

**Related transactions with government agencies: Evidence from Chinese listed
state-owned enterprises**

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Related party transactions may serve as a channel for related parties to expropriate resources from listed firms (Berkman, Cole, & Fu, 2009; Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2008), but listed firms may also be propped up via related transactions (Cheung, Jing, Lu, Rau, & Stouraitis, 2009; Friedman, Johnson, & Mitton, 2003). Existing literatures classify related party transactions into various categories to examine the impact of these transactions on listed firms. For instance, Berkman et al. (2009) suggest that loan guarantees issued by listed firms to their related parties are the direct channel for controlling shareholders tunnelling minority shareholders since controlling shareholders clearly gain benefits through lower loan interest rates and the option to default on the loan. Importantly, the influence of related party transactions may also be subject to the identity of related parties due to the intuition that different identities may have different incentives to conduct the related party transactions. However, to our knowledge, existing literature haven not yet clearly clarified the identities of related parties. In this study, we examine the related party transactions conducted between Chinese state-owned enterprises (SOEs) and government agencies to analyse the incentives of government agencies in conducting related party transactions and investigate how such transactions affect SOEs' investment efficiency.

China's listed firms are dominated by SOEs, especially in strategic industries, such as utilities, oil and gas, and mining sectors (Hubbard & Williams, 2017). Although the influence of government is expected to be weakened in SOEs through the initiation and processing of China's Share Issue Privatizations (SIPs) and non-tradable share reform (NTS reform) (Liu, Luo, & Tian, 2017; Zhang, M, Zhang, & Yi, 2016), state control is still retained by the government (Yiu, Wan, & Xu). According to Wu, Wu, Zhou, and Wu (2012), by the end of 2007, out of 1533 listed firms in China that issue A-shares, 943 (more than 60%) were SOEs. The influence of state on SOEs may even increase since President Xi Jinping's governance, who emphasizes that the SOEs should continue to grow faster, better and larger (Gan, 2018). Additionally, SOEs are essentially different from non-SOEs. Unlike private shareholders, state controlling shareholders in SOEs tend to value political targets, such as maintaining employment and local GDP growth, over firm value maximization (Boubakri, Cosset, & Saffar, 2008; Zhang et al., 2016), thus share similar interests with the government.

We focus on government agencies that conduct related parties of transactions with SOEs. The government holds the distribution power of various state resources and is the ultimate owners of SOEs. Additionally, SOEs sometimes bears the burden to assist local government with maintaining local development and stability. Therefore, the government has stronger incentive to allocate resources to SOEs, rather to other firms, mainly due to the political function of SOEs (Liu, Liu, Tian, & Wang, 2018).

The influence of political connection to corporations has been widely discussed and documented by existing studies. Political connection is particularly considered valuable to firms in countries with weak legal and institution environment since it is able to assist firms with accessing various resources and favourable treatments of the government, such as debt financing resources (Fan, Wong, & Zhang, 2007), beneficial tax treatments (Wu et al., 2012) and easier access to equity market (Wu, Li, & Li, 2013). Executives with bureaucratic background may value their personal interests and political targets over firms' financial objectives (Fan et al., 2007) and thus make sub-optimal decisions that could potentially reduce firm value (Shleifer & Vishny, 1994) and efficiency (Chen, Sun, Tang, & Wu, 2011). Additionally, firms' managerial system and monitoring efficiency may be deteriorated though low turnover of politically connected executives, because firms tend to replace politically connected executives only when the value loss caused by politically connection exceeds the value of resources and benefits gain via politically connected executives (Cao, Pan, Qian, & Tian, 2017). Therefore, we expect that political connection is able to assist SOEs in obtaining resources through related party transactions conducted with government agencies, but the resources obtained may not necessarily improve firm efficiency.

We hand collect the related party transactions conducted between SOEs and government agencies from 2008 to 2014. We first read the background of counterparts of the related party transactions and manually identify the related party transactions with government agencies, including local government, government ministries, government bureaus, state asset investment bureaus, state asset management bureaus, research institutions and state-owned banks. Second, all related parties are properly identified and divided into transactions that are more likely to tunnel or prop up following the method of Cheung et al. (2009). In total, 1,415 transactions conducted between the sample SOEs and government agencies are identified. Among those, 258 transactions are more likely to prop up SOEs, 42 transactions are more likely to tunnel and others not clear on natures.

