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경제학석사학위논문

Performance of Business Groups in
China from 2000 to 2015
– Comparing Several Hypotheses –

2000년-2015년 중국 기업집단의 성과
– 다양한 가설 비교 –

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Abstract

Performance of Business Groups in China from 2000 to 2015 – Comparing Several Hypotheses –

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This paper studies longitudinal performance of business groups in China from 2000 to 2015. There is a downward trend of group firms relative to non-group firms. There are several hypotheses regarding the downward trend, which are market hypothesis, agency cost hypothesis, resource-based hypothesis, diversification hypothesis and business cycle hypothesis. Traditional theories regarding group firms are tested. As a result, the market hypothesis and agency cost hypothesis are proven, while resource-based hypothesis is refuted. We find that there is an overall diversification premium, but excessive diversification would lead to diversification discount. Furthermore, group firms perform better in periods of economic expansion and relatively high economic growth. Therefore, business group performances could vary according to the market, agency problem, degree of diversification and the business cycle. We conclude that both firm-level and market-level factors can influence the performance of business groups.

Keyword : Business group, China, Tobin's Q, time-trend, performance, diversification, business cycle
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I. Introduction

The performance of business groups in emerging economies has gathered interest of many researchers. Business groups are collections of firms bound together in formal and/or informal ways, characterized by an intermediate level of binding (Granovetter, 1995). Early works of Leff (1978) and Goto (1982) refer to underdevelopment of markets as the reason for emergence and prevalence of business groups. From then, many studies have been committed to analyzing the performance of business groups in various nations.

There are many papers describing the longitudinal performance of business groups. Khanna and Palepu (2000b) tracks Chilean business groups from 1988 to 1996. Lee, Peng and Lee (2007) documents the longitudinal process of how diversification premium becomes discount during institutional transitions in Korea. Choo, Lee, Ryu and Yoon (2009) hypothesizes that reducing investment inefficiencies and enhancing technological capabilities caused Chaebols to be more efficient than non-Chaebols compared to the pre-crisis period. Lee, Kim and Lee (2010) considers three hypotheses: overinvestment, diversification and cross-subsidization hypotheses to explain the weak premium of Chaebols in the 1980s, strong discount in the 1990s, and strong premium during the post-crisis period.

Business groups in China emerged since the mid-1980s. From mid-1980s to 1993, there were only state-owned firms and thus only state-owned business groups. It was only from 1993 that non-state business groups formed. There are many

theories explaining the emergence of business groups in China: the market-based view, the state-activism view, and the resource-based view. Lee and Jin (2009) also verifies three paths toward group firms, which are M&A, spin-offs, and joint ventures.

Big business groups in China tend to have more state shares, be more heavily indebted, less profitable, and accumulate capital more slowly than non-group firms (Lee and Hahn, 2007). Compared to Korean chaebols, Chinese business groups are smaller in absolute asset size and relative to China's GDP, less diversified and less growth-oriented (Lee and Woo, 2001).

This study updates upon Seo, Lee and Wang (2010), which illustrates the relative downward trend of Chinese business groups from 1994 to 2003. We will analyze whether the decreasing trend continues. Also, this paper will compare several hypotheses in order to explain the trend.

The next section discusses several theoretical views and hypotheses on business groups. Section 3 illustrates the longitudinal performance of group and non-group firms. Section 4 tests the hypotheses by using regression models. Section 5 concludes and summarizes the findings.

II. Theories on the Performance Change of Business Groups

1) Market Failure / Institutional Development Hypothesis

Market failure or institutional development hypothesis explains that business groups internalize market failures to overcome imperfections in capital, labor, raw materials, components, and technology in emerging economies (Leff, 1978; Goto, 1982). Furthermore, it is costly to establish a quality brand image in product markets, and to establish contractual relationships with international partners. Therefore, a business group can act as an intermediary between individual firms and imperfect markets. It can benefit from access to these internal institutions to alleviate external market failures (Khanna and Palepu, 2000a). The market hypothesis assumes that the performance of business groups will decline as market institutions develop.

As market develops, the benefits in overcoming market failure or reducing transaction costs decrease. Also, it is less costly to establish a brand image and contractual relationships. As business group's role as an intermediary becomes unnecessary with market's evolution, the grouping premium decreases. Khanna and Palepu (2000b) also posits that as time passes, benefits from unrelated group diversification become increasingly harder to attain.

The Chinese economy has evolved through many years. Since 1993, the Party decided to establish "a socialist market economy". The economy has changed from

a centrally planned economy to a decentralized market economy. Therefore, it is safe to assume that the market has developed with the lapse of time. Thus, the hypothesis is: *As market institutions evolve over time in China, the relative performance of business groups will decline.*

2) Agency Cost Hypothesis

Agency cost hypothesis claims that management environment in emerging economies increases the potential agency costs associated with grouping. Higher asymmetric information, weak corporate law and lax enforcement mechanisms might allow management and large shareholders to exploit the firm more easily for their own purposes using grouping strategy (Lins and Servaes, 2001; Bertrand et al., 2002; Baek, Kang and Lee, 2006). According to Lee and Hahn (2007), diverse forms of agency costs are serious in listed companies in China, and long-term investment or loans from unlisted subsidiaries are often used as channels for tunneling or asset stripping. In addition, managers want to gain further autonomy from their supervising agencies by breaking up existing enterprises to form subsidiaries and joint ventures (Lee and Hahn, 2007). Furthermore, grouping can be used to shift bad debts and surplus labor burdens to parent companies (Seo, Lee and Wang, 2010). Market investors will value firms linked to agency costs lower, therefore, business groups will experience devaluation.

From this basis, the agency cost hypothesis is: *As the impact of agency costs*

increases upon business groups, it will lead to the decline of group firms' valuation.

3) Resource-Based Hypothesis

According to Penrose (1959), a firm is a bundle of resources utilizing existing resources and acquiring lacking resources as the most critical matters determining the fate of firms. Resource-based hypothesis states that the benefit of grouping strategy comes from the ability to combine inputs, operational knowledge, distribution channels, and contacts with foreign groups and government quickly and efficiently by repeatedly entering a variety of industries (Guillen, 2000). Firms may utilize its resources to enter in new businesses for profit-seeking.

Furthermore, firms in business groups can share resources, which leads to a premium compared to non-business groups. Having the resource-sharing ability decreases costs entailed in running stand-alone firms. Thus, the hypothesis is: *Business groups have a premium of resource-sharing compared to non-business groups, thus the longitudinal performance of business groups will be better.*

4) Diversification Hypothesis

From the hypotheses above, it can be assumed that there is a group discount as time passes. Then, what would be the correlation between degree of diversification and the relative performance of business groups? There are several theories measuring how diversification would affect the relative performance of business

groups, but not the degree of diversification. On average, it has been assumed that unrelated product diversification may destroy value, whereas related diversification may add value (Rumelt, 1974; Palich et al., 2000). Thus, we assumed that there is an optimal level of diversification. The performance of business groups will depend upon the level of deviation from the optimal number of affiliates. Thus, the hypothesis is: *The further the affiliate number of a business group is from the optimal level, the lower the performance will be.*

5) Business Cycle Hypothesis

The business cycle hypothesis analyzes the impact of business cycle on the performance of business groups. The business cycle or economic cycle is the downward and upward movement of gross domestic product (GDP) around its long-term growth trend (Madhani, 2010). The downward movement is referred to as economic contractions or recessions and upward movement is referred to as economic expansions or booms. After the Korean chaebols experienced 1997 Asian crisis, Lee, Kim and Lee (2010) found that chaebols tend to show lower variations of accounting profits than do non-chaebols, but with higher profitability in the post-crisis period and lower profitability in the pre-crisis period. Business groups tend to have less variation regardless of business cycle. Hence, the hypothesis is: *Compared to stand-alone firms, business groups tend to have lower variations in profitability according to business cycle.*

III. Measuring the Performance of Business Groups in China

1) Data and Performance Measures

This study uses the China Stock Market and Accounting Research Database (CSMAR) from 2000 to 2015, which contains the financial statements and stock market information of all listed firms. CSMAR is provided by GTA, an industry leader in China in providing financial analytics, financial education and related value-added services to financial institutions, business schools and individual investors. Data regarding affiliates of the listed firms are from Shenzhen Stock Exchange (SZSE) and Shanghai Stock Exchange (SSE) market data. Both SZSE and SSE are self-regulated legal entities under the supervision of China Securities Regulatory Commission (CSRC). This study solely focuses on publicly listed companies because of the fact that the database of listed companies is the most consistent, accurate, and transparent among available information on all types of firms in emerging economies.

From 2000 to 2015, the total number of listed companies in China increased from 1191 to 2933, which is shown in Table 1. On the other hand, to track the performance of equivalent companies throughout the years, this paper uses balanced panel sample of firms in all panel regressions. The balanced panel sample contains 837 companies existing every year.

[Table 1: Number of Listed Companies in the Sample]

In Table 2, comparative descriptive statistics between business and non-business groups are presented. We calculated the median in order to remove outliers. From 2000 to 2009, group firms have higher total assets than non-group firms, but from 2011, non-group firms have higher total assets. Business groups have higher net profit throughout the years, meaning that they are more profitable than their counterparts. For total sales and total liability, business groups are on average higher until 2007, then from 2008, non-business groups are higher. Total equity of business groups is constantly higher during the sample period. Furthermore, SIZE of business groups is higher until 2009, but from 2011, that of non-business groups is higher. For ROA and market value, business groups are higher throughout the period. GROWTH of the firms vary a lot from 2000 to 2015, thus, there is not a certain trend.

It is notable that for total assets, total sales, total liability and SIZE, there is a change from business groups having higher values to non-business groups having higher values. Business groups on average have higher net profit, total equity, ROA and market value throughout the years.

[Table 2: Descriptive Statistics]

Following the method used in Lee and Woo (2002) and Seo, Lee and Wang (2010), this paper adopts two criteria for defining a business group. First is having

at least two affiliated companies and second, having at least four affiliated companies. The criteria are assumed to check the robustness of regression results.

