University of Pennsylvania
ScholarlyCommons

Wharton Research Scholars Journal | Wharton School

4-1-2010

Complex Organizational Structure and Chinese Firm Value

Xiaochan Jia
University of Pennsylvania

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/wharton_research_scholars/69
For more information, please contact repository@pobox.upenn.edu.

Complex Organizational Structure and Chinese Firm Value

Abstract
The rapid economic development in recent years inspired Chinese firms to entertain global ambitions, and growing domestic competition as a result of the government's liberalization policies has rendered internationalization a necessity. In addition to the State-owned enterprises that already had complex structures from government-mandated privatization, many large private companies developed complex organizational structures as well to fulfill the demands of the changing operating environment. Some reincorporated outside of the country and registered new subsidiaries in China to gain legal and tax advantages. Some formed joint ventures with foreign firms to learn the most advanced technologies. Some established branches overseas. These efforts seemed to have paid off. In 2009, 37 companies made it to the Fortune Global 500 list of the largest companies in the world by revenue compared to 16 in 2005. But along with the expansion, the more pertinent question for shareholders is whether there has been commensurate growth in their holdings, specifically, how does the new complex firm structure affect firm value?

Disciplines
Business

Comments
Suggested Citation:
Jia, X. "Complex Organizational Structure and Chinese Firm Value." *Wharton Scholars Research Journal.* University of Pennsylvania. April 2010.

This thesis or dissertation is available at ScholarlyCommons: http://repository.upenn.edu/wharton_research_scholars/69

Wharton Research Scholars

Complex Organizational Structure and Chinese Firm Value

"Cindy" Xiaochan Jia

10

Table of Contents

I. Introduction……. 3

II. Literature Review…….. 3

III. Data Description…….. 5

IV. Organizational Complexity and Firm Value in Non-State-owned Firms……. 8

V. Organizational Complexity, Information Asymmetry, Efficiency, and Firm Value in Non-State-owned Firms…… 9

VI. Organizational Complexity and Its Effect on State-owned Firms…… 9

VII. Robustness Checks……... 10

VIII. Conclusion……. 10

References…… 12

Appendix…… 14

Tables 1-13…… 16

Graph 1……... 30

I. Introduction

The rapid economic development in recent years inspired Chinese firms to entertain global ambitions, and growing domestic competition as a result of the government's liberalization policies has rendered internationalization a necessity. In addition to the State-owned enterprises that already had complex structures from government-mandated privatization, many large private companies developed complex organizational structures as well to fulfill the demands of the changing operating environment. Some reincorporated outside of the country and registered new subsidiaries in China to gain legal and tax advantages. Some formed joint ventures with foreign firms to learn the most advanced technologies. Some established branches overseas. These efforts seemed to have paid off. In 2009, 37 companies made it to the Fortune Global 500 list of the largest companies in the world by revenue compared to 16 in 2005. But along with the expansion, the more pertinent question for shareholders is whether there has been commensurate growth in their holdings, specifically, how does the new complex firm structure affect firm value?

II. Literature Review

Past literature suggests two primary channels in which organizational complexity may affect a firm's value: firm efficiency and information asymmetry. Structural complexity has been related to decreased productivity, decreased internal communication effectiveness, and increased management difficulties, all of which can negatively impact firm efficiency. Carrillo and Kopelman (1991) studied regional branches of a US financial company. They found that the ones with the least vertical complexity were roughly 44% more productive than those with the greatest complexity

(Carillo and Kopelman 1991). Wang (2000) proposed information transmission efficiency as the most important determinant of organizational efficiency and that complex structures hinder transmission efficiency. Meyer and Lu (2004) noted that Chinese managers also have to deal with the unique issue of “indefinite boundaries.” In the familial structure, the listed entity is often just a subsidiary of the larger group. Though legally a separate entity, it is still very much connected in terms of management and operations with the rest of the group and in the case of State-owned enterprises, with the government as well (Meyer and Lu 2004).

Aside from these efficiency-based factors on firm value, several papers document how complexity may twist public perception of firm information and cause undervaluation. Gu and Jiang (2002) showed that complex organizational structures increase accounting information complexity, and Plumlee (2003) analyzed how financial analysts have trouble assimilating complex information in their valuations. According to Root (1996) the rampant corruption in China can easily take advantage of such complex structures, and fear of insider trading and information asymmetry can cause investors to undervalue the firm.

There is a surprising dearth of empirical literature to match the theoretical connecting organizational complexity and firm value. Most Chinese studies have focused on the effect of shareholder structure (Xu and Zhang 2008, Sun 2009). Only one recent paper dealt with organizational complexity and firm value directly. Manconi and Massimo (2009) studied a large number of US firms over 1998-2006. Complexity was measured by the number of vertical layers in the structure, from the ultimate parent company down to the bottom-most subsidiary. This was regressed against Tobin’s Q as

a proxy of firm value, taking into account several standard control variables including size, cash, cash flow, leverage, dividend payout, and a new one, number of segments. They found a significant negative relationship between complexity and firm value; a unit increase in Complexity led to a 4% lower Tobin's Q. They then attributed this to effect information asymmetry due to the significant relationships between complexity as asymmetry as measured by proxies like analyst forecast error and between complexity-driven asymmetry and firm value. A one standard deviation increase in complexity-driven Illiquidity led to a 4% decrease in Tobin's Q.