We find there is a positive relation between politically connected executives and related party transactions conducted with government agencies, indicating that the government indeed maintains a close relation with SOEs via politically connected executives. We test the likelihood, frequency and the amount of such transactions and generate robust results.

As discussed, we classify the related transactions into three groups, e.g., tunnelling, propping up, and others, based on the nature and direction of transactions to further examine whether government agencies are more likely to prop up or expropriate SOEs through related party transactions. Consistent with literature, SOEs are being propped up by the government, especially those with politically connected managers (Liu, Pan, & Tian, 2018; Ru, 2018). To control for the influence of potential endogeneity, both the propensity score matching method and Heckman Two-Stage analysis are applied. The results of these two models suggest that the positive relation between SOEs' political connection and government related transaction is relatively robust.

The connection between executives with bureaucratic background and government resources may be subject to regional variations. According to Chen, Li, Su, and Sun (2011), political connection is more likely to be highly valued in regions with lower level of market development and higher influence of government on the local economy. We apply one category of the NERI index constructed by Wang, Fan, and Yu (2017), which indicates the extent of dependency of corporations on the local government in China's 31 provinces/regions to measure one type of regional disparity. We find that transactions between SOEs and government agencies are conducted more frequently in provinces where corporations are more dependent on the local governments.

We further examine the impact of government related transaction on SOEs' investment efficiency. As suggested by the results, SOEs that conduct transactions with government agencies tend to underinvest. However, SOEs with politically connected executives that conduct government related transactions are associated with overinvestment and lower investment efficiency.

Our study contributes to the literature in two ways. First, the study contributes to the related party transaction literature by classifying the identity of counterparties in transactions. We find government agencies prop up politically connected SOEs via related party transactions. Second, we add new evidence that political connection would be beneficial to firms by providing access

to government controlled resources. However, the resources gained from political connection may not improve firm efficiency.

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Tables

Table 1. Summary statistics of government related transactions

Panel A. Year distribution of government related transactions (G-related transactions)						
year	No. of G-related transactions	Percentage	No. of Firms with G-related transaction	Percentage	Total No. of listed firms	Percentage
2008	149	10.53%	41	10.00%	584	11.19%
2009	211	14.91%	51	12.44%	693	13.28%
2010	194	13.71%	50	12.20%	753	14.43%
2011	161	11.38%	51	12.44%	795	15.24%
2012	200	14.13%	63	15.37%	821	15.74%
2013	229	16.18%	72	17.56%	758	14.53%
2014	271	19.15%	82	20.00%	813	15.58%
Total	1415	100.00%	410	100.00%	5217	100.00%
Panel B. Industry distribution of G-related transactions						
Industry	No. of G-related transactions	Percentage	No. of Firms with G-related transaction	Percentage	Total No. of listed firms	Percentage
Agriculture	54	3.82%	10	2.44%	74	1.42%
Mining	79	5.58%	25	6.10%	267	5.12%
Manufacturing	522	36.89%	162	39.51%	2734	52.41%
Electric	50	3.53%	29	7.07%	407	7.80%
Construction	43	3.04%	11	2.68%	164	3.14%
Wholesale	26	1.84%	17	4.15%	394	7.55%
Transport	207	14.63%	28	6.83%	388	7.44%
Information	59	4.17%	18	4.39%	147	2.82%
Real estate	71	5.02%	23	5.61%	356	6.82%
Leasing	114	8.06%	14	3.41%	59	1.13%
Scientific	23	1.63%	13	3.17%	22	0.42%
Water	62	4.38%	19	4.63%	62	1.19%
Culture	92	6.50%	29	7.07%	82	1.57%
Diversified	13	0.92%	12	2.93%	61	1.17%
Total	1415	100.00%	410	100.00%	5217	100.00%

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Panel C. Province distribution of G-related transactions

