Opacity and Valuation of Chinese Companies: The VIE Discount

by

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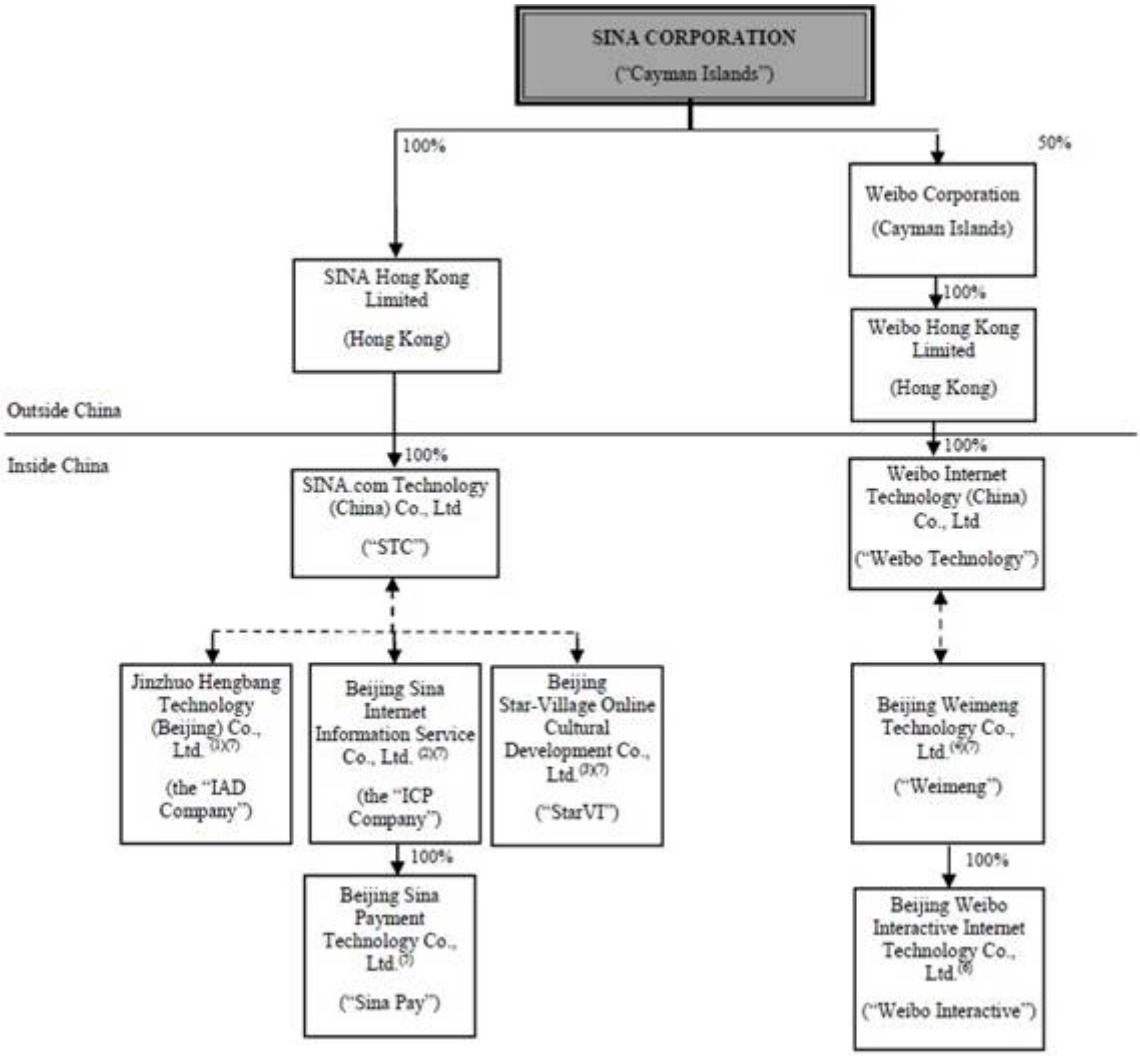
Abstract

This paper studies the stock discounts of U.S.-listed Chinese firms from the perspective of VIE structures. First, we show the potential implications of VIE structures and the contributing factors of Tobin's Q. Second, we group the firms based on VIE and WFOE information disclosures. We then compare Tobin's Q for the three subgroups and examine the similarities and differences across VIE and Non-VIE companies. The key methodology behind the research is multivariate regression. Using Minitab, we analyze Tobin's Q in the context of company characteristics, financials and estimates, and stock performances, and we explore the potential correlation and causal relationships.

JEL classification: G14
Keywords: Variable Interest Entity, Stock Discount, China

1. Introduction

When going public in the U.S., Chinese firms are under strict regulatory scrutiny. The Chinese regulatory bodies aim to protect sensitive technologies and supervise foreign investments. Firms in education, technology, media, telecommunications, financial services, and healthcare industries have to create specific financial structures and adopt particular contractual arrangements. In 2000, Sina Corporation created the first VIE structure when getting listed on Nasdaq. Compared to Foreign Direct Investments (FDI), VIE firms have introduced alternative pathways to access investment opportunities in restricted industries.

