impropriation can significantly influence the capital investments of listed firms. Related receivables will occupy some funds of listed firms for capital investment, lowering the capital investment levels; while the related payables can be a kind of costless financing, providing more funds for investment capitals, therefore promoting the capital investments of listed firms. In all, separating regression is in line with previous results. Results in Table V are consistent with those in Table IV, further supporting our *H1*.

The existence of investment-cash sensitivity is due to financial constraint. Influence of related capital impropriation on investment-cash sensitivity can investigate whether listed firms carry out financing from their related parties. If listed firms do get financing supports as shown by the related payables to related parties, thus they can get more internal capital than what they should have for capital investments, promoting the investment-cash sensitivity. If they do not get support as shown by the related receivables, they will lose liquidity due to the impropriation by related parties. Thus, they will budget their funds to invest not arbitrarily and reduce the investment-cash sensitivity. In Table VI, we investigate the relation for related receivables/related payables and the investment-cash sensitivity separately. Related receivables are actually the capitals impropriated by other related parties, reducing the cash flow from operation for listed firms and thus lowering the investment-cash sensitivity. It is evidently shown by the significantly negative relation between capital investment and the cross-term of related receivables and cash flow for three regressions in four, where the just coefficient for I_2 is not significant. Related payables indeed provide funds for listed firms to do more capital investment and act as a financing channel, increasing the investment-cash sensitivity, which is exhibited by the positive relation for capital investment and the cross-term, not significantly just for I_4. In all, results in Table VI support *H2*.

Table VII shows the regression results for the influence of the net related receivables/payables on investment-cash sensitivity. The net receivables/payables actually are the capital impropriation among related parties. Firms should use other liquid assets to compensate for the funds impropriated by related parties; therefore they cannot invest the funds as they wish, which leads to lower investment-cash sensitivity as shown by the negative relation between the capital investment and cross-term of related receivables and cash flow.

We divide samples into two groups according to the sign of net receivables/payables. If the net value is positive, the net receivables which mean that related parties impropriate capitals from listed firms are negatively related to investment-cash sensitivity. While if the net value is negative, net payables which indicate the relation between net payables

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Table VI.
Influence of related capital impropriation on investment-cash sensitivity

	I_1			I_2			I_3			I_4	
CF/K	0.2264	(6.17)***	0.2498	(6.87)***	0.2760	(7.15)***	0.2012	(7.75)***
Grow	0.0593	(6.44)***	0.0649	(6.79)***	0.0625	(6.03)***	0.0522	(8.82)***
Debt/K	0.0016	(0.11)	−0.0397	(−2.65)***	−0.0416	(−2.59)**	−0.0303	(−3.37)***
RelRec/K × CF	−0.4969	(−2.18)**	−0.2964	(−1.36)	−0.4063	(−1.77)*	−0.3557	(−3.01)***
RelPay/K × CF								
Inds	*Control*		*Control*		*Control*		*Control*	
n	2,050		2,050		2,050		2,050	
R^2	0.1054		0.1280		0.1242		0.1416	
	I_1		I_2		I_3		I_4	
CF/K	0.1346	(3.82)***	0.1664	(4.72)***	0.1954	(5.28)***	0.1880	(7.94)***
Grow	0.0601	(6.52)***	0.0652	(6.82)***	0.0631	(6.04)***	0.0531	(8.98)***
Debt/K	−0.0031	(−0.22)	−0.0440	(−2.96)***	−0.0457	(−2.86)***	−0.0308	(−3.44)***
RelRec/K × CF								
RelPay/K × CF	2.0261	(2.18)***	2.1800	(2.38)**	1.8439	(1.92)**	−0.3330	(−1.16)
Inds	*Control*		*Control*		*Control*		*Control*	
n	2,050		2,050		2,050		2,050	
R^2	0.1131		0.1375		0.1297		0.1401	