Province	No. of G-related transactions	Percentage	No. of Firms with G-related transaction	Percentage	Total No. of listed firms	Percentage
Beijing	102	7.21%	28	6.83%	511	9.79%
Tianjin	4	0.28%	3	0.73%	148	2.84%
Hebei	7	0.49%	6	1.46%	132	2.53%
ShanXi	164	11.59%	10	2.44%	128	2.45%
Innor Mogolia	0	0.00%	0	0.00%	61	1.17%
Liaoning	45	3.18%	22	5.37%	159	3.05%
Jilin	124	8.76%	15	3.66%	112	2.15%
Heilongjiang	2	0.14%	2	0.49%	88	1.69%
Shanghai	76	5.37%	33	8.05%	558	10.70%
Jiangsu	42	2.97%	17	4.15%	294	5.64%
Zhejiang	65	4.59%	29	7.07%	206	3.95%
Anhui	61	4.31%	22	5.37%	226	4.33%
Fujian	46	3.25%	18	4.39%	161	3.09%
Jiangxi	40	2.83%	9	2.20%	120	2.30%
Shandong	7	0.49%	7	1.71%	289	5.54%
Henan	8	0.57%	6	1.46%	141	2.70%
Hubei	59	4.17%	26	6.34%	210	4.03%
Hunan	24	1.70%	12	2.93%	171	3.28%
Guangdong	143	10.11%	38	9.27%	534	10.24%
Guangxi	7	0.49%	2	0.49%	70	1.34%
Hainan	42	2.97%	12	2.93%	37	0.71%
Chongqing	6	0.42%	5	1.22%	113	2.17%
Sichuan	100	7.07%	30	7.32%	180	3.45%
Guizhou	2	0.14%	1	0.24%	81	1.55%
Yunnan	8	0.57%	8	1.95%	117	2.24%
Tibet	6	0.42%	3	0.73%	16	0.31%
Shan'Xi	30	2.12%	10	2.44%	125	2.40%
Gansu	1	0.07%	1	0.24%	60	1.15%
Qinghai	4	0.28%	2	0.49%	33	0.63%
Ningxia	0	0.00%	0	0.00%	18	0.35%
Xinjiang	190	13.43%	33	8.05%	118	2.26%
Total	1415	100.00%	410	100.00%	5217	100.00%

Table 2. Propping up transactions and tunnelling transactions

	No. of transactions	Percentage	No. of Firm-year observation	Percentage
Unclear transactions	1117	78.94%	297	72.44%
Clear transactions	298	21.06%	113	27.56%
Total Government related transactions	1415	100.00%	410	100.00%
Propping up transactions	257	86.24%	85	75.22%
Tunnelling transactions	41	13.76%	28	24.78%
Clear transactions	298	100.00%	113	100.00%
Non-cash propping up transactions	162	63.04%	33	38.82%
Cash propping up transactions	95	36.96%	52	61.18%
Total propping up transactions	257	100.00%	85	100.00%
Non-tunnelling cash transactions	27	65.85%	20	71.43%
Tunnelling cash transactions	14	34.15%	8	28.57%
Tunnelling transactions	41	100.00%	28	100.00%

The table reports the classification of the government related transactions. Among 1,415 transactions, 298 transactions (clear transactions) clearly benefit one party of the transaction. By carefully examining the nature and direction of these transactions, 257 of them are identifies as to benefit listed SOEs (propping up transactions) and 41 transactions are identifies as to benefit the government (tunnelling transactions). Additionally, 95 of the propping up and 14 tunnelling transactions involve direct cash transfers.

Table 3. Summary statistics of the key variables

	No. of observations if G_D=1	Mean if G_D=1 (1)	Median if G_D=1 (2)	No. of observations if G_D=0	Mean if G_D=0 (3)	Median if G_D=0 (4)	Difference (1)-(3)	Difference (2)-(4)
Pchair	410	0.420	0.000	4,807	0.334	0.000	0.086***	0.000***
Pceo	410	0.205	0.000	4,807	0.133	0.000	0.072***	0.000***
Duality	410	0.063	0.000	4,807	0.096	0.000	-0.033**	0.000**
Board Size	410	2.357	2.303	4,807	2.351	2.303	0.006	0.000
Independent Ratio	410	0.367	0.333	4,807	0.371	0.333	-0.004	0.000
Leverage	410	0.500	0.505	4,807	0.537	0.552	-0.037***	-0.046***
Firm Size	410	22.146	21.976	4,807	22.557	22.372	-0.411***	-0.396***
ROA	410	0.038	0.033	4,807	0.034	0.031	0.004	0.002*
Tobin's Q	410	1.915	1.548	4,807	1.704	1.403	0.211***	0.145***
Top 1	410	0.349	0.331	4,807	0.404	0.405	-0.056***	-0.074***
Institution	410	0.064	0.040	4,807	0.085	0.042	-0.021***	-0.002
NERI Index	410	6.596	7.020	4,807	7.008	7.130	-0.412***	-0.110***