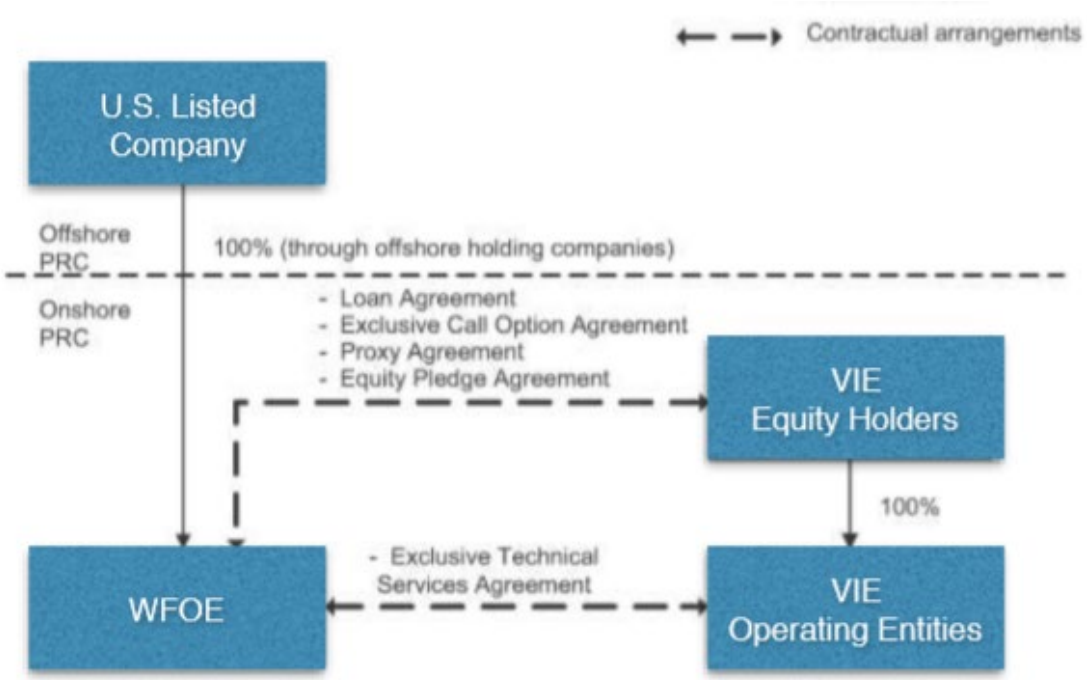


Stock discounts of U.S.-listed Chinese stocks are subject to the legal validity of VIE shares and fraudulent transfers of VIE assets. It is noticeable that VIE firms' validity is dependent upon Chinese laws, which have neither rejected nor affirmed the legality of VIE structures explicitly. VIE firms also have indirect control over the operational entities, and shareholders may face difficulties in legal recourses for asset transfers. Research has shown that companies with VIE structures are discounted relative to companies without VIE structures. Because legal and contractual risks are priced in the capital market, analyzing the VIE structures is crucial to understanding the stock discounts.

In the past few years, investors have started to pay more attention to U.S.-listed Chinese stocks, thanks to the economic successes, technological innovations, and capital investments. In this paper, we use Capital IQ to create a dataset, covering qualitative and quantitative variables between December 2017 and March 2019. We examine the differences among VIE(Detailed), VIE(Abstract), and Non-VIE stock discounts by employing a wide range of determinants. We also provide an alternative pathway to understand the U.S.-listed Chinese stocks, to evaluate the widely used VIE structures, and to examine the current trading strategies.

1.1VIE Structure

VIE structure is usually comprised of the U.S. listing company, the WFOE (Wholly Foreign-Owned Entity), and the VIE operating entities. In the FIN 46 statement, United States Financial Accounting Standards Board (FASB) defines VIEs as entities in which "the investor holds a controlling interest that is not based on the majority of voting rights." As shown below, the U.S. listed company does not own shares of the VIE operating entities. The U.S. listed company owns shares of WFOE, and WFOE indirectly obtains economic interests from the operating entities through contractual agreements. For example, WFOE may provide capital for the operational entities and receive the majority of profits in the form of management fees. That is to say, owning a stock in U.S. listed companies may only guarantee limited rights to derive cash flows and exercise contractual controls. It does not guarantee claims to the operating assets, which are implicit in the traditional corporate structure.



From a qualitative perspective, Lan (2015) discusses the gray area in the legal system that the Chinese government has neither prohibited nor endorsed the VIE structure. And Liu (2013) analyzes the risks for investors and recommendations for government agencies. Because investors remain cautious in assessing political risks, the Chinese government needs to release more consistent policies and regulations across different regulatory bodies. Eales (2015) agrees with Liu in that uncertainties associated with the VIE structure should be reduced in order to achieve higher market efficiency.

From a quantitative perspective, some studies (Hopkins, Lang and Zhao, 2017) have shown that VIE firms have higher Tobin's Q compared to non-VIE firms, and that stock discounts depend on political, regulatory, and agency risks. Stock discounts can be also affected by economic conditions, politically connected directors, Big N auditors, institutional investors, etc.

Our paper also examines VIE and non-VIE firms using regression model. The difference between the literature and our paper is that we divide the companies into three subgroups based on VIE-related disclosures. We believe that the complete dataset might omit important trends and patterns, whereas the subgroups will help to examine the different characteristics of our dataset. In this way, our paper offers a more specific and detailed analysis.

- "VIE(Detailed)" represent VIE firms, whose prospectuses contain information regarding both VIEs and WFOEs.
- "VIE(Abstract)" represent VIE firms, whose prospectuses contain information regarding VIEs but not WFOEs.
- "Non-VIE" represent firms, whose prospectuses contain no information regarding VIE entities or contracts

1.2Stock Discount

The variables used for the study are given below. Tobin's Q provides a measurement on the extent to which firms are undervalued or overvalued. According to Tobin (1969), the measurement is calculated by dividing market value assets with book value assets. A high value of Tobin's Q can imply that the firm is overvalued or the firm has considerable intangible capital.

Tobin's Q = (Market Value Equity + Total Liabilities)/ (Total Assets). *(1)*

Some studies (Hirsch and Seaks, 1993) have incorporated a great variety of determinants. Firm size is measured by the number of total employees, and firm age is measured by year founded. The models also take into consideration long-term debt and net property, plant and equipment (net PPE). Other studies (Shalini, 2018) have examined Tobin's Q by considering return on assets (ROA) debt-to-equity ratio (D/E Ratio), and dividend payout ratio.

ROA = Net Income/ Average Total Assets *(2)*

D/E Ratio = Total Liabilities/ Total Equities *(3)*

Dividend Payout Ratio = Dividends Per Share/ Earnings Per Share *(4)*

Prior studies on Tobin's Q have provided both theoretical arguments and empirical analysis. In this paper, we also take into consideration company information, financials and estimates, and stock performances. We select the most statistically significant determinants to create a more holistic and reliable Tobin's Q model for the complete dataset, VIE(Detailed) firms, VIE(Abstract) firms, and non-VIE firms correspondingly. Our paper also provides the unique opportunity to examine the similarities and differences among the models.

2. Hypotheses

In light of the above discussion, we propose the following three hypotheses.

Hypothesis 1: Due to the contractual and legal risks, we expect VIE and non-VIE firms to differ in stock discounts. The hypothesis is that VIE firms will be undervalued compared to non-VIE firms, and that VIE firms will have lower Tobin's Q compared to non-VIE firms.

Hypothesis 2: Due to the uncertainties in VIE structures and legislations, we also expect VIE(Detailed) and VIE(Abstract) firms to differ in stock discounts. The hypothesis is that VIE(Abstract) firms will be undervalued compared to VIE(Detailed) firms, and that VIE(Abstract) firms will have lower Tobin's Q compared to VIE(Detailed) firms.

Hypothesis 3: VIE(Detailed) firms have legal and contractual risks, VIE(Abstract) firms have information asymmetry risks in addition to the above risks, and non-VIE firms do not include these forms of risks. We expect most of the determinants to differ across different models. The hypothesis is that the determinants of complete dataset model does not overlap with that of the three subgroup models. Determinants of the three subgroup models are indicative of risks of the three subgroup firms.