From these past studies, it would be reasonable to hypothesize that a) organizational complexity has a negative effect on Chinese firms' values as well, and b) the effect can be attributed to both firm efficiency and information asymmetry.

III. Data Description

The Chinese firms included in this study to test the above two hypotheses were drawn from those listed on the New York Stock Exchange that have filed SEC annual reporting form 20-F or 10-K for the 2007 and 2008 fiscal years. Going back further would decrease the number of firms with available data dramatically. While there is a much larger number of Chinese firms listed on the domestic exchanges in Shanghai and Shenzhen, many firms are smaller in size and have comparatively simpler organizational structures, which may skew the study results. Also there is some debate about the quality of accounting information reported in China, especially for State-owned firms. While a 2004 Chinese study revealed no significant relationship between accounting standard and accounting information quality, it did suggest that a stricter

legal environment like in the US and greater probability of punishment in case of wrongdoing may improve accounting information quality (Liu, Wu and Zhong).

The firm financial data was gathered from COMPUSTAT and supplemented with information from EDGAR of the US Securities and Exchange commission. All regressions included standard control variables for firm Size($\ln Total\ Assets$), Cash Flow, Cash, Market Leverage, and Dividend Payout. Annual reports from EDGAR were used to construct the main variable of interest: Complexity. It was defined as total number of related entities divided by vertical span. Total number of related entities was calculated as the sum of

1) number of parent, grandparent firms, and so on above the listed company in the organizational structure, including the controlling government entity for State-owned firms,

2) number of child, grandchild firms, and so on below the listed company in the organizational structure,

3) number of firms with related transactions held by a company belonging to the former two categories but not counted before.

Vertical span was the measure of complexity used by the Manconi and Massimo (2009). It was calculated as the number of levels from the ultimate parent firms to the bottom most subsidiaries. The quotient of total number of related entities and vertical span was used rather than just vertical span in this study to account for the unique features of the Chinese firm structure, where the listed firm often has close relationships with other subsidiaries of the parent, sometimes even partial ownership, which would be difficult to account for with only vertical span. Although the dollar ratio of net related-party

transactions and income would be a more precise proxy for these relationships, firms vary in the level of detailed reported for such transactions. For robustness checks, total number of related entities and vertical span were be regressed individually first and then together against firm value as different proxies of complexity.

Complexity was first regressed against firm value, measured by Tobin's Q. It was then regressed against proxies for the two main channels through which organizational complexity can affect firm value as suggested by past literature, information asymmetry and firm efficiency. The former was measured by Analyst Forecast Error, which was also used in Manconi and Massimo's study (2009). It was calculated as $|EPS - FEPS|/Price$, EPS being the annual earnings-per-share, FEPS the median analyst forecast of EPS from First Call, and Price the firm's stock price at the end of the calendar year before earnings was announced. Return on Asset (ROA) has been used to measure firm efficiency by other studies on Chinese firms like Li, Poppo, and Zhou's study (2008). To control for the effect of variations across industries, the percentage difference between firm ROA and industry ROA obtained from Fortune's annual ranking of industries (2009) was used. The proxy for efficiency in this study was calculated as $(Firm\ ROA - Industry\ ROA)/Industry\ ROA$. Even if the relationship between Complexity and a channel proxy was not significant, the proxy was still examined for relationship with firm value. A significant result might indicate that another measure of complexity would be more appropriate.

Throughout the analysis, State-owned firms were regressed separately from non-State-owned firms. Previous studies have shown that state-ownership itself has a significant negative effect on firm value, lowering it by 5% in some estimates (Xu and

Zhang 2008). State-owned firms also have more complex organizational structures. The Tukey's test on Graph 1 showed that they have significantly larger average vertical span. Among the firms included in this study, for State-owned firms, the median number of related entities was 20.5 compared to 13 for others. To avoid this issue of collinearity, firms were analyzed separately based on whether they have State-ownership. Table 13 lists all firms studied.

IV. Organizational Complexity and Firm Value in Non-State-owned Firms

Based on previous research results on the negative effects of complex organizational structures on productivity, communication efficiency, management effectiveness, and accounting information reporting and processing, I theorized that the more complex Chinese firms would be undervalued. This hypothesis was tested by the following regression:

$$Tobin's\ Q = \alpha + \beta * Complexity + \sum \gamma_n * Control\ Variable_n + \varepsilon.$$

The results are shown in Table 3. In the initial analysis of all non-state-owned firms, Complexity with β of 0.047 was not a significant factor in determining firm value, however, there were surprising results after removing the two influential firms, GA-Giant Interactive Group Inc, and QXM-Qiao Xing Mobile Communications Company. The coefficient for Complexity became larger at 0.291684, and was significant at even the 1% level with p-value of 0.0024. In economic terms, a one unit increase in Complexity raised Tobin's Q by 11.88%. This result suggested that complex organizational structures may not necessarily mean increased information asymmetry and decreased efficiency, or those two might not be significant determinants of firm value, whose

negative effects may therefore be masked by possible benefits of complex structures. The next section explores these possibilities.