Table 3 shows the summary statistics of the key variables employed in the analyses. Definition of variables are shown in Appendix 1. T-tests and Wilcoxon rank-sum tests are used to test the difference between firms conducting government-related transaction (G_D=1) and non-conducting firms(G_D=0). *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Table 4. Determinants of conducting listed firms' government-related transactions

Variables	(1) G_D	(2) G_F	(3) G_M	(4) G_D	(5) G_F	(6) G_M
Pchair	0.129** (2.257)	0.029*** (2.688)	0.005*** (3.538)			
Pceo				0.201*** (2.667)	0.056*** (3.666)	0.003 (1.469)
NERI index	-0.066*** (-3.953)	-0.022*** (-6.382)	-0.001 (-1.469)	-0.064*** (-3.860)	-0.022*** (-6.313)	-0.001 (-1.459)
Duality	-0.201** (-1.968)	-0.032* (-1.863)	0.000 (0.010)	-0.243** (-2.345)	-0.044** (-2.489)	-0.000 (-0.221)
Boardsize	-0.062 (-0.534)	-0.000 (-0.015)	0.002 (0.788)	-0.071 (-0.605)	-0.001 (-0.044)	0.002 (0.852)
Independent ratio	-0.257 (-0.611)	-0.047 (-0.611)	-0.010 (-1.044)	-0.236 (-0.560)	-0.042 (-0.551)	-0.010 (-0.988)
Leverage	0.014 (0.081)	-0.054* (-1.660)	0.002 (0.520)	0.018 (0.105)	-0.053 (-1.624)	0.002 (0.471)
Firm size	-0.066** (-2.257)	-0.004 (-0.872)	-0.002** (-2.552)	-0.069** (-2.342)	-0.005 (-1.020)	-0.002** (-2.400)
ROA	1.006* (1.802)	0.045 (0.444)	-0.019 (-1.471)	0.989* (1.776)	0.040 (0.401)	-0.018 (-1.405)
Tobin's Q	0.017 (0.523)	0.004 (0.547)	0.001 (0.696)	0.018 (0.553)	0.004 (0.551)	0.001 (0.788)
Top 1	-1.367*** (-7.043)	-0.157*** (-4.523)	0.001 (0.204)	-1.347*** (-6.929)	-0.153*** (-4.408)	0.001 (0.157)
Institution	-0.818*** (-2.678)	-0.109*** (-2.612)	-0.000 (-0.017)	-0.812*** (-2.674)	-0.112*** (-2.673)	-0.001 (-0.117)
Constant	1.215* (1.805)	0.456*** (3.817)	0.040*** (2.640)	1.271* (1.883)	0.472*** (3.954)	0.038** (2.541)
Observations	5,217	5,217	5,217	5,217	5,217	5,217
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ² /Adjusted R ²	0.104	0.061	0.004	0.105	0.063	0.002

Table 4 presents the regression analysis of the determinants of conducting government-related transactions. Definition of variables can be found in Appendix 1. Both industry and year dummy variables are included. Z-statistics (t-statistics) are reported in parentheses. *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Table 5. Determinants of conducting listed firms' government-related transactions, propensity score matching analysis