3. Data and Methodology

3.1Data Description

From Nasdaq's official website, we have compiled a list of 168 U.S.-listed Chinese companies. Using Capital IQ, we have eliminated 22 redundant or unidentifiable companies from the list, and we have collected monthly data from December 31, 2017 to March 31, 2019. Determinants for Tobin's Q include (a) Company Information: exchange, index membership, industry classifications, investors, year founded, prime office location, number of employees, co-investors, compensation, and investments as LP; (b) Financials and Estimates: revenue, gross profit, net income, market capitalization, total capital, return on assets, gross margin, EBIT margin, current ratio, total debt/ equity, growth in revenue, EV/ Revenue, EV/ EBIT, P/EPS, and P/BV; and (c) Stock Performances: current last sale, net Change, Target Price, 52 Week High, 52 Week Low, beta, average daily volume, RSI, PSR, annualized dividend, and dividend yield.

3.2Methodology

We classify the 146 companies into three subgroups: VIE(Detailed), VIE(Abstract), and Non-VIE. Employing multivariable regression, we select 10 determinants that are statistically significant based on VIF values. Using the selected determinants, we select the best subgroups using adjusted R-square values. We then build up multivariable models for the complete dataset, VIE(Detailed) companies, VIE(Abstract) companies, and Non-VIE companies. We present our models and explain the similarities and differences among different subgroups.

4. Empirical Results: Subgroup Comparisons

4.1Descriptive Statistics

This section examines Hypotheses 1 and 2 and presents the key measures of VIE(Detailed) firms, VIE(Abstract), and Non-VIE subgroups. To examine Hypotheses 1 and 2, we calculate the average Tobin's Q for each subgroup. The average Tobin's Q is 1.64 for VIE(Detailed) firms, 1.26 for VIE(Abstract) firms, 2.86 for Non-VIE firms, and 2.05 for the complete dataset.

As shown in Table 1 and Appendix 0, there are 87 VIE firms and 59 non-VIE firms in our dataset, of which most are registered in the Cayman Islands and classified in the Consumers sector. The majority of VIE(Detailed) and non-VIE firms chose to list on Nasdaq CM, whereas the majority of VIE(Abstract) chose to list on Nasdaq GS. Our evidence suggests that VIE companies have a lower average Tobin's Q compared to non-VIE companies. And among VIE companies, VIE(Abstract) firms have a lower average Tobin's Q compared to VIE(Detailed) firms.

Table 1 Descriptive Statistics

Term	VIE(Detailed)	VIE(Abstract)	Non-VIE	Complete Dataset
Number of Firms	53	34	59	146
Country	Cayman Islands	Cayman Islands	Cayman Islands	Cayman Islands
Industry	Internet and Direct Marketing Retail	Education Services	Auto Parts and Equipment	Internet and Direct Marketing Retail
Exchange	NasdaqCM	NasdaqGS	NasdaqCM	NasdaqCM
Tobin's Q	1.64	1.26	2.86	2.05
Beta	1.63	1.85	0.8	1.34
Revenue CAGR	42.94	19.96	23.09	29.45
Number of VIE	29	26	1	17
Gross Margin	37.82	37.74	29.68	34.59
DE	4.94	0.91	0.22	2.09
EV/ EBIT	20.23	18.34	16.63	18.38

4.2Qualitative Analysis

Due to legal and contractual risks, VIE companies are lower in Tobin's Q than non-VIE companies. That is to say, different corporate structures and contractual agreements can imply different risk levels and stock discounts. And due to information asymmetry risks, VIE(Abstract) firms are lower in Tobin's Q than VIE(Detailed) firms. That is to say, disclosures on both VIE-level and WFOE-level can facilitate investors to value firms in a more reliable way.

All VIE firms are discounted due to the inherent corporate structure risks. Under Chinese law, contracts are invalidated when "there is an attempt to conceal illegal goals under the disguise of legitimate forms." In other words, VIE structures may be invalidated because they bypass government approvals for FDIs. VIE structures may be considered breach of contract due to legal provisions. One example is Giga Media Limited ("Giga Media"). Shareholders decided to fire Ji Wang, a former executive of Giga Media's VIE. But Wang took the company seals, financial seals, and other documents that facilitate the VIE contractual arrangements. Without the required documents, Giga Media was unable to file lawsuits in China, losing the right of control over its VIE and approximately 20% of its revenues. It is possible that Chinese law will impose a burden on U.S. shareholders in unforeseen situations as such. Furthermore, VIE structures are crucial to determining Tobin's Q. Different layers of holding companies and operating companies are employed to construct the VIE structures. The more complex VIE structures are, the more likely transfers of assets will take place. We can employ the number of subsidiaries to explain the VIE risks involved. Multiple layers of subsidiaries, which are located in different countries and cities, can make it difficult for auditors to supervise the capital flow. Chan Tze Ngon, the former CEO and chairman of

the board at ChinaCast Education Corporation, moved $41 million issuance proceeds out of the company. The transfer was made via ChinaCast Technology (HK) Limited, which has four layers of holding companies. It is the complex structure that made the transfer unnoticeable. It is also noteworthy that illegal transfers can not only harm shareholder interests, but also incur bankruptcies in some cases.

Contract clauses can impact Tobin's Q. In VIE structures, WFOE may control VIE operating entities via different types of contractual agreements. For example, Alibaba employs loan agreement, equity pledge agreement, service agreement, etc. Because different types of agreements imply different level of control, we can use the contract clauses to roughly explain the extent to which firms are overvalued. Moreover, contract entities can also impact Tobin's Q. Material assets and operations may be controlled by either WFOE or VIE operating entities. We believe that holding material assets at WFOE level will yield a premium than holding material assets at VIE level. In the case of legal recourse, it is easier to obtain compensations if the material assets were held at WOFE level rather than VIE level. For Alibaba, WFOE directly controls all operating assets besides ICP license. Alibaba directly generates the majority of its revenue from WFOE, without relying on contractual arrangements to transfer cash flows from VIE to WFOE. In this way, the contract entities also help to explain the differences in stock discounts.

Legal and contractual risks are key to explaining the differences in Tobin's Q for VIE and non-VIE firms. Disclosures regarding these risks are key to explaining the differences in Tobin's Q for VIE(Abstract) and VIE(Detailed) firms. Information at VIE level determines whether to discount for VIE risks, and information at WFOE level determines the extent to which stocks are discounted. This is the reason why disclosures of both VIE and WFOE information will yield a premium.

5. Empirical Results: Multivariable Regression

5.1Determinants and Best Subset Selection

As summarized in Table 2, we run Tobin's Q multivariable regressions for 35 determinants using VIE(Detailed) firms, VIE(Abstract) firms, Non-VIE firms, and the complete dataset. Among variables that are statistically significant at 10% level, we select 10 determinants which have the lowest VIF values. The selected determinants are denoted with the symbol *. The full models are presented in Appendix 1-4.