Notes: Significance at: *0.10, **0.05, and ***0.01 levels; I_1 is the increase of fixed asset plus depreciation; I_2 is the change of fixed asset, and projects undergoing; I_3 is the change of long-term investment, fixed assets and projects undergoing; I_4 is the cash expenditure in cash flow statement on purchasing of fixed assets, intangible assets and other assets; all capital investment measures are standardized by total assets at year beginning; K is the total asset at year beginning; CF is the cash flow from operation at year beginning; grow is the revenue growth at previous year; debt is the debt ratio at year beginning; RelRec is the sum of related receivables; RelPay is the sum of related payables; Inds are the industry dummy variables; White-adjusted t-statistics considering the heteroscedasticity are in the parentheses; VIF for regressions are lower than 5

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	I_1		I_2		I_3		I_4	
CF/K	0.2257	(5.98)***	0.2575	(6.95)***	0.2770	(7.06)***	0.1857	(7.82)***
Grow	0.0583	(6.36)***	0.0637	(6.70)***	0.0615	(5.94)***	0.0525	(8.87)***
Debt/K	0.0012	(0.09)	−0.0396	(−2.65)***	−0.0418	(−2.61)**	−0.0310	(−3.46)***
RelNet/K × CF	−0.8918	(−3.03)***	−0.7637	(−2.74)***	−0.7739	(−2.79)***	−0.2130	(−1.91)*
|RelNet/K × CF| (RelRec > 0)								
|RelNet/K × CF| (RelRec < 0)								
Inds	*Control*		*Control*		*Control*		*Control*	
n	2,050		2,050		2,050		2,050	
R^2	0.1113		0.1326		0.1280		0.1405	
	I_1		I_2		I_3		I_4	
CF/K	0.2193	(4.77)***	0.2382	(4.79)***	0.2618	(4.99)***	0.1776	(5.42)***
Grow	0.0609	(5.60)***	0.0626	(5.47)***	0.0640	(4.94)***	0.0498	(7.27)***
Debt/K	0.0055	(0.38)	−0.0343	(−2.23)**	−0.0475	(−2.77)***	−0.0376	(−3.47)***
RelNet/K × CF								
|RelNet/K × CF| (RelRec > 0)	−0.5201	(−2.61)**	−0.2881	(−1.45)	−0.4377	(−2.00)**	−0.2426	(−2.04)**
|RelNet/K × CF| (RelRec < 0)								
Inds	*Control*		*Control*		*Control*		*Control*	
n	1,157		1,157		1,157		1,157	
R^2	0.1212		0.1417		0.1404		0.1523	

(*continued*)

Table VII.
Influence of net related capital impropriation on investment-cash sensitivity

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	I_1		I_2		I_3		I_4	
CF/K	0.1205	(1.65)*	0.1456	(2.10)**	0.1986	(2.65)***	0.2288	(4.90)***
Grow	0.0525	(3.30)***	0.0629	(3.89)***	0.0528	(3.01)***	0.0540	(5.08)***
Debt/K	−0.0072	(−0.27)	−0.0551	(−1.90)	−0.0451	(−1.46)	−0.0319	(−1.95)**
RelNet/K × CF								
|RelNet/K × CF| (RelRec > 0)	2.1584		2.3620		1.7151		−0.5348	
|RelNet/K × CF| (RelRec < 0)	(2.02)**		(2.36)**		(1.69)*		(−1.30)	
Inds	*Control*		*Control*		*Control*		*Control*	
n	893		893		893		893	
R^2	0.1108		0.1306		0.1174		0.1372	

Notes: Significance at: *0.10, **0.05, and ***0.01 levels; I_1 is the increase of fixed asset plus depreciation; I_2 is the change of fixed asset, and projects undergoing; I_3 is the change of long-term investment, fixed assets and projects undergoing; I_4 is the cash expenditure in cash flow statement on purchasing of fixed assets, intangible assets and other assets; all capital investment measures are standardized by total assets at year beginning; K is the total asset at year beginning; CF is the cash flow from operation at year beginning; grow is the revenue growth at previous year; debt is the debt ratio at year beginning; RelRec is the sum of related receivables; RelPay is the sum of related payables; RelNet is the net of related receivables and payables; Inds are the industry dummy variables; White-adjusted t-statistics considering the heteroscedasticity are in the parentheses; VIF for regressions are lower than 5

Table VII.