V. Organizational Complexity, Information Asymmetry, Efficiency, and Firm Value in Non-State-owned Firms

The regression results in Tables 4-7 of Information Asymmetry and Efficiency proxies with Complexity and with firm value seriously question the relevance of these two factors in the effect chain. Complexity was not a significant determinant of Analyst Forecast Error or ROA Difference even when the influential firms GA and QXM were not included. Although its coefficient against Analyst Forecast Error was negative at -0.01, the t-statistic was -0.53 and p-value was 0.60. Against ROA Difference, the coefficient was 0.71, with t-statistic of 0.72 and p-value of 0.48. Neither of the two channels could be significantly related to firm value either, both had p-values greater than 0.25 in regressions without GA and QXM.

VI. Organizational Complexity and Its Effect on State-owned Firms

All of the regressions above were conducted on a second sample consisting of only State-owned firms. The results, reported in Tables 3-7, are very similar. For State-owned firms, there was no significant relationship between Complexity and firm value, and there were no influential firms. Again, information asymmetry, measured by Analyst Forecast Error, and firm efficiency, measured by ROA Difference, could not be linked to Complexity or to firm value as measured by Tobin's Q.

Overall, Complexity affected firm value significantly only when the firm had no State-ownership, but that positive effect could not be attributed to either information asymmetry or operational efficiency as suggested by past literature.

VII. Robustness Checks

These unexpected regression results prompted the doubt that the organizational structure complexity measure used may not have been the most suitable, therefore, robustness checks were done using Vertical Span and Total Related Entities independently and then together as alternatives. The results are shown in Tables 8-10. Vertical Span was used in the Manconi and Massimo (2009) study of US firms and had proved to be significant to firm value, however in the regression against Chinese firm data, it remained insignificant in all cases. Total Related Entities was significant, but only at the 10% level when regressed by itself and the control variables against non-State-owned firms and without influential points GA and QXM. When Vertical Span was added to this regression, Total Related Entities became very significant with coefficient of 0.0635 and p-value of 0.0018. This seemed to suggest that the number of layers in the organizational structure played a very marginal role in complexity-related firm value determination, especially relative to the actual number of related parties. However, neither of these alternative complexity measures or their combination could be significantly linked to information asymmetry or operational efficiency either, as shown in Tables 11-12.

VIII. Conclusion

This empirical study on how Chinese firms' complex organizational structure may affect firm value and the possible channel for possible effects revealed some surprising results. Unlike suggested by past theoretical literature and an empirical study on US firms, the complexity of Chinese firms actually increase their values, but not through information asymmetry or operational efficiency. There are some limitations on this

study due to the small number of firms and time span studied, but there are also two main contributions. It provided some quantitative insight to the existing theoretical literature on organizational structure of Chinese firms that might be useful for managers of non-State-owned firms who can independently make decisions related to firm structure. While the number of studies on the disadvantages of structural complexity is large, there are very few on the ways and extent that complexity can provide significant benefits. This study's results may provide the impetus for expanding research in this field as well.

References

Carillo, Phoebe M, and Richard E Kopelman. "Organizational Structure and Productivity: Effects of Subunit Size, Vertical Complexity, and Administrative Intensity on Operational Efficiency." *Group Organization Management* 16, no. 1 (1991): 44-59.

Fortune. *Top Industries: Most Profitable.* 2009. http://money.cnn.com/magazines/fortune/global500/2009/performers/industries/profits/assets.html (accessed March 10, 2010).

Gu, Qi 谷祺, and Yingbing 姜英兵 Jiang. "Accounting Information Complexity and Financial Valuation Adjustment 会计信息复杂性与财务估价修正." *Accounting Research 会计研究*, June 2002: 17-23.

Li, Julie Juan, Laura Poppo, and Kevin Zhengzhou Zhou. "DO MANAGERIAL TIES IN CHINA ALWAYS PRODUCE VALUE? COMPETITION, UNCERTAINTY, AND DOMESTIC VS. FOREIGN FIRMS." *Strategic Management Journal* 29 (2008): 383-400.

Liu, Feng 刘峰, Feng 吴风 Wu, and Reiqing 钟瑞庆 Zhong. "Can Accounting Standards Enhance Accounting Information Quality 会计准则能提高会计信息质量吗———来自中国股市的初步证据." *Accounting Research 会计研究* 5 (2004): 8-20.

Manconi, Alberto, and Massa Massimo. *Modigliani and Miller Meet Chandler: Organizational Complexity, Capital Structure, and Firm Value.* September 1, 2009. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1359762 (accessed February 2, 2010).

Meyer, Marshall W, and Xiaohui Lu. "Managing Indefinite Boundaries: The Strategy and Structure of a Chinese Business Firm." *Management and Organization Review* 1, no. 1 (2004): 57-86.

"NYSE-Traded Chinese Companies Have Poor Earnings Quality and Inadequate Governance, RateFinancials Study Warns." *Business Wire.* September 17, 2007. http://www.businesswire.com/portal/site/home/permalink/?ndmViewId=news_view&newsId=20070917005726&newsLang=en (accessed February 10, 2010).