Table 2 Determinants Selection

Term	VIE(Detailed) Coef	VIE(Abstract) Coef	Non-VIE Coef	Complete Dataset Coef
Constant	46.9	4.1	17.64	14.67
Number of VIE	0.00121	0.00978*	-0.01288	-0.00597*
Country	-0.002	-0.337*	-0.01126	0.0070
Sector	0.1010*	0.1334*	0.01466	0.0057
Industry	-0.0269	0.0462*	-0.00199	-0.00293
Exchange	-0.0691	0.0186	0.0996*	0.0870*
Firm Age	-0.0235	0.0632*	-0.00654*	-0.00279
ROA	3.651	5.385*	2.337*	2.035*
DE	-0.04081*	0.0519	-0.00621	-0.01169
Long-term Debt	0.000204	-0.000096	0.000003	0.000017
Net PPE	0.000185	0.000044	-0.000002	-0.000005
Total Employee	-0.000005	-0.000002	0.000000	0.000006
Total Revenue	0.000099	-0.000085	0.000001	0.000007
Gross Profit	-0.000621	-0.000070	-0.000000	-0.000096
Net Income	0.000374	-0.000034	0.000001	0.000187
Gross Margin	0.03654*	0.01339	0.011563*	0.01245*
EBIT Margin	-0.06469	-0.08886	-0.00656	-0.03388*
Current Ratio	0.0910*	-0.0184	-0.1126*	0.0229
Revenue CAGR	0.01026*	0.00334	0.003508*	0.004231*
EV/ Revenue	0.0114	0.006	-0.0404	-0.0728
EV/ EBIT	0.00792	-0.02900*	-0.00159	0.01252*
P/EPS	-0.00460	-0.00367*	0.001899	-0.00319*
P/BV	0.0645*	0.0508	0.0639*	0.07394*
Last Sale Price	-0.0378	0.0177	-0.00004	0.04342

Target Price	-0.004067	0.00006	-0.00826	-0.002783
52 Week High	-0.0187	-0.00245	0.00753	0.00423
52 Week Low	0.1383	0.0161	-0.0001	-0.0560
Beta	-0.3451*	0.5433*	0.0337	0.1463*
Daily Volume	-0.0748	2.887*	0.2142*	0.0232
RSI	0.03448	0.00653	-0.00479*	-0.00531
P/Sales	-0.0077	0.170	-0.0050	0.0870
EPS	0.00811*	-0.0180	-0.01437	-0.00343
PEG	0.641*	-0.0241	-0.0784	-0.0456
Dividend	-19.12	-0.147	0.518	-0.131
Dividend Yield	1.004	0.0171	-0.0904	-0.0147
Date	-0.001101*	-0.000149	-0.000399*	-0.000340
R-Square	68.06%	93.72%	82.04%	39.21%

As shown in Table 2, we run Tobin's Q best subset regressions for each subset using the selected determinants. We select the best subgroups that have the fewest number of determinants among those with the highest or the second highest adjusted R-square values. The full models are presented in Appendix 5-8.

Table 3 Best Subset Selection

Term	VIE (Detailed)	VIE (Abstract)	Non-VIE	Complete Dataset
Determinant 1	Date	Country	Revenue CAGR	Beta
Determinant 2	Beta	Sector	Gross Margin	Revenue CAGR
Determinant 3	Current Ratio	Firm Age	ROA	Exchange
Determinant 4	EPS (Deleted)	Beta	Exchange	Number of VIE
Determinant 5	Gross Margin	Industry	Dividend Yield	Gross Margin
Determinant 6	Sector	Daily Volume	P/BV	DE
Determinant 7	P/BV	EV/ EBIT	-	EV/ EBIT

5.2Multivariable Models

As shown in Table 3, we build up multivariable models for VIE(Detailed), VIE(Abstract), non-VIE firms, and complete dataset. Note that the VIE(Detailed) regression model changed from a seven-determinant model to a six-determinant model because determinant EPS is not statistically significant on a 1% confidence level. The symbols ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels. The full models are presented in Appendix 9-12.

Table 4 Multivariate Models

Term	VIE (Detailed)	VIE (Abstract)	Non-VIE	Complete Dataset
Constant	50.1 (2.62**)	0.132 (0.41)	-0.017 (-0.12)	0.013 (0.08)
Sector	-0.0843 (-2.98**)	0.0765 (1.99*)		
Beta	-0.1503 (-3.92***)	0.4464 (11.81***)		0.1077 (5.07***)
Date	-0.001134 (-2.57**)			
Current Ratio	0.0844 (7.53***)			
Gross Margin	0.01921 (10.54***)		0.01100 (7.41***)	0.00863 (7.18***)
P/BV	0.01501 (5.14***)		0.14402 (26.79***)	
CountryofIncorporation		-0.396 (-3.30**)		
FirmAge		0.0579 (4.88***)		
Industry		-0.0656 (-4.49***)		
Daily Volume		0.745 (5.76***)		
EV/ EBIT		0.01123 (2.54***)		0.00639 (5.16***)
Total Revenue 2 Yr CAGR			-0.000505 (-2.97**)	0.003378 (4.30***)
Exchange			0.0884 (4.73***)	0.0711 (4.60***)
ROA			-3.737 (-13.63***)	
Dividend Yield			-0.0832 (-3.34**)	
Number of VIE				-0.00506 (-4.81***)
DE				0.01388 (3.07**)
R-Square	26.11%	41.14%	58.92%	10.41%

5.3 Qualitative Analysis

This section examines Hypothesis 3 and presents the key findings of VIE(Detailed), VIE(Abstract), and Non-VIE subgroups. To examine Hypothesis 3, we analyze the explanatory power and selected determinants multivariable regressions, and we analyze the extent to which the complete dataset model overlaps with the three subgroup models.

We first examine the explanatory power of models. The subgroup models provide a better explanation of Tobin's Q compared to the traditional model. Using the traditional approach, the complete dataset has a R-square of 10.41%. Using the VIE subgroups, each regression model has a significantly higher R-square. R-square for VIE(Detailed) is 26.11%, for VIE(Abstract) is 41.14%, and for Non-VIE is 58.92%. These findings prove that each subgroup model is tailored to its unique characteristics. As discussed in Section 6.2, the VIE(Detailed) subgroup addresses the legal and contractual risks, the VIE(Abstract) subgroup addresses the information asymmetry risks, and Non-VIE stock subgroup addresses none of the above risks. These characteristics can result in drastic differences across different subgroup models, but they are easily ignored or omitted in the complete dataset model.