In this study, affiliated companies of business groups are those that are included in the consolidated balance sheet of the parent companies each year, as their shares are more than 50% owned by the parent companies. Information on the affiliation is manually obtained from the annual reports of each company presented in SZSE and SSE market data. According to the method of defining a business group as having two or more affiliates, around 84% of the companies are classified as groups in the balanced panel sample. By the criterion of defining a business group as having four or more affiliates, around 67% of the companies are classified as groups.

This study uses Tobin's Q in order to measure the performance of business groups and non-business groups. Tobin's Q is market value of capital divided by the replacement value of assets. Market value of capital is equal to market value of equity plus book value of debt. Also, we calculated Tobin's Q, assuming that the replacement value of assets is the value of total assets.

$$\begin{aligned} \text{Tobin's Q} &= \frac{\text{Market value of capital}}{\text{Replacement value of assets}} \\ &= \frac{\text{Market value of equity} + \text{book value of debt}}{\text{Replacement value of assets}} \end{aligned}$$

2) Examining the Time Trends of Market Performance

To examine the trend of Tobin's Q, this paper employs three methods. First, Tobin's Q of group firms and non-group firms are compared each year. Table 3 and 4 show the time trend of the Tobin's Q differences between group and non-group firms. The difference is Tobin's Q of group firms minus that of non-group firms. Therefore, positive values mean that there is a premium for group firms. By criterion of defining groups as having two or more affiliates, Table 3 shows that there is a premium for group firms from 2001 to 2005 and a discount from 2011 to 2014. By criterion of defining groups as having four or more affiliates, Table 4 shows a similar result: there is a premium for group firms from 2000 to 2005 and discount from 2012 to 2014. Looking at Figure 1, the time trend of Tobin's Q differences is more clear.

[Table 3 and 4, Figure 1]

Second, this paper uses year by year OLS regression of Tobin's Q, using group firm dummy to test time trend. Following Berger and Ofek (1995), firm size, profitability and growth are controlled for. Following Seo, Lee and Wang (2010), this paper uses SIZE (the log of total asset), ROA (net income on total assets) and GROWTH (increase of sales over the sales of previous year) as control variables for the regression. Furthermore, the firm's ownership and industry are controlled for. The group dummy variable takes the value of 1 if the firm is a group and 0 if it is a non-group. The ownership dummy takes the value of 1 if the firm is state-owned and

0 if the firm is non-state-owned. The industry dummy shows which industry each firm belongs to. Industry code 1 is finance, 2 is utilities, 3 is properties, 4 is conglomerates, 5 is industry, and 6 is commerce.

Hence, the yearly OLS regression model for Tobin's Q is as follows:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Group Dummy}) + \\ & \beta_2 * (\text{Ownership Dummy}) + \beta_3 * (\text{Industry Dummy}) + \beta_4 * (\text{SIZE}) + \\ & \beta_5 * (\text{ROA}) + \beta_6 * (\text{GROWTH}) + \text{Error Term} \quad (1) \end{aligned}$$

By criterion of defining groups as having two or more affiliates, Table 5 shows that there is a premium for group firms in 2000, 2001, and from 2003 to 2005. There is a discount for group firms in 2010, 2011, 2013 and 2014. By criterion of defining groups as having four or more affiliates, Table 6 shows that there is a premium for group firms from 2000 to 2005 and a discount in 2012 and 2014. Looking at Figure 2, the time trend can be observed more clearly. Also, comparing the time trend of Tobin's Q using two methods, we can easily observe that the graphs are similar, thus the methods are robust.

[Table 5 and 6, Figure 2]

Last, the third method uses the time and group dummy interaction to check time varying tendency (Khanna and Palepu, 2000b; Lee, Peng and Lee, 2008; Seo, Lee and Wang, 2010). The time variable takes a value of 1 in year 1994, 2 in year 1995, and so on.

The model is as follows:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Group Dummy}) + \\ & \beta_2 * (\text{Time} * \text{Group Dummy}) + \beta_3 * (\text{Time}) + \\ & \beta_4 * (\text{Ownership Dummy}) + \beta_5 * (\text{Industry Dummy}) + \beta_6 * (\text{SIZE}) + \\ & \beta_7 * (\text{ROA}) + \beta_8 * (\text{GROWTH}) + \text{Error Term} \quad (2) \end{aligned}$$

This paper uses the interaction term of time and group dummy variables to measure time varying tendency of group premium. The results of the regressions are presented in Table 7. The interaction term coefficients for time and group dummy are significantly negative for all regressions regardless of the definition of business groups. This means that there is a downward trend in the longitudinal performance of business groups. This shows that the trend has not changed from the result of Seo, Lee and Wang (2010). The grouping premium in China has turned to a discount.

[Table 7. Results with Group Firms, Using TIME and Group Dummy]

Furthermore, in place of group dummy, we adopted affiliate number as a variable. The model is:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Affiliate number}) + \\ & \beta_2 * (\text{Time} * \text{Affiliate number}) + \beta_3 * (\text{Time}) + \\ & \beta_4 * (\text{Ownership Dummy}) + \beta_5 * (\text{Industry Dummy}) + \beta_6 * (\text{SIZE}) + \\ & \beta_7 * (\text{ROA}) + \beta_8 * (\text{GROWTH}) + \text{Error Term} \quad (3) \end{aligned}$$

Table 8 presents the results of this model. The results are the same as above: all coefficients are negative for the interaction term. There is also a downward trend based on the number of affiliates for the listed firms.

[Table 8: Results with Group Firms, Using TIME and Affiliate number]

IV. Testing the Hypotheses

1) Market Failure / Institutional Development Hypothesis

The market failure hypothesis claims that business groups in emerging economies have emerged because of an imperfection in market. Therefore, performance of business groups will decline as market institutions develop. As the regressions show that the downward trend continues, the hypothesis is proven to be true.

2) Agency Cost Hypothesis

The agency cost hypothesis states that due to high asymmetric information, weak corporate law and lax enforcement mechanisms, management and large shareholders of groups will exploit the firm more easily for their own purposes. Hence, the market investors tend to value the group firms less. Therefore, the group firms will be valued less than non-group firms. The continuing relative downward trend of group firms proves the hypothesis.

3) Resource-based Hypothesis

The resource-based hypothesis illustrates that business groups in emerging countries are created because they could acquire and maintain the capability of

combining foreign and domestic resources to repeatedly enter new industries. Therefore, diversification is the result of making use of the firm's specific resources. Also, the resource-sharing ability enables business groups to perform better than non-business groups. However, as there is a downward trend of group firms, the hypothesis can be refuted.

4) Diversification Hypothesis

Diversification hypothesis claims that there is an optimal level of diversification. Therefore, as the affiliate number of a firm deviates further from the optimal level, the performance of business groups will worsen. Regarding this hypothesis, this paper creates a simple OLS regression model to test the impact of diversification (number of affiliates) on the performance of business groups. By the regression, this paper seeks to find the trend of the relationship between performance of business groups and the degree of diversification. This model only takes business groups as the sample, thus only firms with one or more affiliates are used in this model.

The model is as follows:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Affiliate number}) + \\ & \beta_2 * (\text{Ownership Dummy}) + \beta_3 * (\text{Industry Dummy}) + \beta_4 * (\text{SIZE}) + \\ & \beta_5 * (\text{ROA}) + \beta_6 * (\text{GROWTH}) + \text{Error Term} \quad (4) \end{aligned}$$

The regression results are presented in Table 9. The affiliate number coefficient

is significantly positive. This means that the more affiliates there are, the higher the performance. Thus, there is a diversification premium.

[Table 9: Regression of Tobin's Q, Using Affiliate number]

Furthermore, we also added a variable of affiliate number square, in order to see whether the relationship is quadratic rather than linear:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Affiliate number}) + \\ & \beta_2 * (\text{Affiliate number})^2 + \beta_3 * (\text{Ownership Dummy}) + \\ & \beta_4 * (\text{Industry Dummy}) + \beta_5 * (\text{SIZE}) + \beta_6 * (\text{ROA}) + \\ & \beta_7 * (\text{GROWTH}) + \text{Error Term} \quad (5) \end{aligned}$$

From Table 10, we can see that the affiliate number square coefficient is negative. It means that the general relationship between affiliate number of a group firm and its Tobin Q will be positive, but excessive diversification will lead to diversification discount.

[Table 10: Regression of Tobin's Q, Using Affiliate number and (Affiliate number)²]

Figure 3A shows the result more clearly. Figure 3 shows the fitted line, illustrating the relationship between Tobin's Q and the number of affiliates. The fitted line is quadratic, as explained above. The optimal level of affiliate number, derived from the equation of the fitted line, is about 56. Therefore, we can conclude

that there is diversification premium for business groups, but excessive diversification would lead to diversification discount.

[Figure 3A: Relationship Between Tobin's Q and Affiliate number]

We divided the sample period into 2 parts, in order to analyze whether the level of diversification leads to lower performance of business groups with the lapse of time. The period is divided into 2000 to 2008, and 2009 to 2015 according to the time-trend of Tobin's Q. As Figure 3B and 3C show, the overall quadratic form is the same, according to regressions. From 2000 to 2008, the optimal level of diversification is about 34. From 2009 to 2015, the optimal level of diversification is about 67. If the number of affiliates exceeds this number, there will be diversification discount.

[Figure 3B and 3C]

The average number of affiliates increased from about 9 in 2000 to about 15 in 2009. The optimal level of diversification and the average number of affiliates increases with the lapse of time. However, whereas the ratio of the average number divided by the optimal level of affiliate number is about 0.26 in 2000, the ratio decreases to about 0.22 in 2009. As the average number of affiliates deviates further from the optimal level of diversification, there is a relative downward trend of business groups with time.