Plumlee, Marlene A. "The Effect of Information Complexity on Analysts' Use of That Information." *The Accounting Review* 78, no. 1 (2003): 275-296.

Root, Hilton. "Corruption in China: Has It Become Systemic?" *Asian Survey* 36, no. 8 (1996): 741-757.

Sun, Jianping 孙建平. "Empirical Analysis on the Effect of Shareholder Structure and Full Circulation on Listed Firm Value 上市公司股权结构及全流通对公司价值影响的实证分析." *World Economic Outlook 世界经济情况* 10 (2009): 83-88.

Wang, Ying 王英. "Organizational Structure and Information Transmission Efficiency 组织结构与信息传递效率." *Systems Engineering - Theory and Practice 系统工程理论与实践*, November 2000: 46-50.

Xu, Xiangyi 徐向艺, and Lida 张立达 Zhang. "Relations between Ownership Structure and Corporate Value: A Subgroup Test Result 上市公司股权结构与公司价值关系研究——一个分组检验的结果." *China Industrial Economics 中国工业济经* 4 (2008): 102-109.

Appendix: Variable Definitions

Organizational Complexity Measures

Complexity $= \frac{Total\ Related\ Entities}{Vertical\ Span}$

Total Related Entities $=$
Number of parent, grandparent firms and so on above the listed company in the organizational structure including the state owned government entity for State-owned firms +
Number of child, grandchild firms, and so on below the listed company in the organizational structure +
Number of firms with related transactions held by a company belonging to the former two categories but not counted before

Vertical Span $=$ *Maximum numbers of levels in the organization from the ultimate parent group with no parent above down to the bottom most subsidiaries with no more subsidiaries below. Each existing level adds one count to the span*

Firm Value Effect Channel Proxies

Analyst Forecast Error as proxy for information asymmetry $= \frac{|EPS - FEPS|}{Price}$
EPS=reported annual earnings per share
FEPS=median EPS forecast from First Call
Price=stock price at end of calendar year before EPS announcement

ROA Difference as proxy for firm efficiency $= \frac{Firm\ ROA - Industry\ ROA}{Industry\ ROA}$

$Firm\ ROA = \frac{Net\ Income}{Total\ Assets}$

Industry ROA=reported industry figure from Fortune annual ranking

Firm Value Measure

Tobin's Q $= \frac{Market\ Value\ of\ Firm\ (MV)}{Book\ Equity\ (BE)}$
Book Equity (BE)=stockholders' equity + preferred stock-carrying value
Market Equity (ME)=closing price at fiscal year-end $*$ shares outstanding
Market Value of Firm (MV)=total assets $-$ BE+ME

Control Variables

Size $\ln Total\ Assets$

Cash	$\frac{\textit{Cash and short term investments}}{\textit{lagged total assets}}$
Cash Flow	$\frac{\textit{Depreciation and amortization + income before extraordinary items}}{\textit{lagged total assets}}$
Dividend Payout	$\frac{\textit{Common Dividends + Preferred dividends}}{\textit{Lagged Total Assets}}$
Market Leverage	$\frac{\textit{Long-term debt + Short-term debt}}{\textit{long-term debt + short-term debt + market equity}}$

Table 1 Variable Statistics

2008 Data	Mean	Median	St. Dev.	Min	Max	N. Obs.
Complexity	5.2742	4.0000	4.5908	0.8000	24.5000	37
Vertical Span	4.6216	5.0000	1.4014	2.0000	8.0000	37
Total Related Entities	24.0541	18.0000	21.7727	3.0000	98.0000	37
Analyst Forecast Error	0.2229	0.0618	0.5480	0.0025	3.1477	35
Size	7.8344	6.8460	2.1418	5.0463	12.0727	37
Fiscal End Market Leverage	0.2469	0.1270	0.2694	0.0000	0.9091	37
Dividend Payout	0.0235	0.0000	0.0417	0.0000	0.2169	37
Cash	0.3600	0.2956	0.2789	0.0112	1.0308	37
Cash Flow	0.2648	1.3105	7.7811	-42.2276	15.8114	37
Tobin's Q	2.4730	1.9920	2.7569	-6.9655	11.9103	37
Firm Efficiency	-0.1382	0.3437	4.5062	-15.6811	9.6399	33

2007 Data	Mean	Median	St. Dev.	Min	Max	N. Obs.
Complexity	4.8952	3.5000	5.0516	0.8000	29.6667	37
Vertical Span	4.7027	5.0000	1.3305	2.0000	8.0000	37
Total Related Entities	22.0541	16.0000	20.1507	4.0000	89.0000	37
Analyst Forecast Error	0.0110	0.0049	0.0180	0.0000	0.0840	34
Size	7.5808	6.7181	2.1184	4.8604	11.8868	37
Fiscal End Market Leverage	0.0908	0.0243	0.1398	0.0000	0.5483	37
Dividend Payout	0.0725	0.0000	0.2747	0.0000	1.6623	37
Cash	1.4627	0.7475	2.7647	0.0146	15.4616	37
Cash Flow	0.3219	0.2317	0.3980	0.0492	2.4453	37
Tobin's Q	5.6467	4.0661	4.8038	1.3479	27.4406	37
Firm Efficiency	0.7030	0.2845	1.1913	-0.8387	4.9485	33