Then, we investigate the selected determinants of models. The determinants in subgroup models are different from those in the complete dataset model. Although overlapping determinants include Beta and Gross Margin for VIE(Detailed) subgroup, Beta and EV/EBIT for VIE(Abstract) subgroup, and Gross Margin and Exchange for Non-VIE subgroup, more than half of the determinants are different. Among the subset models, the only overlapping determinants are Sector and P/BV. These findings illustrate that each model requires subgroup-specific analysis. Thus, subgroup-specific determinants account for the unique characteristics of each subgroup.

The subgroup-specific analysis is consistent with our expectations. VIE(Detailed) has the subgroup-specific determinants of Date and Current Ratio, in that its stock discount is subjective to time series and liquidity capabilities. VIE(Detailed) stock discounts account for the legal and contractual risks. These risks are time-sensitive because they are affected by new announcements and policies made by the Chinese government. VIE(Abstract) has the subgroup-specific determinants of Country of Registration, Firm Age, Industry, Daily Volume and EV/EBIT, in that its stock discount is subjective to VIE-related characteristics and stock performances. VIE(Abstract) stock discounts account for the information asymmetry risks. These risks depend on VIE-related measures, which specify how VIE structures are defined and regulated. Non-VIE has the subgroup-specific determinants of Revenue CAGR, ROA, and Dividend Yield, in that its stock discount is subjective to business performances. And Non-VIE stock discounts account for the none of the above risks. In this case, business performances are the main determinants of stock discounts.

6. Conclusions

In the past few years, investors and researchers have put U.S.-listed Chinese stocks under the spotlight. After the Alibaba, ChinaCast, and Giga Media incidences, stakeholders have drawn attention to understanding the stock discounts from the perspective of VIE structures. In this paper, we have analyzed key determinants of Tobin's Q and potential inferences of VIE structures. The most challenging part is that the complete dataset model omits important patterns and trends. To tackle the issue, we have constructed three multivariable regression models based on VIE and WFOE information disclosures.

Our empirical results are consistent with our previous assumptions. We find that the VIE firms have lower Tobin's Q compared to non-VIE firms due to legal and contractual risks, and that VIE(Abstract) firms have lower Tobin's Q compared to VIE(Detailed) firms due to information asymmetry risks. Moreover, we find that the subgroup models have higher explanatory power than the complete dataset model because each subgroup has its unique characteristics and risks. It is noteworthy that the subgroup-specific determinants account for the subgroup-specific risks. VIE(Detailed) stock discounts are time-sensitive, accounting for the legal and contractual risks. VIE(Abstract) stock discounts are related to VIE characteristics, accounting for the information asymmetry risks. And Non-VIE stock discounts are related to business performances, accounting for the none of the above risks discussed.

For policy makers, this paper again highlights the market inefficiency led by policy uncertainty. Chinese government has neither prohibited nor endorsed the VIE structure. It needs to release more consistent policies and regulations across different regulatory bodies. For researchers, this paper divides the dataset into three subgroups,

VIE(Detailed), VIE(Abstract), and Non-VIE based on information disclosures. The subgroup models help to capture the trends and patterns, and to examine the different characteristics of our dataset. For practitioners, this paper represents an alternative perspective in analyzing the stock discount of U.S.-listed Chinese Firms. Given that VIE structure is still evolving with business practices, government regulations, and ongoing debates, this paper should be continuously reexamined in light of new dynamics and changes.

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8. Appendices

Appendix 0 Descriptive Statistics

Symbol	Firm Age	ROA	DE	LT Debt	Net PPE	Employee	Total Rev	Gross Profit	NI	% Gross
Complete Dataset	13.55	-0.09	2.09	3,176	5,720	4,101	15,887	3,645	939	34.59
VIE (Detailed)	10.00	-0.07	4.94	2,660	2,234	3,002	9,029	3,899	1,178	37.82
VIE (Abstract)	15.29	-0.04	0.91	1,497	1,411	6,796	15,189	2,349	150	37.74
Non-VIE	15.73	-0.14	0.22	4,606	11,335	3,536	22,449	4,163	1,179	29.68

Symbol	% EBIT	Current Ratio	Rev CAGR	EV/ Rev	EV/ EBIT	P/EPS	P/BV	Last Price	Target Price	52 wk High
Complete Dataset	-4.16	3.44	29.45	6.97	18.38	31.44	3.85	16.75	41.54	25.96
VIE (Detailed)	-8.94	4.25	42.94	6.59	20.23	33.83	6.17	18.29	75.36	30.50
VIE (Abstract)	0.07	2.06	19.96	3.32	18.34	50.46	3.23	15.06	35.23	25.01
Non-VIE	-2.22	3.50	23.09	9.53	16.63	18.83	2.17	16.34	14.80	22.42

Symbol	52 wk Low	Beta	Daily Vol	RSI	P/ Sales	EPS	P/E	PEG	Div	Div Yield
Complete Dataset	11.19	1.34	0.53	47.48	7.15	-0.66	31.44	0.23	0.05	0.37
VIE (Detailed)	11.49	1.63	0.94	46.89	6.90	-1.90	33.83	0.15	0.01	0.18
VIE (Abstract)	9.65	1.85	0.49	50.92	3.33	-0.01	50.46	0.33	0.05	0.44
Non-VIE	11.82	0.80	0.18	46.02	9.63	0.08	18.83	0.24	0.09	0.50

Appendix 1 VIE(Detailed0 Regression Analysis

Terms	Coef	SE Coef	T-Value	P-Value	VIF
Constant	46.9	15.5	3.04	0.003	
Number of VIE	0.00121	0.00210	0.58	0.564	4.82
CountryofIncorporation	-0.002	0.152	-0.01	0.990	2.58
Sector	0.1010	0.0356	2.84***	0.005	3.84
Industry	-0.0269	0.0110	-2.44**	0.015	3.52
Exchange	-0.0691	0.0468	-1.48	0.141	2.73
FirmAge	-0.0235	0.0144	-1.63	0.104	6.02
ROA	3.651	0.711	5.14***	0.000	11.04
DE	-0.04081	0.00605	-6.75***	0.000	3.35
LongTermDebt	0.000204	0.000031	6.65***	0.000	256.54
NetPPE	0.000185	0.000035	5.28***	0.000	143.42
TotalEmployee	-0.000005	0.000006	-0.75	0.452	6.78
Total Revenue	0.000099	0.000017	5.87***	0.000	466.08
Gross Profit	-0.000621	0.000080	-7.77***	0.000	2681.83
Net Income	0.000374	0.000067	5.61***	0.000	341.65
Gross Margin	0.03654	0.00331	11.03***	0.000	3.56
EBIT Margin	-0.06469	0.00608	-10.64***	0.000	13.15
Current Ratio	0.0910	0.0167	5.44***	0.000	3.12
Total Revenue 2 Yr CAGR	0.01026	0.00119	8.65***	0.000	2.27
EV/ Revenue	0.0114	0.0390	0.29	0.770	28.36
EV/ EBIT	0.00792	0.00547	1.45	0.148	4.57
P/EPS	-0.00460	0.00216	-2.13*	0.034	5.89
P/BV	0.0645	0.0114	5.64***	0.000	5.56
Last Sale Price	-0.0378	0.0175	-2.16*	0.031	293.15
Target Price	-0.004067	0.000716	-5.68***	0.000	22.51
52 Week High	-0.0187	0.0123	-1.52	0.130	211.32
52 Week Low	0.1383	0.0427	3.23***	0.001	759.69
Beta	-0.3451	0.0487	-7.08***	0.000	2.75
Daily Volume	-0.0748	0.0492	-1.52	0.129	4.89
RSI	0.03448	0.00581	5.94***	0.000	6.22
P/Sales	-0.0077	0.0406	-0.19	0.849	30.77
EPS	0.00811	0.00243	3.33***	0.001	3.12
PEG	0.641	0.203	3.17***	0.002	3.86
Dividend	-19.12	2.63	-7.27***	0.000	27.09
Dividend Yield	1.004	0.139	7.21***	0.000	26.45
Date	-0.001101	0.000355	-3.10***	0.002	1.43