Variables	(1) G_D	(2) G_F	(3) G_M	(4) G_D	(5) G_F	(6) G_M
Pchair	0.110*	0.025*	0.005***	0.043	0.008	0.001
	(1.712)	(1.858)	(2.579)	(0.539)	(0.542)	(0.594)
Xi				0.171	-0.018	0.023***
				(1.134)	(-0.372)	(3.510)
Pchair*Xi				0.197	0.057*	0.012***
				(1.448)	(1.927)	(2.885)
NERI index	-0.068***	-0.027***	-0.001	-0.068***	-0.027***	-0.001
	(-3.488)	(-5.773)	(-1.134)	(-3.502)	(-5.753)	(-0.848)
Duality	-0.294**	-0.046**	0.000	-0.295**	-0.046**	0.000
	(-2.323)	(-2.007)	(0.104)	(-2.327)	(-1.994)	(0.011)
Boardsize	0.011	0.024	0.004	0.005	0.023	0.002
	(0.077)	(0.845)	(0.925)	(0.038)	(0.811)	(0.628)
Independent ratio	-0.406	-0.068	-0.014	-0.376	-0.059	-0.012
	(-0.826)	(-0.693)	(-1.015)	(-0.764)	(-0.602)	(-0.878)
Leverage	-0.095	-0.096**	0.000	-0.101	-0.096**	0.001
	(-0.463)	(-2.192)	(0.009)	(-0.489)	(-2.192)	(0.116)
Firm size	-0.046	-0.003	-0.002*	-0.044	-0.002	-0.002**
	(-1.381)	(-0.389)	(-1.859)	(-1.302)	(-0.359)	(-1.990)
ROA	1.118	0.080	-0.043**	1.131	0.079	-0.046**
	(1.574)	(0.540)	(-2.111)	(1.593)	(0.533)	(-2.252)
Tobin's Q	0.020	0.003	0.001	0.021	0.003	0.002
	(0.513)	(0.359)	(1.240)	(0.541)	(0.394)	(1.256)
Top 1	-1.345***	-0.144***	0.002	-1.345***	-0.144***	0.002
	(-5.955)	(-3.203)	(0.334)	(-5.951)	(-3.194)	(0.374)
Institution	-0.569	-0.094	-0.003	-0.551	-0.090	-0.001
	(-1.511)	(-1.551)	(-0.309)	(-1.464)	(-1.473)	(-0.153)
Constant	0.727	0.422***	0.040*	0.703	0.420***	0.036*
	(0.944)	(2.772)	(1.882)	(0.914)	(2.759)	(1.715)
Observations	3,552	3,552	3,552	3,552	3,552	3,552
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ² /Adjusted R ²	0.112	0.071	0.003	0.113	0.072	0.010

Table 5 presents the results of propensity score matching analysis. The matched sample consists of 3552 firm-year observations from 2008 to 2014. Definition of variables can be found in Appendix 1. Both industry and year dummy variables are included. Z-statistics (t-statistics) are reported in parentheses. *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Table 6. Determinants of conducting listed firms' government-related transactions, Heckman Two-stage analysis

Variables	(1) G_D	(2) G_F	(3) G_M	(4) G_D	(5) G_F	(6) G_M
Pchair	0.136** (2.367)	0.030*** (2.744)	0.005*** (3.552)	0.033 (0.466)	0.009 (0.720)	0.001 (0.793)
Xi				-2.840*** (-4.065)	-0.130** (-2.511)	0.028*** (4.360)
Pchair*Xi				0.293** (2.486)	0.071*** (2.957)	0.013*** (4.158)
NERI index	-0.133*** (-5.591)	-0.026*** (-6.920)	-0.001 (-1.638)	-0.138*** (-5.756)	-0.029*** (-7.216)	0.000 (0.236)
Duality	0.264* (1.706)	-0.005 (-0.270)	0.001 (0.382)	0.289* (1.858)	0.013 (0.580)	-0.005* (-1.684)
Boardsize	1.300*** (3.605)	0.080** (2.163)	0.005 (1.063)	1.381*** (3.802)	0.133*** (2.942)	-0.012** (-2.097)
Independent ratio	1.944*** (2.798)	0.085 (0.931)	-0.005 (-0.478)	2.128*** (3.038)	0.174* (1.749)	-0.030** (-2.428)
Leverage	-1.306*** (-3.514)	-0.133*** (-3.030)	-0.001 (-0.116)	-1.399*** (-3.734)	-0.185*** (-3.658)	0.016** (2.467)
Firm size	0.788*** (3.654)	0.047** (2.358)	0.000 (0.058)	0.847*** (3.892)	0.080*** (3.146)	-0.010*** (-3.163)
ROA	9.471*** (4.301)	0.552** (2.573)	-0.001 (-0.030)	10.033*** (4.519)	0.881*** (3.307)	-0.103*** (-3.082)
Tobin's Q	0.507*** (4.004)	0.033** (2.565)	0.002 (0.997)	0.539*** (4.228)	0.052*** (3.305)	-0.004** (-2.126)
Top 1	-4.100*** (-5.742)	-0.323*** (-4.548)	-0.005 (-0.547)	-4.278*** (-5.945)	-0.426*** (-4.901)	0.028** (2.556)
Institution	-3.729*** (-4.700)	-0.285*** (-3.661)	-0.006 (-0.635)	-3.904*** (-4.889)	-0.393*** (-4.165)	0.029** (2.446)
IMR	11.226*** (3.990)	0.676*** (2.675)	0.024 (0.743)	11.964*** (4.216)	1.104*** (3.386)	-0.110*** (-2.684)
Constant	-29.711*** (-3.823)	-1.604** (-2.059)	-0.032 (-0.330)	-31.757*** (-4.052)	-2.888*** (-2.902)	0.369*** (2.950)
Observations	5,217	5,217	5,217	5,217	5,217	5,217
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ² /Adjusted R ²	0.110	0.062	0.004	0.112	0.064	0.013