Table 2 State-owned and Non-State-owned Firm Statistics

	State-owned Firms					
	Mean	**Median**	**St. Dev.**	**Min**	**Max**	**N. Obs.**
2007						
Complexity	4.7463	4.0536	2.4679	1.8000	10.1250	14
Vertical Span	5.3571	5.0000	1.2157	4.0000	8.0000	14
Total Related Entities	26.0000	20.5000	18.3177	9.0000	81.0000	14
Analyst Forecast Error	0.0164	0.0098	0.0232	0.0011	0.0840	12
Firm Performance	0.6994	0.2840	1.4216	-0.8205	4.9485	13
Tobin's Q	5.9535	3.8011	6.5140	1.9554	27.4406	14
2008						
Complexity	7.1363	5.1667	5.8932	2.1667	24.5000	14
Vertical Span	5.2857	5.0000	1.1387	4.0000	8.0000	14
Total Related Entities	36.2857	29.0000	26.6037	11.0000	98.0000	14
Analyst Forecast Error	0.3942	0.0649	0.8975	0.0067	3.1477	12
Firm Performance	0.0828	0.4231	4.2885	-10.0632	9.1821	13
Tobin's Q	2.7417	2.0771	4.1369	-6.9655	11.9103	14

	Non-State-owned Firms					
	Mean	**Median**	**St. Dev.**	**Min**	**Max**	**N. Obs.**
2007						
Complexity	4.9858	3.2500	6.1754	0.8000	29.6667	23
Vertical Span	4.3043	5.0000	1.2590	2.0000	7.0000	23
Total Related Entities	19.6957	13.0000	21.2120	4.0000	89.0000	23
Analyst Forecast Error	0.0080	0.0029	0.0142	0.0000	0.0620	22
Firm Performance	0.7056	0.4163	1.0472	-0.8387	3.6552	20
Tobin's Q	5.4599	4.1942	3.5485	1.3479	15.3980	23
2008						
Complexity	4.1407	3.0000	3.2272	0.8000	14.6000	23
Vertical Span	4.2174	5.0000	1.4128	2.0000	7.0000	23
Total Related Entities	16.6087	14.0000	14.2948	3.0000	73.0000	23
Analyst Forecast Error	0.1336	0.0346	0.1924	0.0025	0.7785	23
Firm Performance	-0.2819	0.3253	4.7465	-15.6811	9.6399	20
Tobin's Q	2.3095	1.9074	1.5002	0.4816	6.2432	23

Table 3 Complexity and Firm Value

This table shows the results of the regressions of Tobin's Q, a proxy of firm value, on Complexity and control variables.

$$Tobin's\ Q_{2008} = \alpha + \beta * Complexity_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure.
Column (2) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in the (1) with Cook's D Statistic greater than 1.
Column (3) reflects analysis of all firms with State-ownership in the structure.
For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β		
	(1)	(2)	(3)
Complexity	0.0470567 (0.05355)	0.291684*** (0.078911)	0.411856 (0.756864)
Size	1.1930769* (0.581153)	0.9415736 (0.442769)	0.9643832 (1.168529)
Dividend Payout	0.6307388 (1.914915)	8.7229367** (3.563647)	-36.52637 (114.1683)
Cash	-0.31336 (0.31056)	-0.470671 (0.228279)	12.805598 (18.06619)
Cash Flow	0.9317497 (2.097784)	4.5358934** (1.883922)	-22.48069 (36.92297)
Market Leverage	-8.780412* (4.499952)	-2.900131 (3.64452)	-3.277294 (10.55497)
R^2	0.335968	0.686912	0.198805
RMSE	1.433522	1.026132	5.046215
N. Obs	23	21	14
Influential Firm: Cook's D	GA: 19.62		
	QXM: 3.95		

Table 4 Complexity and Information Asymmetry

This table shows the results of the regressions of Analyst Forecast Error, a proxy of information asymmetry, on Complexity and control variables.

$$Analyst\ Forecast\ Error_{2008} = \alpha + \beta * Complexity_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in Table 2, Column (1) with Cook's D Statistic greater than 1. Column (2) reflects analysis of all firms with State-ownership in the structure. For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β	
	(1)	(2)
Complexity	-0.010259 (0.019316)	0.0187921 (0.046764)
Tobin's Q	-0.019833 (0.023913)	0.1106255*** (0.020919)
Size	0.0487665 (0.137664)	-0.219576** (0.075643)
Dividend Payout	-0.140235 (0.778157)	2.1320224 (7.438926)
Cash	0.0276088 (0.051108)	-2.311743 (1.273547)
Cash Flow	-0.271136 (0.434468)	0.5776657 (2.330572)
Market Leverage	-0.07632 (0.901636)	0.0949597 (0.917625)
R^2	0.196375	0.963953
RMSE	0.221992	0.282579
N. Obs	21	12
	NO GA and QXM	

Table 5 Information Asymmetry and Firm Value

This table shows the results of the regressions of Tobin's Q, a proxy of firm value, on Analyst Forecast Error, a proxy of information asymmetry, and control variables.