Appendix 2 VIE(Abstract) Regression Analysis

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	4.1	10.4	0.39	0.693	
Number of VIE	0.00978	0.00206	4.75***	0.000	8.20
CountryofIncorporation	-0.337	0.112	-3.00***	0.003	2.77
Sector	0.1334	0.0294	4.54***	0.000	5.39
Industry	0.0462	0.0140	3.29***	0.001	7.93
Exchange	0.0186	0.0605	0.31	0.758	7.82
FirmAge	0.0632	0.0116	5.44***	0.000	7.16
ROA	5.385	0.858	6.27***	0.000	21.99
DE	0.0519	0.0493	1.05	0.294	5.19
LongTermDebt	-0.000096	0.000039	-2.47**	0.014	90.65
NetPPE	0.000044	0.000070	0.63	0.528	33.02
TotalEmployee	-0.000002	0.000006	-0.29	0.770	2.98
Total Revenue	-0.000085	0.000026	-3.29***	0.001	58.69
Gross Profit	-0.000070	0.000056	-1.26	0.210	127.75
Net Income	-0.000034	0.000127	-0.27	0.788	14.22
Gross Margin	0.01339	0.00521	2.57**	0.011	24.47
EBIT Margin	-0.08886	0.00980	-9.07***	0.000	34.68
Current Ratio	-0.0184	0.0585	-0.31	0.753	12.90
Total Revenue 2 Yr CAGR	0.00334	0.00132	2.52**	0.012	4.15
EV/ Revenue	0.006	0.118	0.05	0.960	199.40
EV/ EBIT	-0.02900	0.00511	-5.68***	0.000	11.48
P/EPS	-0.00367	0.00104	-3.53***	0.000	3.89
P/BV	0.0508	0.0202	2.51**	0.013	10.84
Last Sale Price	0.0177	0.0213	0.83	0.408	279.12
Target Price	0.00006	0.00130	0.05	0.962	11.08
52 Week High	-0.00245	0.00636	-0.39	0.700	50.24
52 Week Low	0.0161	0.0268	0.60	0.549	209.67
Beta	0.5433	0.0335	16.21***	0.000	7.30
Daily Volume	2.887	0.121	23.78***	0.000	8.41
RSI	0.00653	0.00489	1.33	0.183	4.33
P/Sales	0.170	0.112	1.53	0.128	201.35
EPS	-0.0180	0.0163	-1.10	0.272	16.00
PEG	-0.0241	0.0681	-0.35	0.724	3.28
Dividend	-0.147	0.382	-0.39	0.700	17.13
Dividend Yield	0.0171	0.0637	0.27	0.788	30.74
Date	-0.000149	0.000237	-0.63	0.532	1.56

Appendix 3 Non-VIE Regression Analysis

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	17.64	4.35	4.06	0.000	
Number of VIE	-0.01288	0.00668	-1.93*	0.054	2.85
CountryofIncorporation	-0.01126	0.00748	-1.51	0.133	4.37
Sector	0.01466	0.00832	1.76*	0.079	4.68
Industry	-0.00199	0.00259	-0.77	0.442	5.63
Exchange	0.0996	0.0178	5.59***	0.000	7.22
FirmAge	-0.00654	0.00208	-3.14***	0.002	6.47
ROA	2.337	0.468	5.00***	0.000	4.57
DE	-0.00621	0.00328	-1.90*	0.059	1.46
LongTermDebt	0.000003	0.000002	1.51	0.132	23.36
NetPPE	-0.000002	0.000001	-1.65	0.099	32.80
TotalEmployee	0.000000	0.000001	0.05	0.956	2.61
Total Revenue	0.000001	0.000001	0.97	0.333	197.43
Gross Profit	-0.000000	0.000013	-0.04	0.971	484.52
Net Income	0.000001	0.000016	0.09	0.931	81.12
Gross Margin	0.011563	0.000961	12.03***	0.000	3.47
EBIT Margin	-0.00656	0.00257	-2.55**	0.011	4.93
Current Ratio	-0.1126	0.0160	-7.05***	0.000	3.04
Total Revenue 2 Yr CAGR	0.003508	0.000528	6.65***	0.000	1.94
EV/ Revenue	-0.0404	0.0321	-1.26	0.209	27.50
EV/ EBIT	-0.00159	0.00178	-0.89	0.371	4.30
P/EPS	0.001899	0.000701	2.71**	0.007	2.94
P/BV	0.0639	0.0160	3.98***	0.000	9.15
Last Sale Price	-0.00004	0.00629	-0.01	0.994	828.38
Target Price	-0.00826	0.00177	-4.67***	0.000	104.99
52 Week High	0.00753	0.00486	1.55	0.122	777.60
52 Week Low	-0.0001	0.0135	-0.01	0.996	2224.30
Beta	0.0337	0.0207	1.63	0.104	3.88
Daily Volume	0.2142	0.0496	4.32***	0.000	6.43
RSI	-0.00479	0.00156	-3.07***	0.002	3.85
P/Sales	-0.0050	0.0274	-0.18	0.855	20.93
EPS	-0.01437	0.00480	-2.99***	0.003	40.90
PEG	-0.0784	0.0343	-2.29**	0.023	3.14
Dividend	0.518	0.207	2.50**	0.013	63.35
Dividend Yield	-0.0904	0.0192	-4.71***	0.000	8.22
Date	-0.000399	0.000100	-4.00***	0.000	1.35