Table 6 shows the results of Heckman two-stage regression analysis. Definition of variables can be found in Appendix 1. Both industry and year dummy variables are included. Z-statistics (t-statistics) are reported in parentheses. *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Table 7. Determinants of conducting listed firms' government-related transactions that prop up listed firms

Variables	(1) G_Prop_D	(2) G_Prop_F	(3) G_Prop_M
Pchair	0.179 (1.626)	0.010 (1.642)	0.003** (2.473)
NERI index	-0.076*** (-2.923)	-0.013*** (-6.261)	-0.001*** (-3.035)
Duality	-0.110 (-0.566)	-0.010 (-0.997)	-0.002 (-1.038)
Boardsize	-0.294 (-1.187)	-0.006 (-0.445)	0.002 (0.942)
Independent ratio	-0.572 (-0.695)	-0.068 (-1.510)	0.003 (0.351)
Leverage	0.831** (2.422)	0.049** (2.409)	0.016*** (4.341)
Firm size	-0.194*** (-3.099)	-0.009*** (-3.025)	-0.002*** (-2.861)
ROA	1.449 (1.253)	0.103 (1.503)	-0.002 (-0.143)
Tobin's Q	-0.140 (-1.615)	-0.006 (-1.617)	0.001 (1.172)
Top 1	-0.611 (-1.564)	-0.009 (-0.434)	-0.002 (-0.468)
Institution	-0.990 (-1.266)	-0.022 (-0.792)	-0.003 (-0.536)
Constant	3.166** (2.224)	0.345*** (4.924)	0.030** (2.297)
Observations	3,263	3,552	3,552
Industry Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Pseudo R ² /Adjusted R ²	0.121	0.052	0.013

Table 7 reports the regression analysis results of the determinants of conducting government-related transactions that prop up listed firms in the matched sample. Definition of variables can be found in Appendix 1. Both industry and year dummy variables are included. Z-statistics (t-statistics) are reported in parentheses. *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Table 7. Determinants of conducting listed firms' government-related transactions that prop up listed firms with cash

Variables	(1) G_Cashprop_D	(2) G_Cashprop_F	(3) G_Cashprop_M
Pchair	0.173 (1.250)	0.010 (1.642)	0.003** (2.473)
NERI index	-0.084*** (-2.814)	-0.013*** (-6.261)	-0.001*** (-3.035)
Duality	-0.053 (-0.224)	-0.010 (-0.997)	-0.002 (-1.038)
Boardsize	-0.156 (-0.513)	-0.006 (-0.445)	0.002 (0.942)
Independent ratio	-0.179 (-0.182)	-0.068 (-1.510)	0.003 (0.351)
Leverage	0.769* (1.885)	0.049** (2.409)	0.016*** (4.341)
Firm size	-0.169** (-2.276)	-0.009*** (-3.025)	-0.002*** (-2.861)
ROA	2.136 (1.532)	0.103 (1.503)	-0.002 (-0.143)
Tobin's Q	-0.119 (-1.119)	-0.006 (-1.617)	0.001 (1.172)
Top 1	-0.842* (-1.722)	-0.009 (-0.434)	-0.002 (-0.468)
Institution	-1.001 (-1.003)	-0.022 (-0.792)	-0.003 (-0.536)
Constant	3.238* (1.890)	0.345*** (4.924)	0.030** (2.297)
Observations	2,837	3,552	3,552
Industry Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Pseudo R ² /Adjusted R ²	0.146	0.052	0.013