5) Business Cycle Hypothesis

Lastly, the business cycle hypothesis will analyze the performance of business groups regarding business cycle. To specify business cycle in this paper, graph of China's GDP growth is drawn for the period 2000 to 2015. From Figure 4, it is clearly shown that the period can be divided in terms of whether the GDP growth rises or falls. If the GDP growth is on the rising trend, it is referred to as economic expansion. On the other hand, if it is falling, that is referred to as economic contraction. From 2000 to 2006, the economy is going through expansion. From 2007 to 2015, the economy is going through contraction. Hence, to test whether business cycle affects group firms, interaction term of business cycle dummy and group dummy variable is added to the model. The business cycle dummy has the value of 1 for the period 2000 to 2006, and value of 0 for the period 2007 to 2015.

[Figure 4: China's GDP Growth from 2000 to 2015]

As a result, the model is as follows:

$$\begin{aligned} \text{Tobin's } Q = & \alpha + \beta_1 * (\text{Group Dummy}) + \\ & \beta_2 * (\text{Business Cycle Dummy} * \text{Group Dummy}) + \\ & \beta_3 * (\text{Business Cycle Dummy}) + \beta_4 * (\text{Ownership Dummy}) + \\ & \beta_5 * (\text{Industry Dummy}) + \beta_6 * (\text{SIZE}) + \beta_7 * (\text{ROA}) + \\ & \beta_8 * (\text{GROWTH}) + \text{Error Term} \quad (6) \end{aligned}$$

The results of the regression using both definitions of business groups are presented in Table 11. For all regressions of Tobin's Q, the interaction term of business cycle dummy and group dummy coefficients are significantly positive. This means that business groups perform better in economic expansion and poorer in economic contraction compared to non-business groups. This refutes the hypothesis that group firms have lower variability compared to non-group firms.

[Table 11: Results with Group Firms, Using Business Cycle Dummy and Group Dummy]

For robustness, we put in affiliate number variable instead of group dummy variable and created a new model. The model is as follows:

$$\begin{aligned}
 \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Affiliate number}) + \\
 & \beta_2 * (\text{Business Cycle Dummy} * \text{Affiliate number}) + \\
 & \beta_3 * (\text{Business Cycle Dummy}) + \beta_4 * (\text{Ownership Dummy}) + \\
 & \beta_5 * (\text{Industry Dummy}) + \beta_6 * (\text{SIZE}) + \beta_7 * (\text{ROA}) + \\
 & \beta_8 * (\text{GROWTH}) + \text{Error Term} \quad (7)
 \end{aligned}$$

Table 12 presents the results of the regression. The coefficients for business cycle, affiliate number interaction term are significantly positive. This means that in the time of economic expansion, the business groups have a premium, especially business groups with more affiliates. This also refutes the earlier hypothesis.

[Table 12: Regressions with Group Firms, Using Business Cycle Dummy and

Affiliate number]

Other than the business cycle dummy, another variable is implemented in the next model. This variable is derived by subtracting the mean of GDP growth from each year's GDP growth (normalizing GDP growth) and for normalized GDP growth that is 0 or higher, giving the value of 1, and for normalized GDP growth that is lower than 0, giving the value of 0. The normalized GDP growth dummy shows whether relatively high GDP growth results in group premium or the other way around. Hence, this model is somewhat different from the business cycle model.

The model is as follows:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Group Dummy}) + \\ & \beta_2 * (\text{Norm. GDP Growth Dummy} * \text{Group Dummy}) + \\ & \beta_3 * (\text{Norm. GDP Growth Dummy}) + \beta_4 * (\text{Ownership Dummy}) + \\ & \beta_5 * (\text{Industry Dummy}) + \beta_6 * (\text{SIZE}) + \beta_7 * (\text{ROA}) + \\ & \beta_8 * (\text{GROWTH}) + \text{Error Term} \quad (8) \end{aligned}$$

Table 13 provides the results for regression. The coefficients for the interaction term of normalized GDP growth dummy and group dummy are significantly positive for all regressions on either definition of business groups. This means that in the time of relatively high GDP growth, group firms have a premium relative to non-group firms. As this means that there is more variability for business groups between periods of high economic growth and low economic growth, the hypothesis is refuted again.

[Table 13: Results with Groups Firms, Using Normalized GDP Growth Dummy and Group Dummy]

Also, we put affiliate number in place of group firm dummy to check for robustness:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Affiliate number}) + \\ & \beta_2 * (\text{Norm. GDP Growth Dummy} * \text{Affiliate number}) + \\ & \beta_3 * (\text{Norm. GDP Growth Dummy}) + \beta_4 * (\text{Ownership Dummy}) + \\ & \beta_5 * (\text{Industry Dummy}) + \beta_6 * (\text{SIZE}) + \beta_7 * (\text{ROA}) + \\ & \beta_8 * (\text{GROWTH}) + \text{Error Term} \quad (9) \end{aligned}$$

Table 14 presents the results. The results are significantly positive for all regressions, consistent with the results above. The hypothesis can be refuted.

[Table 14: Regressions with Group Firms, Using Normalized GDP Growth Dummy and Affiliate number]

Overall, it can be concluded that during economic expansion or relatively high GDP growth, there is group premium. Group firms tend to perform better in times of economic boom or relatively high economic growth compared to non-group firms and vice versa. Therefore, the hypothesis that group firms have low variation in profitability compared to stand-alone firms can be refuted.

(6) Overall

To analyze the significance of a term when all interaction variables are considered, we created a model that contains all terms considered so far:

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 * (\text{Group Dummy}) + \\ & \beta_2 * (\text{TIME} * \text{Group Dummy}) + \\ & \beta_3 * (\text{Business Cycle Dummy} * \text{Group Dummy}) + \\ & \beta_4 * (\text{Norm. GDP Growth Dummy} * \text{Group Dummy}) + \beta_5 * (\text{TIME}) + \\ & \beta_6 * (\text{Business Cycle Dummy}) + \beta_7 * (\text{Norm. GDP Growth Dummy}) + \\ & \beta_8 * (\text{Ownership Dummy}) + \\ & \beta_9 * (\text{Industry Dummy}) + \beta_{10} * (\text{SIZE}) + \beta_{11} * (\text{ROA}) + \\ & \beta_{12} * (\text{GROWTH}) + \text{Error Term} \quad (10) \end{aligned}$$

Table 15 presents the results. It is notable that except the OLS regression for definition of groups as having four or more affiliates, the interaction term of normalized GDP growth dummy and group dummy coefficients are significantly positive for all regressions. Even after controlling for other interaction terms, business groups perform better in relatively high economic growth.

[Table 15: Results with Group Firms, Using TIME, Business Cycle Dummy, Normalized GDP Growth Dummy and Groups Dummy]

Also, the group dummy variable is replaced by affiliate number variable to check for robustness:

$$\begin{aligned}
\text{Tobin's Q} = & \alpha + \beta_1 * (\text{Affiliate number}) + \\
& \beta_2 * (\text{TIME} * \text{Affiliate number}) + \\
& \beta_3 * (\text{Business Cycle Dummy} * \text{Affiliate number}) + \\
& \beta_4 * (\text{Norm. GDP Growth Dummy} * \text{Affiliate number}) + \beta_5 * (\text{TIME}) + \beta_6 \\
& * (\text{Business Cycle Dummy}) + \beta_7 * (\text{Norm. GDP Growth Dummy}) + \\
& \beta_8 * (\text{Ownership Dummy}) + \\
& \beta_9 * (\text{Industry Dummy}) + \beta_{10} * (\text{SIZE}) + \beta_{11} * (\text{ROA}) + \\
& \beta_{12} * (\text{GROWTH}) + \text{Error Term} \quad (11)
\end{aligned}$$

The results are presented in Table 16. For all regressions, the interaction term of TIME and affiliate number is significantly negative. Therefore, we can say that even after controlling for all other variables, business groups perform worse as time passes.

[Table 16: Results with Group Firms, Using TIME, Business Cycle Dummy, Normalized GDP Growth Dummy and Affiliate number]

V. Summary and Concluding Remarks

This study uses data on listed firms in China from 2000 to 2015 to track longitudinal performance of business groups. Using Tobin's Q as the value performance measure and using multiple panel regressions, this paper discovers that there is relative downward trend in business groups from 2000 to 2015. This result is not different from that of Seo, Lee and Wang (2010). To explain this downward trend, there were five hypotheses.

First is market failure or institutional development hypothesis, which was proven by the fact that there is downward trend of business groups as the market evolves with time. Second is agency cost hypothesis, which was proven by the same result. Third one is resource-based hypothesis. In contrast to the hypothesis, there was a downward trend of business groups compared to stand-alone firms. Fourth, diversification hypothesis was tested by regression of Tobin's Q, using affiliate number. With the result of regression, it is shown that there is diversification premium up to about 56 affiliates, and from then, there is diversification discount. With the lapse of time, the ratio of the average number of affiliates divided by the optimal level decreases, causing the performance of business groups to decline.

Lastly, business cycle hypothesis was tested by putting in new variables on business cycle. The interaction term of business cycle dummy and group dummy and that of business cycle dummy and affiliate number showed significantly positive results, meaning that in times of economic expansion, there is a premium for group

firms. The interaction term of normalized GDP growth dummy and group dummy coefficients, and that of normalized GDP growth dummy and affiliate number variable both also show significantly positive results. This means that during economic expansion, or relatively high GDP growth, business groups perform better than stand-alone firms and worse, vice versa. Therefore, there is more variation in profitability for group firms, which refutes the hypothesis.

After controlling for all other variables including interaction terms, when using group dummy, interaction term of normalized GDP growth dummy is significantly positive. It means that all other terms remaining still, business groups have a premium during relatively high economic growth. Also, using affiliate number, the interaction term of TIME is significantly negative. It means that all other terms unchanged, business groups have a discount as time passes, confirming there is a downward trend of business groups. Therefore, business group performances could vary according to the market, agency problem, degree of diversification and the business cycle. We conclude that both firm-level and market-level factors can influence the performance of business groups.

There is further research that needs to be done on this study. First of all, the business cycle hypothesis is a new hypothesis, thus lacking in previous literature or theory. Therefore, the hypothesis needs to be elaborated and studied more thoroughly. Also, as the sample is balanced, it disregards newly entering firms, or firms that go bankrupt and leave the market. Further study could be done by changing the sample structure.