$$Tobin's\ Q_{2008} = \alpha + \beta * Analyst\ Forecast\ Error_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in Table 2, Column (1) with Cook's D Statistic greater than 1. Column (2) reflects analysis of all firms with State-ownership in the structure. For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β	
	(1)	(2)
Analyst Forecast Error	-25.34771 (22.79509)	10.781396 (69.48519)
Size	0.2384037 (0.77078)	0.9007167 (1.250852)
Dividend Payout	3.9703293 (9.900388)	42.778196 (80.98086)
Cash	-0.285252 (0.281523)	2.8476347 (12.39195)
Cash Flow	2.0924591 (2.310205)	-31.24216 (27.74431)
Market Leverage	-0.920725 (5.337662)	-12.75911 (8.634145)
R^2	0.585408	0.583874
RMSE	1.244362	3.302558
N. Obs	20	12
	NO GA and QXM	

Table 6 Complexity and Efficiency

This table shows the results of the regressions of ROA Difference, a proxy of firm efficiency, on Complexity and control variables.

$$ROA\ Difference_{2008} = \alpha + \beta * Complexity_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in Table 2, Column (1) with Cook's D Statistic greater than 1. Column (2) reflects analysis of all firms with State-ownership in the structure. For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β	
	(1)	(2)
Complexity	0.7093471 (0.98293)	-0.173762 (0.50637)
Tobin's Q	0.1255789 (0.689369)	0.3229108 (0.198565)
Size	-0.769806 (3.844916)	2.136388* (0.884692)
Dividend Payout	-0.566707 (22.09035)	-64.70576 (80.4291)
Cash	-0.576665 (1.643422)	20.217361 (13.10295)
Cash Flow	1.433007 (13.59504)	-1.872448 (27.49543)
Market Leverage	3.5329642 (27.52877)	-5.23794 (8.66909)
R^2	0.010835	0.748489
RMSE	6.136561	3.334189
N. Obs	18	13
	NO GA and QXM	

Table 7 Efficiency and Firm Value

This table shows the results of the regressions of Tobin's Q, a proxy of firm value, on ROA Difference, a proxy of firm efficiency, and control variables.

$$Tobin's\ Q_{2008} = \alpha + \beta * ROA\ Difference_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in Table 2, Column (1) with Cook's D Statistic greater than 1. Column (2) reflects analysis of all firms with State-ownership in the structure. For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β	
	(1)	(2)
ROA Difference	0.236857 (0.246836)	-0.455432 (0.570505)
Size	0.6910636 (0.444607)	2.0068754 (1.904418)
Dividend Payout	11.532597*** (2.535913)	-55.86613 (134.1573)
Cash	-0.34047 (0.189765)	25.168694 (25.06468)
Cash Flow	3.8811264** (1.530304)	-23.71906 (41.12632)
Market Leverage	-2.384682 (3.089073)	-0.62086 (10.16781)
R^2	0.850611	0.240526
RMSE	0.681474	5.273094
N. Obs	17	13
	NO GA and QXM	

Table 8 Vertical Span and Firm Value

This table shows the results of the regressions of Tobin's Q, a proxy of firm value, on Vertical Span and control variables.

$$Tobin's\ Q_{2008} = \alpha + \beta * Vertical\ Span_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure.
Column (2) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in the (1) with Cook's D Statistic greater than 1.
Column (3) reflects analysis of all firms with State-ownership in the structure.
For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β		
	(1)	(2)	(3)
Vertical Span	-0.037053 (0.258224)	0.0111639 (0.247811)	-2.437957 (1.667204)
Size	1.1785252* (0.594798)	1.3576451** (0.577359)	1.0010082 (1.032304)
Dividend Payout	0.5317757 (1.981165)	7.8512391 (4.89456)	-61.44729 (103.4311)
Cash	-0.297273 (0.317773)	-0.409907 (0.310631)	35.278309 (22.30522)
Cash Flow	0.8507485 (2.15448)	3.2155709 (2.518368)	-1.934917 (32.92349)
Market Leverage	-7.424786 (4.424741)	-7.286778 (4.216455)	3.7089465 (8.591561)
R^2	0.304816	0.407126	0.36032
RMSE	1.466763	1.397433	4.508978
N. Obs	23	22	14
Influential Firm: Cook's D	GA:16.61		

Table 9 Total Related Entities and Firm Value

This table shows the results of the regressions of Tobin's Q, a proxy of firm value, on Total Related Entities and control variables.

$$Tobin's\ Q_{2008} = \alpha + \beta * Total\ Related\ Entities_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure.
Column (2) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in the (1) with Cook's D Statistic greater than 1.
Column (3) reflects analysis of all firms with State-ownership in the structure.
For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β		
	(1)	(2)	(3)
Total Related Entities	0.0208915 (0.014739)	0.02555699* (0.013575)	-0.01039 (0.121635)
Size	1.1666997* (0.560787)	1.3686483** (0.518493)	1.0849876 (1.205051)
Dividend Payout	0.851828 (1.857629)	9.4102154* (4.420666)	-26.01491 (114.8501)
Cash	-0.319009 (0.299636)	-0.451602 (0.279469)	13.495617 (20.30036)
Cash Flow	0.882271 (2.021108)	3.7128401 (2.279794)	-15.04235 (38.97011)
Market Leverage	-8.967031* (4.242192)	-8.972308** (3.853836)	0.1501742 (11.06033)
R^2	0.381578	0.520475	0.165782
RMSE	1.383415	1.256768	5.149159
N. Obs	23	22	14
Influential Firm: Cook's D	GA: 25.56		