Appendix 4 Complete Dataset Regression Analysis

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	14.67	9.56	1.53	0.125	
Number of VIE	-0.00597	0.00119	-5.03***	0.000	2.00
CountryofIncorporation	0.0070	0.0126	0.56	0.577	1.51
Sector	0.0057	0.0129	0.44	0.659	1.69
Industry	-0.00293	0.00221	-1.33	0.185	1.48
Exchange	0.0870	0.0189	4.59***	0.000	1.65
FirmAge	-0.00279	0.00459	-0.61	0.543	2.86
ROA	2.035	0.465	4.37***	0.000	5.14
DE	-0.01169	0.00523	-2.23**	0.026	2.20
LongTermDebt	0.000017	0.000004	4.35***	0.000	8.95
NetPPE	-0.000005	0.000002	-2.82***	0.005	6.90
TotalEmployee	0.000006	0.000003	2.41**	0.016	2.28
Total Revenue	0.000007	0.000001	4.83***	0.000	15.17
Gross Profit	-0.000096	0.000014	-6.81***	0.000	100.24
Net Income	0.000187	0.000024	7.63***	0.000	48.72
Gross Margin	0.01245	0.00175	7.10***	0.000	2.12
EBIT Margin	-0.03388	0.00401	-8.44***	0.000	6.26
Current Ratio	0.0229	0.0130	1.76*	0.079	1.78
Total Revenue 2 Yr CAGR	0.004231	0.000825	5.13***	0.000	1.48
EV/ Revenue	-0.0728	0.0328	-2.22**	0.027	21.00
EV/ EBIT	0.01252	0.00285	4.39***	0.000	2.41
P/EPS	-0.00319	0.00104	-3.05***	0.002	2.38
P/BV	0.07394	0.00782	9.46***	0.000	2.57
Last Sale Price	0.04342	0.00601	7.22***	0.000	78.84
Target Price	-0.002783	0.000440	-6.32***	0.000	7.53
52 Week High	0.00423	0.00436	0.97	0.332	64.64
52 Week Low	-0.0560	0.0107	-5.22***	0.000	132.32
Beta	0.1463	0.0222	6.60***	0.000	1.44
Daily Volume	0.0232	0.0325	0.72	0.475	2.07
RSI	-0.00531	0.00247	-2.15**	0.032	1.71
P/Sales	0.0870	0.0339	2.57**	0.010	22.95
EPS	-0.00343	0.00209	-1.64	0.102	2.34
PEG	-0.0456	0.0696	-0.66	0.513	1.90
Dividend	-0.131	0.184	-0.71	0.478	4.12
Dividend Yield	-0.0147	0.0207	-0.71	0.477	1.67
Date	-0.000340	0.000220	-1.54	0.124	1.09

Appendix 5 Complete Dataset Best Subset Regression of Tobin's Q

Vars	R-Sq	R-Sq (adj)	R-Sq (pred)	Mallows Cp	S	EV/EBIT	P/EPS	Total Employee	DE	Gross Margin	Number of VIE	RSI	Exchange	Revenue CAGR	Beta
1	5.7	5.7	5.2	116.0	1.3561	X									
1	3.1	3.0	2.7	156.2	1.3749					X					
2	8.0	7.9	7.2	83.4	1.3403	X				X					
2	7.4	7.3	6.7	91.9	1.3443	X								X	
3	9.1	8.9	8.1	68.4	1.3326	X				X				X	
3	9.1	8.9	8.1	69.1	1.3330	X			X	X					
4	10.3	10.0	9.2	52.3	1.3244	X				X	X			X	
4	10.2	10.0	8.9	53.3	1.3249	X				X	X				X
5	11.6	11.3	10.1	33.8	1.3150	X				X	X			X	X
5	11.5	11.2	10.1	35.4	1.3158	X				X	X		X		X
	12.9	12.5	11.4	16.0	1.3058	X			X	X	X		X		X
6	12.7	12.3	11.1	18.9	1.3072	X				X	X		X	X	X
7	13.6	13.1	11.6	8.5	1.3016	X			X	X	X		X	X	X
7	13.1	12.7	11.4	14.7	1.3047	X	X			X	X		X	X	X
8	13.7	13.2	11.8	7.7	1.3008	X	X		X	X	X		X	X	X
8	13.6	13.1	11.6	9.7	1.3017	X		X	X	X	X		X	X	X
9	13.8	13.2	11.8	9.1	1.3009	X	X	X	X	X	X		X	X	X
9	13.7	13.1	11.7	9.6	1.3012	X	X		X	X	X	X	X	X	X
10	13.8	13.1	11.7	11.0	1.3014	X	X	X	X	X	X	X	X	X	X

Appendix 6 Non-VIE Best Subsets Regression of Tobin's Q

Vars	R-Sq	R-Sq (adj)	R-Sq (pred)	Mallows Cp	S	P / BV	Dividend Yield	Exchange	FirmAge	Daily Volume	ROA	Gross Margin	Current Ratio	Revenue CAGR	Date
1	48.1	48.1	45.4	223.3	1.2623	X									
1	13.2	13.1	11.6	952.3	1.6330						X				
2	54.6	54.5	51.3	90.8	1.1819	X					X				
2	48.9	48.8	46.2	209.2	1.2536	X						X			
3	56.9	56.7	53.8	45.3	1.1526	X					X	X			
3	56.2	56.0	52.8	58.9	1.1613	X		X			X				
4	58.1	57.9	54.8	22.1	1.1370	X		X			X	X			
4	57.4	57.2	54.3	36.8	1.1465	X	X				X	X			
5	58.5	58.3	55.3	14.9	1.1317	X	X	X			X	X			
5	58.4	58.1	55.2	17.3	1.1332	X		X			X	X		X	
6	58.9	58.6	55.7	8.1	1.1266	X	X	X			X	X		X	
6	58.6	58.3	55.3	14.6	1.1308	X	X	X			X	X			X
7	59.1	58.7	55.8	6.8	1.1251	X	X	X			X	X		X	X
7	59.0	58.6	55.7	9.1	1.1266	X	X	X	X		X	X		X	
8	59.1	58.7	55.7	7.8	1.1251	X	X	X	X		X	X		X	X
8	59.1	58.7	55.7	8.0	1.1252	X	X	X		X	X	X		X	X
9	59.2	58.7	55.7	9.0	1.1252	X	X	X	X	X	X	X		X	X
9	59.1	58.7	55.6	9.8	1.1257	X	X	X	X		X	X	X	X	X
10	59.2	58.7	55.6	11.0	1.1259	X	X	X	X	X	X	X	X	X	X