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Table 1. Number of Listed Companies in the Sample

	2000	2001	2002	2003	2004	2005	2006	2007
Total No. of Listed Companies	1191	1266	1362	1466	1494	1519	1620	1707
	2008	2009	2010	2011	2012	2013	2014	2015
Total No. of Listed Companies	1718	1874	2220	2455	2580	2625	2739	2933

Our balanced panel sample contains 837 companies existing every year.

Table 2. Descriptive Statistics

		2000	2001	2002	2003	2004	2005	2006	2007
Total assets (billions of yuan)	Group	1.03	1.22	1.34	1.40	1.48	1.60	1.71	1.82
	Non-Group	0.91	0.98	1.00	1.03	1.13	1.24	1.27	1.72
	Whole Sample	1.00	1.17	1.28	1.36	1.43	1.56	1.64	1.80
		2008	2009	2010	2011	2012	2013	2014	2015
Total assets (billions of yuan)	Group	1.98	2.13	2.45	2.85	3.08	3.38	3.81	4.39
	Non-Group	1.93	2.04	2.45	2.91	3.44	3.84	4.32	4.83
	Whole Sample	1.96	2.13	2.45	2.85	3.13	3.45	3.87	4.51
		2000	2001	2002	2003	2004	2005	2006	2007
Net profit (millions of yuan)	Group	45.9	51.6	36.1	34.6	39.0	31.4	33.5	63.4
	Non-Group	32.2	33.3	22.1	24.6	22.1	22.9	24.7	59.0
	Whole Sample	44.3	48.6	34.4	32.6	35.1	30.8	32.2	62.7
		2008	2009	2010	2011	2012	2013	2014	2015
Net profit (millions of yuan)	Group	77.7	49.2	99.3	127	93.6	109	113	105
	Non-Group	49.2	27.9	62.6	98.4	31.2	59.0	63.6	39.0
	Whole Sample	70.0	46.4	94.1	122	84.4	98.6	104	95.5
		2000	2001	2002	2003	2004	2005	2006	2007
Total sales (billions of yuan)	Group	0.44	0.54	0.58	0.72	0.89	0.98	1.10	1.21
	Non-Group	0.36	0.40	0.38	0.46	0.62	0.76	0.84	1.04
	Whole Sample	0.43	0.52	0.56	0.68	0.84	0.95	1.05	1.19
		2008	2009	2010	2011	2012	2013	2014	2015
Total sales (billions of yuan)	Group	1.41	1.31	1.58	1.85	1.90	2.11	2.29	2.41
	Non-Group	1.63	1.37	1.76	2.18	2.45	2.61	2.46	2.57
	Whole Sample	1.42	1.33	1.61	1.90	2.01	2.17	2.32	2.44
		2000	2001	2002	2003	2004	2005	2006	2007
Total liability (billions of yuan)	Group	0.22	0.29	0.34	0.43	0.46	0.46	0.46	0.46
	Non-Group	0.15	0.16	0.20	0.22	0.26	0.27	0.37	0.43
	Whole Sample	0.22	0.27	0.32	0.38	0.42	0.42	0.45	0.45
		2008	2009	2010	2011	2012	2013	2014	2015

Total liability (billions of yuan)	Group	0.49	0.53	0.58	0.65	0.66	0.77	0.86	1.00
	Non-Group	0.52	0.64	0.71	0.93	1.00	1.21	1.18	1.16
	Whole Sample	0.49	0.54	0.60	0.69	0.70	0.85	0.91	1.03
		2000	2001	2002	2003	2004	2005	2006	2007
Total equity (billions of yuan)	Group	0.57	0.68	0.73	0.75	0.78	0.80	0.80	0.89
	Non-Group	0.55	0.58	0.60	0.60	0.60	0.64	0.66	0.80
	Whole Sample	0.56	0.66	0.70	0.73	0.75	0.77	0.78	0.88
		2008	2009	2010	2011	2012	2013	2014	2015
Total equity (billions of yuan)	Group	1.02	1.08	1.23	1.41	1.54	1.73	1.88	2.28
	Non-Group	0.92	0.99	1.04	1.17	1.32	1.68	1.73	1.91
	Whole Sample	0.99	1.06	1.21	1.39	1.52	1.71	1.86	2.24
		2000	2001	2002	2003	2004	2005	2006	2007
SIZE	Group	20.75	20.92	21.02	21.06	21.11	21.19	21.26	21.32
	Non-Group	20.62	20.70	20.73	20.75	20.85	20.94	20.96	21.26
	Whole Sample	20.72	20.88	20.97	21.03	21.08	21.17	21.22	21.31
		2008	2009	2010	2011	2012	2013	2014	2015
SIZE	Group	21.40	21.48	21.62	21.77	21.85	21.94	22.06	22.20
	Non-Group	21.38	21.44	21.62	21.79	21.96	22.07	22.19	22.30
	Whole Sample	21.39	21.48	21.62	21.77	21.86	21.96	22.08	22.28
		2000	2001	2002	2003	2004	2005	2006	2007
ROA	Group	0.049	0.044	0.028	0.027	0.027	0.022	0.023	0.037
	Non-Group	0.040	0.034	0.020	0.027	0.024	0.021	0.028	0.036
	Whole Sample	0.048	0.043	0.028	0.027	0.027	0.022	0.023	0.037
		2008	2009	2010	2011	2012	2013	2014	2015
ROA	Group	0.038	0.026	0.038	0.044	0.031	0.034	0.032	0.027
	Non-Group	0.033	0.012	0.025	0.029	0.011	0.020	0.015	0.013
	Whole Sample	0.037	0.024	0.036	0.042	0.028	0.032	0.030	0.025
		2000	2001	2002	2003	2004	2005	2006	2007
GROWTH	Group	0.205	0.139	0.086	0.205	0.213	0.114	0.112	0.154
	Non-Group	0.171	0.133	0.075	0.157	0.220	0.184	0.118	0.179
	Whole Sample	0.188	0.137	0.085	0.194	0.214	0.125	0.115	0.157

		2008	2009	2010	2011	2012	2013	2014	2015
GROWTH	Group	0.124	-0.046	0.208	0.168	0.033	0.060	0.041	-0.005
	Non-Group	0.250	-0.076	0.281	0.180	0.030	0.046	0.018	-0.041
	Whole Sample	0.136	-0.052	0.215	0.171	0.033	0.059	0.038	-0.010
		2000	2001	2002	2003	2004	2005	2006	2007
Market value (millions of yuan)	Group	3.53	2.72	2.08	1.74	1.43	1.09	1.63	4.65
	Non-Group	2.89	2.17	1.72	1.39	1.17	0.91	1.29	4.05
	Whole Sample	3.43	2.59	2.04	1.69	1.38	1.07	1.59	4.56
		2008	2009	2010	2011	2012	2013	2014	2015
Market value (millions of yuan)	Group	1.83	4.56	4.54	3.16	3.41	3.93	5.86	9.73
	Non-Group	1.75	4.22	4.38	2.90	3.10	3.39	5.10	7.56
	Whole Sample	1.81	4.52	4.51	3.15	3.33	3.87	5.66	9.40

Table 3. Time-Trend of Tobin's Q and the Differences (groups with two or more affiliates)

		2000	2001	2002	2003	2004	2005	2006	2007
(A)	Full sample	0.25	0.26	0.28	0.33	0.34	0.34	0.36	0.34
	Non-Groups	0.23	0.23	0.25	0.26	0.29	0.27	0.34	0.33
	Groups	0.25	0.26	0.28	0.34	0.35	0.35	0.36	0.34
	Group-Non group	0.02	0.03 **	0.04 **	0.08 ***	0.05 **	0.08 **	0.02	0.01
		2008	2009	2010	2011	2012	2013	2014	2015
(A)	Full sample	0.33	0.38	0.32	0.31	0.30	0.32	0.30	0.30
	Non-Groups	0.33	0.36	0.36	0.36	0.35	0.36	0.34	0.33
	Groups	0.33	0.38	0.31	0.30	0.29	0.31	0.30	0.29
	Group-Non group	0.01	0.03	-0.05	-0.06 ***	-0.06 **	-0.05 **	-0.04 *	-0.03

Table 4. Time-Trend of Tobin's Q and the Differences (groups with four or more affiliates)

		2000	2001	2002	2003	2004	2005	2006	2007
(A)	Full sample	0.25	0.26	0.28	0.33	0.34	0.34	0.36	0.34
	Non-Groups	0.22	0.23	0.24	0.28	0.29	0.30	0.33	0.32
	Groups	0.26	0.28	0.29	0.35	0.36	0.36	0.37	0.35
	Group-Non group	0.04 ***	0.05 ***	0.05 ***	0.07 ***	0.07 ***	0.05 **	0.04	0.03
		2008	2009	2010	2011	2012	2013	2014	2015
(A)	Full sample	0.33	0.38	0.32	0.31	0.30	0.32	0.30	0.30
	Non-Groups	0.31	0.33	0.32	0.32	0.34	0.34	0.33	0.31
	Groups	0.34	0.41	0.32	0.30	0.29	0.30	0.29	0.29
	Group-Non group	0.03	0.08	0.00	-0.02	-0.05 **	-0.04 **	-0.03 *	-0.02

Table 5. Time-Trend of Tobin's Q, Using Group Dummy (groups with two or more affiliates)