Table 10 Total Related Entities, Vertical Span, and Firm Value

This table shows the results of the regressions of Tobin's Q, a proxy of firm value, on Total Related Entities, Vertical Span and control variables.

$$Tobin's\ Q_{2008} = \alpha + \beta_1 * Total\ Related\ Entities_{2007} + \beta_2 * Vertical\ Span_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of all firms with no State-ownership in the structure.
Column (2) reflects analysis of all firms with no State-ownership in the structure except the influential outliers identified in the (1) with Cook's D Statistic greater than 1.
Column (3) reflects analysis of all firms with State-ownership in the structure.
For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β		
	(1)	(2)	(3)
Total Related Entities	0.0208394 (0.015226)	0.0635425*** (0.016236)	0.0210919 (0.117027)
Vertical Span	-0.025363 (0.251598)	-0.265887 (0.203579)	-2.502955 (1.831783)
Size	1.1648034* (0.579288)	0.9642746** (0.438513)	0.9552152 (1.140667)
Dividend Payout	0.8216197 (1.940803)	9.5343533** (3.623638)	-62.56581 (111.5899)
Cash	-0.317362 (0.309789)	-0.446299* (0.226257)	34.404287 (24.51194)
Cash Flow	0.9045487 (2.098354)	4.3448616** (1.850581)	-4.190074 (37.6081)
Market Leverage	-8.893403* (4.440313)	-2.260351 (3.818639)	2.774462 10.60834
R^2	0.381996	0.716065	0.363764
RMSE	1.428301	1.014079	4.857123
N. Obs	23	21	14
Influential Firm: Cook's D	GA: 21.39		
	QXM: 1.58		

Table 11 Vertical Span, Total Related Entities, ROA Difference

This table shows the results of the regressions of ROA Difference, a proxy of firm efficiency, on alternative organizational structure complexity measures for non-State-owned firms and control variables without influential firms GA and QXM.

$$ROA\ Difference_{2008} = \alpha + \beta * Alternative\ Complexity\ Measure_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of Vertical Span as the alternative complexity measure.
Column (2) reflects analysis of Total Related Entities as the alternative complexity measure.
Column (3) reflects analysis of both Vertical Span and Total Related Entities as alternative complexity measures.
For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β		
	(1)	(2)	(3)
Vertical Span	0.1978263 (1.256673)		-0.062404 (1.306693)
Total Related Entities		0.2353016 (0.25264)	0.2382875 (0.273514)
Tobin's Q	0.349126 (0.626418)	-0.022545 (0.725681)	-0.024406 (0.76583)
Size	-0.739228 (3.980616)	-0.283156 (3.827607)	-0.305075 (4.060165)
Dividend Payout	0.7167556 (23.20267)	5.1812072 (22.45251)	4.9916772 (23.99451)
Cash	-0.240751 (1.623314)	-0.865673 (1.692029)	-0.858477 (1.789684)
Cash Flow	-1.880354 (13.06568)	2.4677259 (13.41504)	2.4782796 (14.14063)
Market Leverage	1.2666883 (30.45308)	-1.665914 (27.55405)	-1.154567 (30.95183)
R^2	0.064232	0.136792	0.137011
RMSE	6.286545	6.037859	6.363694
N. Obs	18	18	18

Table 12 Vertical Span, Total Related Entities, Analyst Forecast Error

This table shows the results of the regressions of Analyst Forecast Error, a proxy of information asymmetry, on alternative organizational structure complexity measures for non-State-owned firms and control variables without influential firms GA and QXM.

$$Analyst\ Forecast\ Error_{2008} = \alpha + \beta * Alternative\ Complexity\ Measure_{2007} + \sum \gamma_n * Control\ Variable_{2007\ n} + \varepsilon$$

Column (1) reflects analysis of Vertical Span as the alternative complexity measure.
Column (2) reflects analysis of Total Related Entities as the alternative complexity measure.
Column (3) reflects analysis of both Vertical Span and Total Related Entities as alternative complexity measures.
For each variable, β and the standard error of β in parentheses are reported.
*, **, and *** denotes 10%, 5%, and 1% significance respectively.