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and investment-cash sensitivity are positive by using absolute value. Results in Table VII further support those in Table VI, and *H2* is thus supported.

5.3. Robust tests

Some researchers use the current cash flow from operation as the proxy for cash (He and Ding, 2001; Tong and Lu, 2005; Rao and Wang, 2006; Zhi and Tong, 2007), and we use basically the same measure and the results are similar. If the net of receivables and payables is positive, it is negatively related with investment-cash sensitivity, showing the capital impropriation by related parties. If the sign is negative, the relation is positive, still consistent with above.

Luo *et al.* (2007), Zhi and Tong (2007), Gamba and Triantis (2008), Lins *et al.* (2008), and Campbell *et al.* (2008) all find that the cash-holding can be a capital investment reserve, thus we add the cash-holding and short-term investment into regressions and find that results are consistent with Tables VI and VII.

Firm size will also affect the capital investment, so we add this factor into regression. Results show that size is significant positively with capital investment, however it does not change the relation between bidirectional capital impropriation and investment level and investment-cash sensitivity, therefore still supporting the hypotheses.

He and Ding (2001), Zhang and Li (2005), and Rao and Wang (2006) all find that the ownership can significantly influence the capital investment and investment-cash sensitivity of listed firms. Therefore, we also control for this factor in regression and the results are consistent with above.

We regress for 2005 and 2006, respectively, and the results are basically the same and support our hypotheses.

6. Conclusion

By investigating the bidirectional capital impropriation between related parties and listed firms, this paper finds that the related capital impropriation can be regarded as a financing channel and compensation for lower internally generated cash flows, and it can significantly influence firms' capital investment. Related party receivables (capitals impropriated by related parties) can depress the capital investment of listed firms and lower the investment-cash sensitivity, while related payables (capitals supported by related parties) can promote the capital investment and increase the investment-cash sensitivity.

Not all the capital impropriation will damage the listed firms. Even those impropriated by related parties can sometimes reduce the overinvestment of listed firms due to the over-confidence or empire-building incentive of management. However, if the incentive is to support listed firms, then related capital impropriation can provide firms with more capitals with lower cost so that it may be beneficial for long-term operations. But if the listed firms use those capitals improperly such as overinvestment, the effect will also be deteriorated.

Notes

1. On March 24, 2008, the Shanghai Stock Exchange issued the 2008 Annual Report No. 4 Memorandum, which explicitly defined capital impropriation and the illegal guarantee of listed companies. In accordance with Memorandum No. 4, listed companies which failed to correct capital impropriation and the illegal guarantee before May 3, 2008 would be treated as special treatment. Until the completion of correction, they would not be allowed to apply

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for revocation. On March 26, the Shenzhen Stock Exchange also announced the "Notice for the special treatment of listed firms for the capital impropriation and the illegal guarantee", and required the listed firms that have capital impropriation and the illegal guarantee by large shareholder or related parities to submit the relevant materials.

2. Besides the related party transactions, tunneling behavior of large shareholders to listed firms may include related acquisition, capital impropriation, related loans, and asset purchases (Li *et al.*, 2005; Gao *et al.*, 2006; Jian and Wong, 2010; He and Liu, 2005; Chen and Wang, 2005).
3. Thinking that the large shareholders have the incentive to tunnel the listed firms, they may also show their supports in order to legally share the profits (Li *et al.*, 2005; Jian and Wong, 2010; Yuan and Yang, 2006).
4. Most researches on investment-cash sensitivity use the fixed asset investment to proxy for the capital investment, such as Fazzari *et al.* (1988), Vogt (1994), Kaplan and Zingales (1997), Cleary (1999), Feng (1999), Tong and Lu (2005), and Zhi and Tong (2007). This paper uses four measures to proxy for the capital investment to avoid measurement bias, especially the fourth measurement.
5. We use the absolute value of RelNet.

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