Year	2000	2001	2002	2003	2004	2005	2006	2007
Group Dummy	0.091 (3.75)***	0.031 (2.10)**	0.025 (1.60)	0.066 (3.11)***	0.051 (2.39)**	0.058 (2.18)**	0.029 (0.54)	0.007 (0.13)
OwnershipDummy	0.066 (1.36)	-0.031 (-2.47)**	-0.039 (-3.08)***	-0.035 (-1.99)**	-0.044 (-2.48)**	-0.042 (-1.89)*	-0.059 (-1.31)	-0.077 (-1.60)
Industry								
2	-0.314 (-2.52)**	0.085 (1.56)	0.063 (1.13)	0.147 (1.90)*	0.131 (1.68)*	0.128 (1.33)	0.138 (0.71)	0.124 (0.58)
3	-0.297 (-2.41)**	0.111 (2.05)**	0.089 (1.62)	0.186 (2.43)**	0.158 (2.05)**	0.088 (0.91)	0.144 (0.75)	0.105 (0.50)
4	-0.219 (-1.64)	0.110 (1.86)*	0.096 (1.58)	0.146 (1.74)*	0.148 (1.75)*	0.122 (1.16)	0.146 (0.69)	0.116 (0.40)
5	-0.299 (-2.43)**	0.094 (1.79)*	0.089 (1.67)*	0.170 (2.29)**	0.164 (2.20)**	0.139 (1.50)	0.229 (1.23)	0.215 (1.05)
6	-0.298 (-2.40)**	0.107 (1.96)*	0.100 (1.81)*	0.204 (2.65)***	0.157 (2.02)**	0.142 (1.46)	0.181 (0.93)	0.155 (0.73)
SIZE	-0.008 (-0.69)	0.009 (1.29)	0.017 (2.50)**	0.011 (1.27)	0.021 (2.45)**	0.017 (1.67)*	-0.018 (-0.91)	-0.030 (-1.54)
ROA	-0.505 (-3.66)***	-0.303 (-4.25)***	-0.473 (-15.60)***	-0.285 (-8.95)***	-0.530 (-6.66)***	-0.703 (-16.39)***	-0.313 (-4.69)***	-0.744 (-6.80)***
GROWTH	-0.001 (-0.14)	-0.001 (-0.44)	0.014 (5.33)***	0.007 (1.19)	0.005 (1.87)*	-9.76e-06 (-0.05)	-2.12e-07 (-0.12)	0.000 (0.02)
Adj. R2	0.141	0.030	0.250	0.108	0.066	0.250	0.031	0.053
F value	4.92***	3.57***	28.73***	11.09***	6.90***	28.74***	3.69***	5.69***

Year	2008	2009	2010	2011	2012	2013	2014	2015
Group Dummy	-0.012 (-0.19)	-0.023 (-0.39)	-0.058 (-2.53)**	-0.056 (-2.53)**	-0.034 (-1.45)	-0.050 (-2.20)**	-0.050 (-2.23)**	-0.036 (-1.48)
Ownership Dummy	-0.050 (-0.91)	-0.017 (-0.34)	-0.023 (-1.18)	-0.016 (-0.88)	-0.037 (-1.86)*	-0.028 (-1.49)	-0.017 (-0.89)	0.018 (0.87)
Industry 2	0.181 (0.75)	0.157 (0.73)	0.325 (3.84)***	0.314 (3.89)***	0.357 (4.14)***	0.313 (3.72)***	0.284 (3.44)***	0.235 (2.56)**
3	0.158 (0.66)	0.173 (0.81)	0.327 (3.91)***	0.343 (4.29)***	0.398 (4.67)***	0.422 (5.07)***	0.427 (5.23)***	0.357 (3.94)***
4	0.202 (0.77)	0.226 (0.96)	0.431 (4.62)***	0.400 (4.51)***	0.388 (4.11)***	0.384 (4.16)***	0.327 (3.62)***	0.277 (2.76)***
5	0.281 (1.21)	0.271 (1.31)	0.384 (4.73)***	0.381 (4.92)***	0.415 (5.02)***	0.364 (4.50)***	0.343 (4.32)***	0.275 (3.12)***
6	0.218 (0.90)	0.226 (1.05)	0.409 (4.83)***	0.391 (4.86)***	0.427 (4.96)***	0.386 (4.59)***	0.354 (4.29)***	0.286 (3.12)***
SIZE	-0.014 (-0.66)	-0.004 (-0.20)	0.064 (9.08)***	0.061 (9.68)***	0.067 (10.03)***	0.054 (8.42)***	0.049 (8.02)***	0.037 (5.42)***
ROA	-1.081 (-6.34)***	0.003 (63.77)***	-0.199 (-3.61)***	-0.014 (-1.09)	-0.919 (-8.09)***	-0.155 (-2.75)***	-0.107 (-3.19)***	-0.086 (-2.87)***
GROWTH	0.000 (0.33)	0.005 (0.37)	-2.84e-11 (-0.04)	0.000 (1.23)	0.005 (0.63)	0.000 (2.02)**	0.000 (1.55)	0.002 (2.65)***
Adj. R2	0.045	0.842	0.117	0.131	0.167	0.113	0.117	0.069
F value	4.92***	445.90***	11.99***	13.52***	17.69***	11.53***	12.03***	7.15***

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Time-Trend of Tobin's Q, Using Group Dummy (groups with four or more affiliates)

Year	2000	2001	2002	2003	2004	2005	2006	2007
Group Dummy	0.046 (2.12)**	0.047 (3.98)***	0.054 (4.47)***	0.069 (4.10)***	0.065 (3.86)***	0.042 (2.01)**	0.047 (1.12)	0.030 (0.67)
Ownership Dummy	0.077 (1.55)	-0.025 (-1.99)**	-0.032 (-2.48)**	-0.028 (-1.59)	-0.037 (-2.07)**	-0.039 (-1.72)*	-0.053 (-1.19)	-0.073 (-1.51)
Industry 2	-0.322 (-2.53)**	0.079 (1.45)	0.052 (0.94)	0.144 (1.88)*	0.124 (1.61)	0.132 (1.36)	0.132 (0.68)	0.117 (0.55)
3	-0.307 (-2.45)**	0.108 (2.02)**	0.083 (1.52)	0.188 (2.46)**	0.157 (2.04)**	0.093 (0.96)	0.141 (0.73)	0.101 (0.48)
4	-0.230 (-1.69)*	0.101 (1.70)*	0.082 (1.37)	0.136 (1.63)	0.136 (1.62)	0.120 (1.14)	0.136 (0.64)	0.107 (0.46)
5	-0.318 (-2.54)**	0.091 (1.76)*	0.084 (1.59)	0.170 (2.30)**	0.162 (2.18)**	0.142 (1.53)	0.227 (1.22)	0.211 (1.03)
6	-0.313 (-2.47)**	0.098 (1.80)*	0.086 (1.56)	0.196 (2.55)**	0.145 (1.88)*	0.141 (1.46)	0.171 (0.880)	0.146 (0.69)
SIZE	-0.006 (-0.46)	0.004 (0.65)	0.011 (1.64)	0.007 (0.75)	0.017 (1.90)*	0.015 (1.46)	-0.021 (-1.05)	-0.031 (-1.61)
ROA	-0.480 (-3.40)***	-0.301 (-4.25)***	-0.473 (-15.79)***	-0.285 (-9.00)***	-0.519 (-6.56)***	-0.703 (-16.38)***	-0.310 (-4.66)***	-0.743 (-6.78)***
GROWTH	-0.001 (-0.18)	0.000 (-0.30)	0.014 (5.53)***	0.006 (1.10)	0.006 (2.11)**	0.000 (0.08)	-1.12e-07 (-0.06)	0.000 (0.04)
Adj. R2	0.106	0.043	0.265	0.116	0.087	0.249	0.032	0.054
F value	3.82***	4.75***	31.06***	11.89***	7.89***	28.65***	3.79***	5.74***

Year	2008	2009	2010	2011	2012	2013	2014	2015
Group Dummy	0.019 (0.37)	0.009 (0.19)	-0.029 (-1.59)	-0.024 (-1.41)	-0.039 (-2.13)**	-0.027 (-1.49)	-0.033 (-1.89)*	-0.018 (-0.91)
Ownership Dummy	-0.047 (-0.85)	-0.015 (-0.30)	-0.024 (-1.25)	-0.017 (-0.92)	-0.040 (-2.01)**	-0.030 (-1.56)	-0.019 (-1.00)	0.017 (0.84)
Industry 2	0.172 (0.71)	0.149 (0.69)	0.319 (3.76)***	0.307 (3.80)***	0.358 (4.16)***	0.307 (3.64)***	0.279 (3.38)***	0.230 (2.51)**
3	0.151 (0.63)	0.166 (0.78)	0.320 (3.81)***	0.334 (4.18)***	0.396 (4.66)***	0.415 (4.99)***	0.421 (5.16)***	0.351 (3.88)***
4	0.192 (0.73)	0.218 (0.92)	0.429 (4.59)***	0.398 (4.46)***	0.395 (4.18)***	0.384 (4.14)***	0.327 (3.61)***	0.275 (2.73)***
5	0.275 (1.19)	0.266 (1.29)	0.380 (4.66)***	0.376 (4.84)***	0.415 (5.02)***	0.359 (4.44)***	0.339 (4.27)***	0.271 (3.08)***
6	0.208 (0.86)	0.217 (1.01)	0.405 (4.77)***	0.386 (4.78)***	0.431 (5.01)***	0.383 (4.54)***	0.352 (4.27)***	0.283 (3.08)***
SIZE	-0.015 (-0.71)	-0.004 (-0.22)	0.065 (9.18)***	0.062 (9.76)***	0.068 (10.15)***	0.055 (8.48)***	0.050 (8.05)***	0.037 (5.43)***
ROA	-1.074 (-6.29)***	0.003 (63.68)***	-0.201 (-3.65)***	-0.014 (-1.10)	-0.913 (-8.06)***	-0.159 (-2.81)***	-0.106 (-3.14)***	-0.087 (-2.90)***
GROWTH	0.000 (0.31)	0.005 (0.36)	-9.61e-11 (-0.14)	0.000 (1.37)	0.006 (0.69)	0.000 (1.96)*	0.000 (1.48)	0.002 (2.62)***
Adj. R2	0.045	0.842	0.112	0.126	0.170	0.110	0.115	0.067
F value	4.93***	445.83***	11.55***	13.01***	17.98***	11.23***	11.87***	7.01***