	β		
	(1)	(2)	(3)
Vertical Span	0.0381413 (0.04205)		0.0425151 (0.045233)
Total Related Entities		-0.000411 (0.003885)	-0.001445 (0.004054)
Tobin's Q	-0.028788 (0.020981)	-0.024547 (0.024302)	-0.024817 (0.024413)
Size	0.0877043 (0.13525)	0.0589547 (0.141261)	0.0770347 (0.143197)
Dividend Payout	0.0716316 (0.775912)	-0.108361 (0.807475)	0.0112195 (0.821037)
Cash	0.0168154 (0.049623)	0.0235778 (0.051659)	0.019847 (0.052049)
Cash Flow	-0.187423 (0.403568)	-0.209998 (0.433055)	-0.231305 (0.4356)
Market Leverage	-0.388665 (0.945318)	-0.073158 (0.916781)	-0.384854 (0.978809)
R^2	0.227807	0.179645	0.235897
RMSE	0.217608	0.224291	0.225304
N. Obs	21	21	21

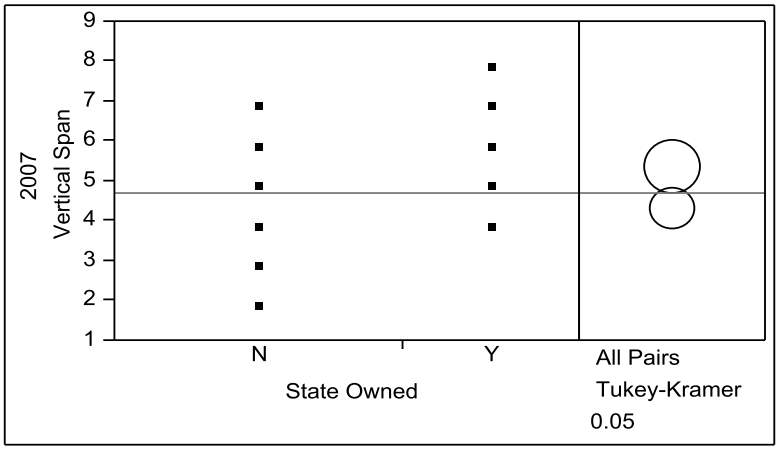
Table 13 List of Firms Studied

Ticker	Company Name	Industry	State-Owned
CH	ALUMINUM CORP OF CHINA LTD	mining	Y
AOB	AMERICAN ORIENTAL BIOENGINEERING INC	pharmaceutical	N
ATV	ACORN INTERNATIONAL INC	household goods	N
CEA	CHINA EASTERN AIRLINES CORPORATION LTD	airline	Y
CEO	CNOOC LTD	oil mining	Y
CHA	CHINA TELECOM CORP LTD	telecom	Y
CHL	CHINA MOBILE LTD	telecom	Y
CHU	CHINA UNICOM (HONG KONG) Ltd	telecom	Y
CSR	CHINA SECURITY & SURVEILLANCE TECHNOLOGY INC	network and communication equipment	N
EDU	NEW ORIENTAL EDUCATION & TECHNOLOGY GROUP INC	education	N
EJ	E-HOUSE (CHINA) HOLDINGS LTD	real estate	N
GA	GIANT INTERACTIVE GROUP INC	entertainment	N
GRO	AGRIA CORP	food production	N
GSH	GUANGSHEN RAILWAY CO LTD	railroad	Y
GU	GUSHAN ENVIRONMENTAL ENERGY LTD	energy	N
HNP	HUANENG POWER INTERNATIONAL INC	utilities	Y
LDK	LDK SOLAR CO LTD	energy	N
LFC	CHINA LIFE INSURANCE CO LTD	insurance	Y
LFT	LONGTOP FINANCIAL TECHNOLOGIES LTD	computers and office equipment	N
MR	MINDRAY MEDICAL INTERNATIONAL LTD	electronic equipment	N
NPD	CHINA NEPSTAR CHAIN DRUGSTORE LTD	food and drug store	N
PTR	PETROCHINA CO LTD	oil refining	Y
QXM	QIAO XING MOBILE COMMUNICATION CO LTD	network and communication	N
SCR	SIMCERE PHARMACEUTICAL GROUP	pharmaceuticals	N
SHI	SINOPEC SHANGHAI PETROCHEMICAL CO LTD	chemicals	Y
SNP	CHINA PETROLEUM & CHEMICAL CORP	oil refining	Y
STP	SUNTECH POWER HOLDINGS CO LTD	energy	N
STV	CHINA DIGITAL TV HOLDING CO LTD	network and communication equipment	N
TCM	TONGJITANG CHINESE MEDICINES CO	pharmaceutical	N
TSL	TRINA SOLAR LTD	energy	N
VIT	VANCEINFO TECHNOLOGIES INC	computers and office equipment	N

WH	WSP HOLDINGS LTD	industrial machinery	N
WX	WUXI PHARMATECH (CAYMAN) INC	electronic equipment	N
XIN	XINYUAN REAL ESTATE CO LTD	real estate	N
YGE	YINGLI GREEN ENERGY HOLDING CO LTD	energy	N
YZC	YANZHOU COAL MINING CO LTD	mining	Y
ZNH	CHINA SOUTHERN AIRLINES CO LTD	airline	Y

Graph 1 Vertical Span Comparison between State-owned and Non-State-owned Firms

Oneway Analysis of 2007 Vertical Span By State Owned



Means Comparisons
Comparisons for all pairs using Tukey-Kramer HSD

q*	Alpha
2.03012	0.05

Abs(Dif)-LSD	Y	N
Y	-0.95384	0.197343
N	0.197343	-0.74417

Positive values show pairs of means that are significantly different.