Appendix 7 VIE(Abstract) Best Subsets Regression of Tobin's Q

Vars	R-Sq	R-Sq (adj)	R-Sq (pred)	Mallows Cp	S	ROA	EV/EBIT	Daily Volume	Number of VIE	Industry	Exchange	Beta	Firm Age	Sector	P/EPS	Country
1	25.2	25.0	23.6	176.9	1.4223		X									
1	17.4	17.1	15.4	227.9	1.4950							X				
2	44.2	43.9	40.9	55.4	1.2303			X				X				
2	40.4	40.0	36.4	80.2	1.2716		X					X				
3	49.2	48.7	45.2	25.0	1.1758		X	X				X				
3	46.7	46.2	43.4	41.4	1.2047			X		X		X				
4	50.8	50.2	46.9	16.4	1.1586		X	X		X		X				
4	49.8	49.1	45.5	23.3	1.1712		X	X				X	X			
5	51.7	50.9	47.6	12.7	1.1502		X	X		X		X		X		
5	51.4	50.6	47.2	14.6	1.1537		X	X		X		X				X
6	52.5	51.5	48.1	9.9	1.1431		X	X		X		X	X	X		
6	52.4	51.4	47.9	10.5	1.1444		X	X		X		X	X			X
7	53.3	52.3	48.9	6.1	1.1343		X	X		X		X	X	X		X
7	52.5	51.5	48.1	11.3	1.1440		X	X		X	X	X	X	X		
8	53.4	52.2	48.7	7.5	1.1351		X	X		X		X	X	X	X	X
8	53.4	52.2	48.9	7.7	1.1354		X	X		X	X	X	X	X		X
9	53.5	52.1	48.9	9.0	1.1359		X	X	X	X	X	X	X	X		X
9	53.5	52.1	48.7	9.0	1.1359		X	X		X	X	X	X	X	X	X
10	53.6	52.1	48.7	10.1	1.1362		X	X	X	X	X	X	X	X	X	X
10	53.5	52.0	48.6	10.9	1.1376	X	X	X		X	X	X	X	X	X	X
11	53.7	52.0	48.6	12.0	1.1378	X	X	X	X	X	X	X	X	X	X	X

Appendix 8 VIE(Detailed) Best Subsets Regression of Tobin's Q

Vars	R-Sq	R-Sq (adj)	R-Sq (pred)	Mallows Cp	S	P/BV	PEG	Sector	Gross Margin	DE	EPS	Current Ratio	Beta	Revenue CAGR	Date
1	16.0	15.9	15.2	111.8	1.8638				X						
1	10.8	10.7	9.7	165.6	1.9208							X			
2	20.6	20.4	19.1	67.1	1.8140				X			X			
2	18.6	18.4	17.5	87.1	1.8360	X			X						
3	23.3	22.9	21.6	41.5	1.7843	X			X			X			
3	22.8	22.5	21.2	46.1	1.7895				X			X	X		
4	25.8	25.4	24.0	17.1	1.7555	X			X			X	X		
4	24.8	24.4	23.2	27.9	1.7678				X	X		X	X		
5	26.6	26.1	24.5	11.3	1.7476	X			X			X	X		X
5	26.3	25.8	24.3	13.7	1.7505	X	X		X			X	X		
6	27.1	26.5	24.9	8.0	1.7428	X		X	X			X	X		X
6	27.0	26.4	24.8	8.6	1.7434	X	X		X			X	X		X
7	27.4	26.8	25.2	6.4	1.7397	X		X	X		X	X	X		X
7	27.3	26.6	25.0	7.7	1.7412	X	X	X	X			X	X		X
8	27.6	26.8	25.2	7.1	1.7393	X	X	X	X		X	X	X		X
8	27.4	26.7	25.1	8.4	1.7408	X		X	X		X	X	X	X	X
9	27.6	26.7	25.0	9.0	1.7404	X	X	X	X	X	X	X	X		X
9	27.6	26.7	25.0	9.1	1.7405	X	X	X	X		X	X	X	X	X
10	27.6	26.6	24.8	11.0	1.7416	X	X	X	X	X	X	X	X	X	X

Appendix 9 Complete Dataset Regression Analysis of Tobin's Q

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.013	0.157	0.08	0.934	
Beta	0.1077	0.0212	5.07	0.000	1.07
Total Revenue 2 Yr CAGR	0.003378	0.000786	4.30	0.000	1.15
Exchange	0.0711	0.0155	4.60	0.000	1.04
Number of VIE	-0.00506	0.00105	-4.81	0.000	1.13
Gross Margin	0.00863	0.00120	7.18	0.000	1.13
DE	0.01388	0.00452	3.07	0.002	1.13
EV/ EBIT	0.00639	0.00124	5.16	0.000	1.03

Appendix 10 Non-VIE Regression Analysis of Tobin's Q

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-0.017	0.143	-0.12	0.904	
Total Revenue 2 Yr CAGR	-0.000505	0.000170	-2.97	0.003	1.08
Exchange	0.0884	0.0187	4.73	0.000	1.06
Gross Margin	0.01100	0.00148	7.41	0.000	1.34
ROA	-3.737	0.274	-13.63	0.000	1.13
Dividend Yield	-0.0832	0.0249	-3.34	0.001	1.16
P/BV	0.14402	0.00538	26.79	0.000	1.10

Appendix 11 VIE(Abstract) Regression Analysis of Tobin's Q

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.132	0.323	0.41	0.683	
CountryofIncorporation	-0.396	0.120	-3.30	0.001	1.22
Sector	0.0765	0.0384	1.99	0.047	1.60
FirmAge	0.0579	0.0119	4.88	0.000	1.32
Beta	0.4464	0.0378	11.81	0.000	1.43
Industry	-0.0656	0.0146	-4.49	0.000	1.51
Daily Volume	0.745	0.129	5.76	0.000	2.18
EV/ EBIT	0.01123	0.00442	2.54	0.011	2.09

Appendix 12 VIE(Detailed) Preliminary Regression Analysis of Tobin's Q

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	52.1	19.2	2.72	0.007	
Sector	-0.0847	0.0283	-2.99	0.003	1.02
Beta	-0.1630	0.0394	-4.14	0.000	1.11
Date	-0.001179	0.000442	-2.67	0.008	1.01
Current Ratio	0.0840	0.0112	7.50	0.000	1.13
EPS	0.00354	0.00256	1.38	0.168	1.07
Gross Margin	0.01933	0.00182	10.60	0.000	1.13
P/BV	0.01499	0.00292	5.14	0.000	1.02

Appendix 13 VIE(Detailed) Regression Analysis of Tobin's Q

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	50.1	19.1	2.62	0.009	
Sector	-0.0843	0.0283	-2.98	0.003	1.02
Beta	-0.1503	0.0383	-3.92	0.000	1.04
Date	-0.001134	0.000441	-2.57	0.010	1.01
Current Ratio	0.0844	0.0112	7.53	0.000	1.13
Gross Margin	0.01921	0.00182	10.54	0.000	1.12
P/BV	0.01501	0.00292	5.14	0.000	1.02