*** p<0.01, ** p<0.05, * p<0.1

Table 7. Results with Group Firms, Using TIME and Group Dummy

Regression	Groups with two or more affiliates			Groups with four or more affiliates		
	OLS	FIXED	RANDOM	OLS	FIXED	RANDOM
Group Dummy	0.0760 (0.0217)***		0.0700 (0.0286)**	0.0816 (0.0169)***		0.0731 (0.0223)***
TIME*Group Dum.	-0.00900 (0.00217)***	-0.00802 (0.00172)***	-0.00829 (0.00172)***	-0.00784 (0.00168)***	-0.00682 (0.00134)***	-0.00709 (0.00134)***
TIME	0.00575 (0.00202)***	0.00345 (0.00170)**	0.00431 (0.00167)***	0.00351 (0.00142)**	0.00138 (0.00126)	0.00220 (0.00122)*
Ownership Dummy	-0.0341 (0.00793)***		-0.0450 (0.0197)**	-0.0323 (0.00798)***		-0.0433 (0.0197)**
Industry 2	0.190 (0.0348)***		0.214 (0.0877)**	0.185 (0.0348)***		0.209 (0.0872)**
3	0.237 (0.0345)***		0.254 (0.0873)***	0.233 (0.0344)***		0.251 (0.0867)***
4	0.226 (0.0380)***		0.249 (0.0959)***	0.221 (0.0380)***		0.244 (0.0954)**
5	0.248 (0.0334)***		0.269 (0.0845)***	0.245 (0.0334)***		0.265 (0.0840)***
6	0.242 (0.0348)***		0.264 (0.0878)***	0.236 (0.0348)***		0.258 (0.0873)***
SIZE	0.0195 (0.00306)***	0.0383 (0.00524)***	0.0313 (0.00450)***	0.0187 (0.00308)***	0.0372 (0.00526)***	0.0302 (0.00452)***
ROA	0.00339 (3.18e-05)***	0.00336 (2.64e-05)***	0.00336 (2.63e-05)***	0.00339 (3.18e-05)***	0.00336 (2.64e-05)***	0.00336 (2.63e-05)***
GROWTH	-4.13e-10 (1.10e-09)	-1.70e-09 (9.03e-10)*	-1.57e-09 (9.00e-10)*	-4.41e-10 (1.10e-09)	-1.74e-09 (9.02e-10)*	-1.61e-09 (9.01e-10)*
R-squared	0.478	0.582	0.582	0.479	0.582	0.582
F test	956.36***	3248.29***		957.38***	3250.30***	
Hausman test			12.81**			13.32***

*** p<0.01, ** p<0.05, * p<0.1

Table 8. Results with Group Firms, Using TIME and Affiliate number

Regression	OLS	FIXED	RANDOM
Affiliate number	0.00372 (0.000838)***		0.00317 (0.00111)***
TIME*	-0.000347	-0.000314	-0.000322
Affiliate no.	(8.31e-05)***	(6.59e-05)***	(6.60e-05)***
TIME	0.00122 (0.00111)	-0.000707 (0.000997)	2.69e-05 (0.000962)
Ownership Dummy	-0.0329 (0.00796)***		-0.0450 (0.0197)**
Industry 2	0.185 (0.0348)***		0.213 (0.0878)**
3	0.232 (0.0345)***		0.253 (0.0874)***
4	0.220 (0.0381)***		0.248 (0.0961)***
5	0.245 (0.0334)***		0.268 (0.0846)***
6	0.235 (0.0349)***		0.261 (0.0881)***
SIZE	0.0185 (0.00314)***	0.0391 (0.00523)***	0.0317 (0.00453)***
ROA	0.00339 (3.18e-05)***	0.00336 (2.64e-05)***	0.00336 (2.63e-05)***
GROWTH	-4.36e-10 (1.10e-09)	-1.71e-09 (9.02e-10)*	-1.59e-09 (9.00e-10)*
R-squared	0.479	0.582	0.582
F test	956.73***	3248.77***	
Hausman test			13.49***

*** p<0.01, ** p<0.05, * p<0.1

Table 9. Regression of Tobin's Q, Using Affiliate number

	Having one or more affiliates
Affiliate number	0.000917 (0.000393)**
Ownership Dummy	-0.0312 (0.00830)***
Industry 2	0.130 (0.0393)***
3	0.178 (0.0392)***
4	0.162 (0.0422)***
5	0.187 (0.0382)***
6	0.180 (0.0394)***
SIZE	0.0114 (0.00323)***
ROA	0.00339 (3.24e-05)***
GROWTH	-5.12e-10 (1.12e-09)
R-squared	0.485

*** p<0.01, ** p<0.05, * p<0.1

Table 10. Regression of Tobin's Q, Using Affiliate number and (Affiliate number)²

	Having one or more affiliates
Affiliate number	0.00427 (0.000925)***
(Affiliate number)²	-7.60e-05 (1.90e-05)***
Ownership Dummy	-0.0310 (0.00830)***
Industry 2	0.130 (0.0393)***
3	0.177 (0.0391)***
4	0.160 (0.0422)***
5	0.186 (0.0381)***
6	0.179 (0.0394)***
SIZE	0.0114 (0.00323)***
ROA	0.00339 (3.24e-05)***
GROWTH	-4.80e-10 (1.12e-09)
R-squared	0.486

*** p<0.01, ** p<0.05, * p<0.1

Table 11. Results with Group Firms, Using Business Cycle Dummy and Group Dummy

Regression	Groups with two or more affiliates			Groups with four or more affiliates		
	OLS	FIXED	RANDOM	OLS	FIXED	RANDOM
Group Dummy	-0.0375 (0.0121)***		-0.0347 (0.0250)	-0.0145 (0.00945)		-0.0138 (0.0195)
Business Cycle Dum.* Group Dum.	0.0813 (0.0191)***	0.0746 (0.0152)***	0.0763 (0.0152)***	0.0639 (0.0148)***	0.0577 (0.0118)***	0.0593 (0.0118)***
Business Cycle Dummy	-0.0542 (0.0178)***	-0.0408 (0.0146)***	-0.0453 (0.0145)***	-0.0290 (0.0124)**	-0.0170 (0.0105)	-0.0212 (0.0103)**
Ownership Dummy	-0.0337 (0.00792)***		-0.0429 (0.0199)**	-0.0320 (0.00797)***		-0.0415 (0.0199)**
Industry 2	0.189 (0.0348)***		0.208 (0.0887)**	0.185 (0.0347)***		0.204 (0.0885)**
3	0.236 (0.0345)***		0.250 (0.0882)***	0.232 (0.0344)***		0.247 (0.0881)***
4	0.225 (0.0380)***		0.243 (0.0969)**	0.220 (0.0380)***		0.239 (0.0969)**
5	0.247 (0.0334)***		0.264 (0.0854)***	0.244 (0.0334)***		0.261 (0.0853)***
6	0.240 (0.0348)***		0.258 (0.0884)***	0.235 (0.0348)***		0.253 (0.0887)***
SIZE	0.0189 (0.00300)***	0.0331 (0.00477)***	0.0282 (0.00420)***	0.0182 (0.00301)***	0.0326 (0.00478)***	0.0277 (0.00421)***
ROA	0.00339 (3.18e-05)***	0.00335 (2.64e-05)***	0.00336 (2.63e-05)***	0.00339 (3.18e-05)***	0.00335 (2.64e-05)***	0.00336 (2.63e-05)***
GROWTH	-4.08e-10 (1.10e-09)	-1.70e-09 (9.03e-10)*	-1.58e-09 (9.00e-10)*	-4.60e-10 (1.10e-09)	-1.77e-09 (9.03e-10)**	-1.64e-09 (9.00e-10)*
R-squared	0.478	0.582	0.582	0.479	0.582	0.582
F test	956.35***	3246.48***		956.74***	3246.48***	
Hausman test			8.77*			8.83*

*** p<0.01, ** p<0.05, * p<0.1

Table 12. Regressions with Group Firms, Using Business Cycle Dummy and Affiliate number

Regression	OLS	FIXED	RANDOM
Affiliate number	-0.000444 (0.000474)		-0.000636 (0.000975)
Business Cycle Dum.*	0.00264	0.00244	0.00248
Affiliate no.	(0.000733)***	(0.000581)***	(0.000582)***
Business Cycle Dummy	-0.00870 (0.00963)	0.00202 (0.00823)	-0.00178 (0.00807)
Ownership Dummy	-0.0325 (0.00795)***		-0.0430 (0.0199)**
Industry 2	0.184 (0.0348)***		0.207 (0.0887)**
3	0.231 (0.0345)***		0.249 (0.0883)***
4	0.219 (0.0381)***		0.242 (0.0971)**
5	0.244 (0.0334)***		0.263 (0.0855)***
6	0.234 (0.0349)***		0.256 (0.0889)***
SIZE	0.0180 (0.00307)***	0.0341 (0.00476)***	0.0289 (0.00423)***
ROA	0.00339 (3.18e-05)***	0.00335 (2.64e-05)***	0.00336 (2.63e-05)***
GROWTH	-4.43e-10 (1.10e-09)	-1.73e-09 (9.03e-10)*	-1.61e-09 (9.00e-10)*
R-squared	0.478	0.581	0.581
F test	955.89***	3243.45***	
Hausman test			9.46*

*** p<0.01, ** p<0.05, * p<0.1

Table 13. Results with Group Firms, Using Normalized GDP Growth Dummy and Group Dummy