Table 8 reports the regression analysis results of the determinants of conducting government-related transactions that prop up listed firms with cash in the matched sample. Definition of variables can be found in Appendix 1. Both industry and year dummy variables are included. Z-statistics (t-statistics) are reported in parentheses. *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Table 9. Determinants of conducting listed firms' government-related transactions, subsample analysis for regions in which corporations are more dependent on local government

Variables	(1) G_D	(2) G_F	(3) G_M
Pchair	0.113 (1.276)	0.042** (1.974)	0.008** (2.484)
Duality	-0.362** (-2.084)	-0.053 (-1.470)	0.002 (0.489)
Boardsize	0.043 (0.238)	0.038 (0.850)	0.006 (1.032)
Independent ratio	-0.267 (-0.418)	-0.078 (-0.524)	-0.021 (-0.983)
Leverage	-0.454 (-1.640)	-0.126* (-1.826)	-0.011 (-1.130)
Firm size	0.007 (0.164)	0.007 (0.636)	-0.002 (-1.448)
ROA	1.517* (1.649)	0.261 (1.178)	-0.068** (-2.163)
Tobin's Q	0.023 (0.438)	0.003 (0.212)	0.001 (0.435)
Top 1	-1.239*** (-4.116)	-0.102 (-1.399)	0.004 (0.383)
Institution	-0.373 (-0.746)	-0.072 (-0.686)	0.001 (0.066)
Constant	-0.687 (-0.694)	0.006 (0.025)	0.047 (1.405)
Observations	1,760	1,772	1,772
Industry Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Pseudo R ² /Adjusted R ²	0.122	0.078	-0.019

Table 9 presents the regression analysis results of determinants of conducting government-related transactions in a subsample that consists of SOEs in regions where corporations are more dependent on local government. The subsample is created based on the median of NERI index in the matched sample. SOEs in a province with NERI index lower than the median will be included and higher otherwise. The subsample consists of 1772 firm-year observations from 2008 to 2014. Definition of variables can be found in Appendix 1. Both industry and year dummy variables are included. Z-statistics (t-statistics) are reported in parentheses. *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Table 10. The impact of government-related transactions and political connection on corporate investment efficiency

Variables	(1)	Abnormal Inv	Variables	(2)	InvExp
G_D		-0.055*** (-3.142)	G_D		-0.150*** (-4.568)
Pchair		0.007 (1.091)	Pchair		0.001 (0.051)
G_D*Pchair		0.058** (2.565)	Tobin's Q		-0.010* (-1.801)
NERI index		-0.004* (-1.859)	Pchair *Tobin's Q		0.004 (0.603)
Duality		-0.006 (-0.543)	G_D*Pchair*Tobin's Q		-0.039** (-1.973)
Board size		0.012 (0.888)	NERI index		-0.004* (-1.783)
Independent ratio		-0.020 (-0.450)	Duality		-0.006 (-0.515)
Leverage		0.160*** (7.373)	Board size		0.011 (0.804)
Firm size		-0.001 (-0.392)	Independent ratio		-0.022 (-0.488)
ROA		0.125 (1.559)	Leverage		0.158*** (7.268)
Tobins'Q		-0.003 (-0.691)	Firm size		0.001 (0.237)
Top1		-0.036* (-1.666)	ROA		0.120 (1.503)
Institution		0.077*** (2.684)	Top1		-0.032 (-1.493)
Constant		-0.044 (-0.599)	Institution		0.075*** (2.629)
			Constant		-0.041 (-0.554)
Observations		2,704	Observations		2,704
Industry Dummy		Yes	Industry Dummy		Yes
Year Dummy		Yes	Year Dummy		Yes
Adjusted R-squared		0.091	Adjusted R-squared		0.098

Table 10 presents the regression analysis results of the impact of government related transaction and political connection on SOEs' investment efficiency in the matched sample. Regression (1) examines whether SOEs that conduct transactions with government agencies over or under invest and how such SOEs with political connection invest differently. Regression (2) examines the investment efficiency of SOEs that conduct transactions with government agencies and have politically connected chairman. Definition of variables can be found in Appendix 1. Both industry and year dummy variables are included. Z-statistics (t-statistics) are reported in parentheses. *, ** and *** represent significance at the 10%, 5% and 1% level, respectively.