Regression	Groups with two or more affiliates			Groups with four or more affiliates		
	OLS	FIXED	RANDOM	OLS	FIXED	RANDOM
Group Dummy	-0.0333 (0.0121)***		-0.0312 (0.0247)	-0.0112 (0.00944)		-0.0114 (0.0191)
Norm. GDP Growth Dummy* Group Dum.	0.0701 (0.0191)***	0.0643 (0.0151)***	0.0656 (0.0151)***	0.0541 (0.0148)***	0.0478 (0.0117)***	0.0492 (0.0117)***
Norm. GDP Growth Dummy	-0.00965 (0.0176)	0.00236 (0.0141)	-0.00122 (0.0141)	0.0128 (0.0122)		0.0208 (0.00988)**
Ownership Dummy	-0.0354 (0.00790)***		-0.0472 (0.0196)**	-0.0339 (0.00794)***		-0.0460 (0.0195)**
Industry 2	0.194 (0.0347)***		0.220 (0.0875)**	0.190 (0.0347)***		0.217 (0.0865)**
3	0.240 (0.0344)***		0.259 (0.0871)***	0.236 (0.0344)***		0.257 (0.0861)***
4	0.230 (0.0379)***		0.256 (0.0956)***	0.225 (0.0379)***		0.252 (0.0947)***
5	0.251 (0.0333)***		0.274 (0.0843)***	0.248 (0.0333)***		0.272 (0.0834)***
6	0.245 (0.0347)***		0.270 (0.0876)***	0.240 (0.0347)***		0.265 (0.0867)***
SIZE	0.0215 (0.00292)***	0.0402 (0.00434)***	0.0345 (0.00389)***	0.0209 (0.00293)***	0.0400 (0.00434)***	0.0341 (0.00389)***
ROA	0.00340 (3.17e-05)***	0.00336 (2.63e-05)***	0.00336 (2.62e-05)***	0.00340 (3.17e-05)***	0.00336 (2.63e-05)***	0.00336 (2.62e-05)***
GROWTH	-3.38e-10 (1.10e-09)	-1.64e-09 (9.00e-10)*	-1.51e-09 (8.98e-10)*	-3.80e-10 (1.10e-09)	-1.69e-09 (9.00e-10)*	-1.55e-09 (8.98e-10)*
R-squared	0.480	0.584	0.584	0.480	0.584	0.584
F test	962.83***	3282.48***		963.09***	3281.79***	
Hausman test			15.90***			18.19***

*** p<0.01, ** p<0.05, * p<0.1

Table 14. Regressions with Group Firms, Using Normalized GDP Growth Dummy and Affiliate number

Regression	OLS	FIXED	RANDOM
Affiliate number	-0.000324 (0.000474)		-0.000608 (0.000961)
Norm. GDP Growth Dummy*	0.00216 (0.000731)***	0.00198 (0.000579)***	0.00201 (0.000580)***
Affiliate no.			
Norm. GDP	0.0306 (0.00946)***	0.0399 (0.00771)***	0.0370 (0.00767)***
Growth Dummy	-0.0343 (0.00792)***		-0.0471 (0.0196)**
Ownership Dummy	0.189 (0.00347)***		0.219 (0.0873)**
Industry 2	0.235 (0.0344)***		0.258 (0.0870)***
3	0.225 (0.0380)***		0.254 (0.0956)***
4	0.248 (0.0333)***		0.273 (0.0842)***
5	0.239 (0.0348)***		0.268 (0.0876)***
6	0.0206 (0.00299)***	0.0407 (0.00434)***	0.0347 (0.0391)***
SIZE	0.00339 (3.17e-05)***	0.00336 (2.63e-05)***	0.00336 (2.62e-05)***
ROA	-3.68e-10 (1.10e-09)	-1.66e-09 (9.00e-10)*	-1.53e-09 (8.98e-10)*
GROWTH			
R-squared	0.480	0.584	0.584
F test	962.34***	3279.38***	
Hausman test			17.16***

*** p<0.01, ** p<0.05, * p<0.1

Table 15. Results with Group Firms, Using TIME, Business Cycle Dummy, Normalized GDP Growth Dummy and Group Dummy

Regression	Groups with two or more affiliates			Groups with four or more affiliates		
	OLS	FIXED	RANDOM	OLS	FIXED	RANDOM
Group Dummy	-0.0141 (0.0528)		-0.0173 (0.0474)	0.394 (0.0409)		0.0316 (0.0358)
TIME* Group Dum.	-0.00269 (0.00419)	-0.00203 (0.00331)	-0.00217 (0.00333)	-0.00501 (0.00324)	-0.00390 (0.00257)	-0.00430 (0.00265)
Business Cycle Dum.* Group Dum.	0.0429 (0.0363)	0.0400 (0.0288)	0.0414 (0.0289)	0.0139 (0.0281)	0.0152 (0.0223)	0.0156 (0.0229)
Norm. GDP Growth Dum.* Group Dum.	0.0401 (0.0217)*	0.0379 (0.0172)**	0.0384 (0.0172)**	0.0274 (0.0168)	0.0247 (0.0133)*	0.0255 (0.0137)*
TIME	0.00277 (0.00386)	0.000455 (0.00310)	0.00136 (0.00309)	0.00396 (0.00268)	0.00147 (0.00219)	0.00283 (0.00222)
Business Cycle Dummy	-0.0405 (0.0334)	-0.0390 (0.0264)	-0.0396 (0.0265)	-0.0135 (0.0231)	-0.0154 (0.0183)	-0.0147 (0.0188)
Norm. GDP Growth Dummy	0.0191 (0.0199)	0.0226 (0.0158)	0.0214 (0.0158)	0.0344 (0.0138)**	0.0379 (0.0109)***	0.0362 (0.0112)***
Ownership Dummy	-0.0346 (0.00792)***		-0.0466 (0.0191)**	-0.0329 (0.00797)***		-0.0422 (0.0150)***
Industry 2	0.192 (0.0347)***		0.218 (0.0851)**	0.187 (0.0347)***		0.207 (0.0664)***
3	0.238 (0.0344)***		0.258 (0.0847)***	0.234 (0.0344)***		0.249 (0.0660)***
4	0.228 (0.0379)***		0.254 (0.0930)***	0.222 (0.0380)***		0.242 (0.0727)***
5	0.249 (0.0334)***		0.272 (0.0820)***	0.246 (0.0333)***		0.263 (0.0639)***
6	0.243 (0.0347)***		0.268 (0.0852)***	0.237 (0.0347)***		0.256 (0.0665)***
SIZE	0.0203 (0.00306)***	0.0419 (0.00525)***	0.0336 (0.00448)***	0.0195 (0.00308)***	0.0410 (0.00527)***	0.0291 (0.00421)***
ROA	0.00339 (3.17e-05)***	0.00336 (2.64e-05)***	0.00336 (2.63e-05)***	0.00339 (3.17e-05)***	0.00336 (2.64e-05)***	0.00336 (2.68e-05)***
GROWTH	-3.52e-10 (1.10e-09)	-1.63e-09 (9.00e-10)*	-1.50e-09 (8.99e-10)*	-4.10e-10 (1.10e-09)	-1.47e-09 (9.20e-10)	-1.47e-09 (9.20e-10)
R-squared	0.481	0.585	0.585	0.481	0.585	0.585
F test	723.08***	1826.19***		723.57***	1826.37***	
Hausman test			26.98***			9.85

Table 16. Results with Group Firms, Using TIME, Business Cycle Dummy, Normalized GDP Growth Dummy and Affiliate number

Regression	OLS	FIXED	RANDOM
Affiliate number	0.00289 (0.00203)		0.00243 (0.00177)
TIME* Affiliate no.	-0.000298 (0.000161)*	-0.000259 (0.000127)**	-0.000273 (0.000133)**
Business Cycle Dum.*	-2.22e-05 (0.00139)	5.27e-05 (0.00110)	5.27e-05 (0.00115)
Norm. GDP	0.000935 (0.000833)	0.000865 (0.000659)	0.000890 (0.000687)
Growth Dummy* Affiliate no.			
TIME	0.00314 (0.00208)	0.000854 (0.00171)	0.00228 (0.00175)
Business Cycle Dummy	-0.00394 (0.0178)	-0.00580 (0.0141)	-0.00470 (0.0147)
Norm. GDP	0.0448 (0.0106)***	0.0473 (0.00843)***	0.0457 (0.00878)***
Growth Dummy	-0.0335 (0.0795)***		-0.0425 (0.0138)***
Ownership Dummy	0.187 (0.0348)***		0.207 (0.0611)***
Industry 2	0.233 (0.0344)***		0.249 (0.0607)***
3	0.222 (0.0380)***		0.242 (0.0668)***
4	0.246 (0.0334)***		0.263 (0.0588)***
5	0.237 (0.0348)***		0.256 (0.0612)***
6	0.0194 (0.00314)***	0.0431 (0.00524)***	0.0289 (0.00412)***
SIZE	0.00339 (3.17e-05)***	0.00336 (2.64e-05)***	0.00337 (2.71e-05)
ROA	-3.88e-10 (1.10e-09)	-1.66e-09 (9.00e-10)	-1.38e-09 (9.31e-10)
GROWTH	0.481 722.86***	0.585 1825.01***	0.584
R-squared			15.32*
F test			
Hausman test			

*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Time-Trend of Tobin's Q and the Differences

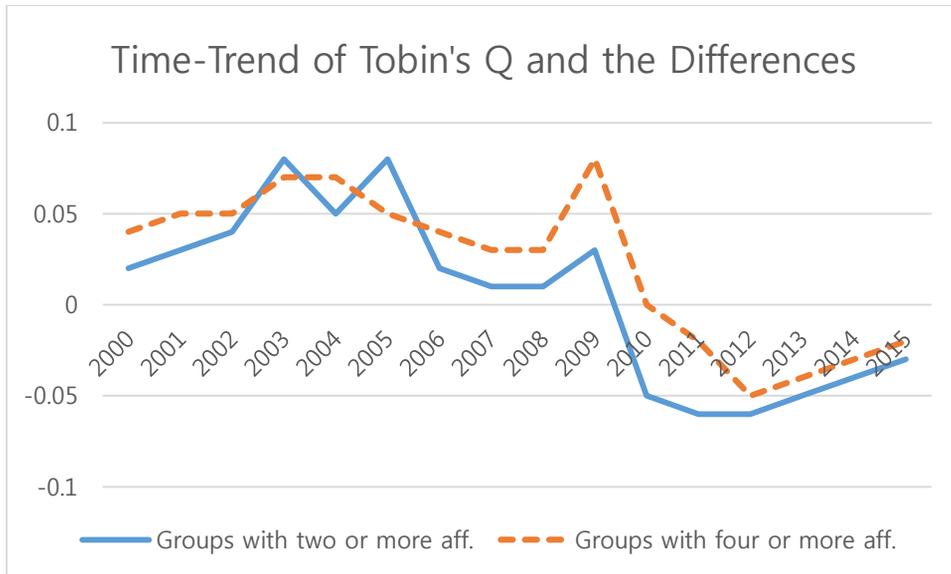


Figure 2. Time-Trend of Tobin's Q, Using Group Firm Dummy

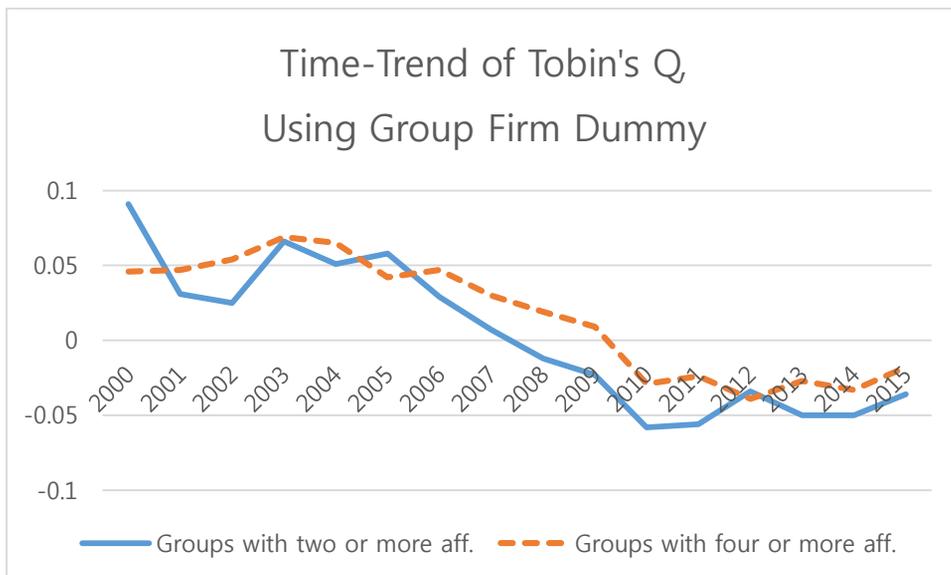


Figure 3A. Relationship between Tobin's Q and Affiliate number from 2000 to 2015

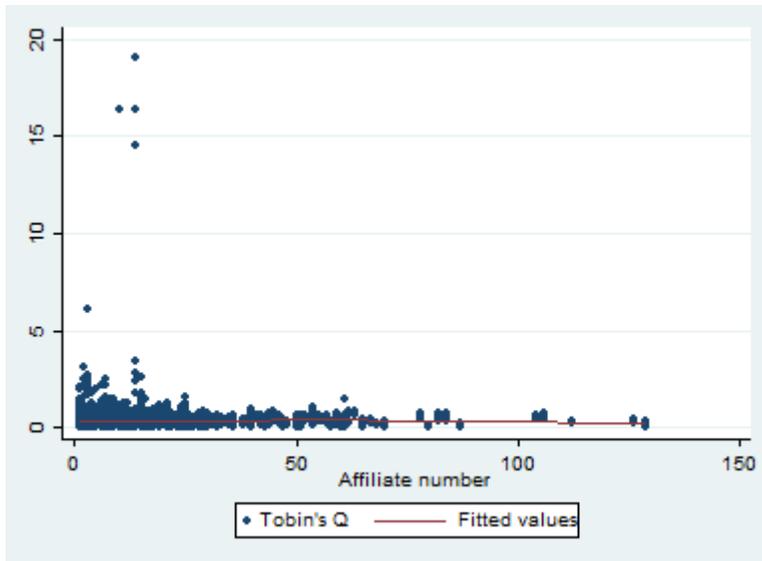


Figure 3B. Relationship between Tobin's Q and Affiliate number from 2000 to 2008

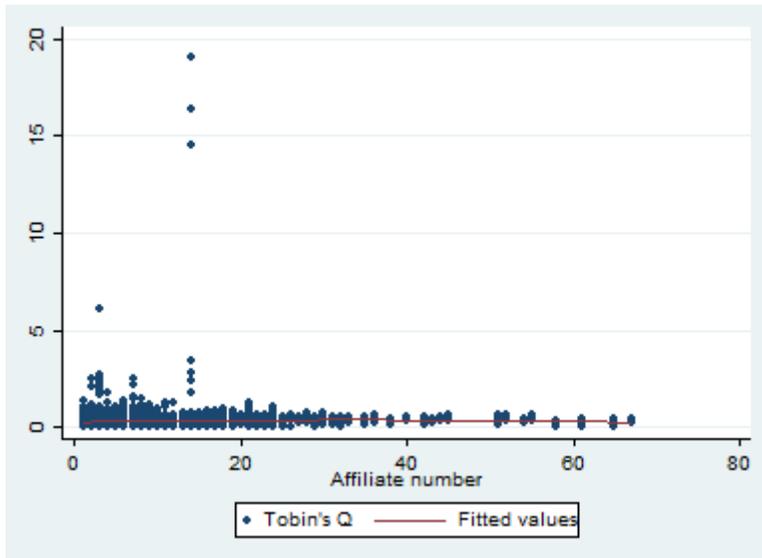


Figure 3C. Relationship between Tobin's Q and Affiliate number from 2009 to 2015

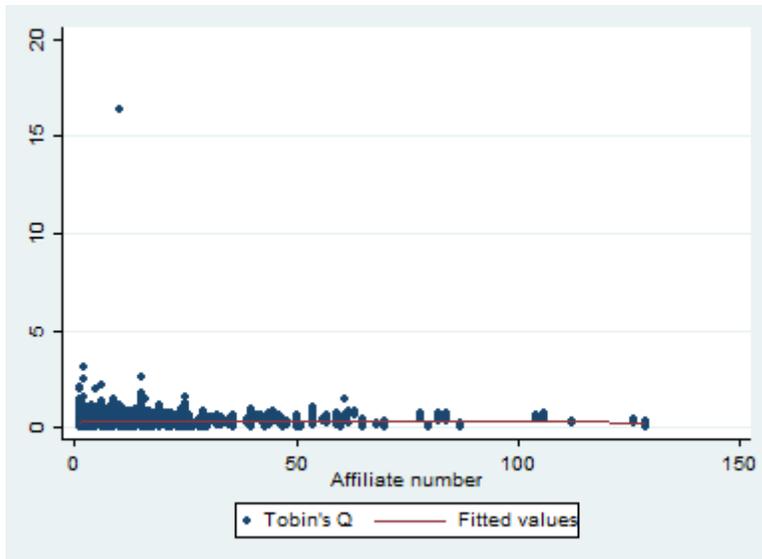
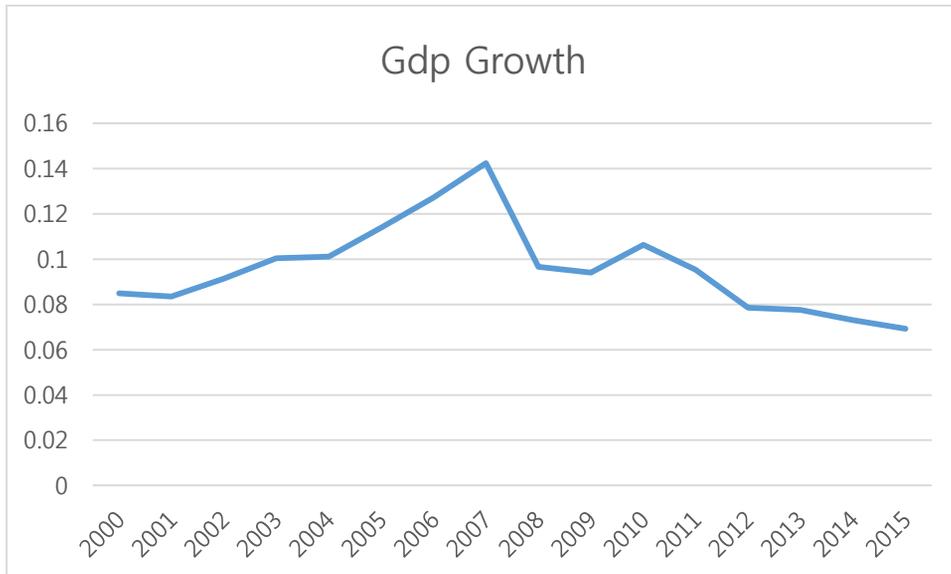


Figure 4. China's GDP Growth from 2000 to 2015



국문초록

이 논문은 2000년에서 2015년까지의 중국 기업집단의 장기적 성과를 분석하고 있다. 기업집단은 비기업집단에 비해 하향 추세를 보인다. 시장 가설, 대리인 비용 가설, 자원 기반 가설, 다각화 가설 및 경기 순환 가설이 기업집단의 하향 추세를 설명한다. 기업집단에 대한 기존 이론들을 검증한 결과, 시장 가설과 대리인 비용 가설은 증명되었고, 자원 기반 가설은 반박되었다. 또한, 다각화 가설에서는 적정 수준까지의 계열사 개수까지는 다각화 프리미엄이 있지만 그 수준을 넘어서는 과도한 다각화를 할 시에는 다각화 디스카운트가 있다는 사실을 알 수 있다. 마지막으로, 기업집단은 경기 확장 및 비교적 높은 경제 성장 시기에 비기업집단에 비해 더 좋은 성과를 보여준다는 사실을 보았다. 결과적으로, 기업집단 성과는 시장, 대리인 문제, 다각화 수준 및 경기 순환에 의해 바뀔 수 있다. 기업집단의 성과에는 개별 기업 및 시장이 모두 영향을 끼침을 알 수 있다.

주요어: 기업집단, 중국, 토빈의 Q, 시계열, 성과, 다각화, 경기순환

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