Appendix

Appendix 1. Variable Definition

Variable	Definition
G_F	Frequency of government-related transactions, calculated as $\ln(\text{number of government related transaction} + 1)$.
G_M	Value (money) involved in government-related transactions, scaled by total assets
G_D	A dummy variable that equals 1 if the firm has conducted government-related transaction in the year and 0 otherwise.
G_Prop_F	Frequency of government-related transactions that clearly prop up listed firms, calculated as $\log(\text{number of propping up government related transaction} + 1)$
G_Prop_M	Value (money) involved in propping up government-related transactions, scaled by total assets.
G_Prop_D	A dummy variable that equals 1 if the firm has conducted propping up government-related transaction in the year and 0 otherwise.
G_Cashprop_F	Frequency of government-related transactions that prop up listed firms with cash, calculated as $\log(\text{number of cash-propping up government related transaction} + 1)$
G_Cashprop_M	Value (money) involved in cash propping up government-related transactions, scaled by total assets.
G_Cashprop_D	A dummy variable that equals 1 if the firm has conducted cash propping up government-related transaction in the year and 0 otherwise.
Pchair	A dummy variable that equals to 1 if the chairman in the listed firm is politically connected and 0 otherwise.
Pceo	A dummy variable that equals to 1 if the CEO in the listed firm is politically connected and 0 otherwise.
Duality	A dummy variable that equals to 1 if chairman and CEO are the same person in the listed firm and 0 otherwise.
Board Size	Natural logarithm of the number of board members.
Independent Ratio	The ratio of the number of independent directors in a board over the number of board members.
Leverage	The ratio of total debt over total assets.
Firm Size	Natural logarithm of total assets.
ROA	Return on assets, calculated as net profit over total assets.
Tobin's Q	Calculated as $(\text{book value of debt} + \text{market value of equity}) / (\text{book value of debt} + \text{book value of equity})$.
OCF	Net operating cash flow scaled by total assets at the beginning of the year.
InvExp	Investment expenditure, calculated as the ratio of investment expenditure (cash paid for fixed assets, intangible assets and other long-term assets less cash received from selling these assets) over total assets at the beginning of the year.
Abnormal Inv	Abnormal level of investment, which is measured as the difference between firms' actual investment expenditure and their expected investment expenditure calculated based on a cash flow model.
Xi	A dummy variable that equals to 1 for the period after Xi Jinping became president of China and 0 for the period before.
Top1	The shareholding percentage of the largest shareholder.
Institution	The shareholding percentage of institutional shareholders.
NERI Index	An index the measures how local economy is dependent on local government. Smaller value of the NERI index represents higher dependence of government.

Appendix 2. Correlation coefficient matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1 Pchair	1.000											
2 Pceo	0.283***	1.000										
3 Duality	-0.003	0.169***	1.000									
4 Board size	0.046***	0.052***	-0.032*	1.000								
5 Independent ratio	0.012	0.001	0.030*	-0.051***	1.000							
6 Leverage	-0.011	-0.016	0.023	0.018	0.036**	1.000						
7 ROA	0.066***	0.058***	-0.026	0.004	-0.008	-0.417***	1.000					
8 Firm size	0.075***	0.076***	-0.034*	0.199***	0.148***	0.327***	0.074***	1.000				
9 Tobin's Q	-0.011	-0.016	0.023	0.018	0.036**	1.000***	-0.416***	0.324***	1.000			
10 Top 1	0.003	-0.028*	-0.091***	0.026	0.071***	-0.025	0.120***	0.322***	-0.026	1.000		
11 NERI index	0.030*	0.009	0.022	-0.051***	-0.041**	-0.031*	0.073***	-0.001	-0.031*	0.019	1.000	
12 Institution	-0.037**	-0.014	-0.007	-0.007	-0.058***	-0.026	0.092***	0.018	-0.026	0.028*	0.048***	1.000

*, ** and *** represent significance at the 10%, 5% and 1% level, respectively.