The effect of post IPO ownership concentration on firm performance

Author: Florian Egbers
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

ABSTRACT

This study investigated the relationship between ownership concentration measured as the Herfindahl Index and cumulative ownership held by the five largest owners and long term firm performance measured in ROA and market to book ratio while controlling for year, industry, total assets and board size. In the sample of 126 Chinese companies that had their IPO on the Shenzhen stock exchange during 2010 conflicting results were found during the period from 2010 until 2013. A statistically insignificant positive relationship was found between market to book ratio and the ownership concentration measures while ROA showed a weak negative and significant relationship with one ownership concentration measure. These results follow previous research that was unable to find a clear relationship between ownership concentration and firm performance. Possible reasons for the conflicting results were identified including suggestions for future research.

Graduation Committee members:
Dr. H. C. Van Beusichem
Prof. Dr. M. R. Kabir

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1. INTRODUCTION

Initial public offerings (IPO) serve an essential role in the resource allocation of the market and create an opportunity for investors to earn significant returns on their investment in the short term. In IPOs, a phenomenon called underpricing can be observed where the initial price of the shares is significantly lower than the price at the end of the first trading day. While the IPO is frequently underpriced in the short term, the long run firm performance following an IPO is often found to be weak (Jain, & Kini, 1994). To assess whether an IPO will be successful in the long term a range of predictors may be useful. One variable impacting firm performance may be the degree of ownership concentration as it is part of a company's corporate governance structure and shapes the power relations between ownership and management of a company. This research will investigate the potential use of ownership concentration of companies following their IPO as an indicator for long-term firm performance.

A commonly regarded definition of corporate governance is that it "deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment" (Shleifer & Vishny, 1997). The goals of management may differ from those of shareholders leading to a reduction of value generated for the shareholders. A misalignment of interests between management and shareholders can cause shareholders direct costs such as a choice of an unnecessarily more expensive accommodation as well as indirect costs such as forgone opportunities from managers avoiding risks due to them not directly benefiting from an increase in revenue.

There are a range of factors impacting the alignment of interests between management and shareholders. Some of these factors are exogenous while others can be impacted by shareholders to try and reduce the costs created by the misalignment.

Exogenous factors such as the market for corporate control, equity capital and executive talent have been found to impact the alignment of interests between shareholders and management (Gillan, 2006; Walsh & Seward, 1990). Internal factors that shareholders can impact to reduce misalignment costs are for example managerial ownership and managerial compensation (Florackis, 2008). By providing compensation incentives and stock options to management, shareholders can improve the alignment of interests between themselves and management.

Another factor increasing alignment of interests between shareholders and management is the degree of concentration of ownership, as it gives shareholders the incentive and capabilities to monitor and control a company's management (Bolton & Von Thadden, 1998; Coffee, 1991). In east Asia, concentrated ownership is a prominent tool of corporate governance and has a history of being favored by investors (Carney & Gedajlovic, 2002; Claessens, Djankov, & Lang, 2000; La Porta, Lopez, De-Silanes, & Shleifer, 1999). This preference is observed as there is a higher prevalence of family owned companies as well as a lower level of minority shareholder protection compared to the west (Denis & McConnell, 2003). In areas with weaker minority shareholder protection, shareholders have an increased interest in concentrating their investments to strengthen their position and maximize their return on the investment. By concentrating their ownership investors can protect themselves from larger shareholders exerting more control and hiring management related to their family (Claessens et al., 2000). As control is increased and management is selected, the alignment of interest between management and controlling shareholder is ensured.

China will be the country of focus of this research due to the weaker minority shareholder protection and prevalence of ownership concentration as a tool of alignment of interests due to a lack of exogenous aligning factors. A potential effect of ownership concentration on firm performance should become more visible as shareholders with monitoring and controlling capabilities can exert more force on management. Furthermore, China is of special interests as it is the second largest economy by gross domestic product and has a rapidly developing economy. In recent years China has been adopting technological advancements and breaking into high tech markets such as robotics (Cheng, Jia, Li & Li, 2019) and is strengthening its position as a leading economy going into the future.

During the time between the late 1970s up until 1990s a range of economic reforms took place in China to battle the stagnation of the economy and raise the standard of living of its population (Qian, 2000). Through these reforms markets were opened and previously state-owned businesses, predominantly in the areas of agriculture and industry, were privatized (Qian, 2000). Nowadays, Chinas economy is a mix of open capitalism and retained government ownership (Coase & Wang, 2012). This has many implications for the Chinese stock market and who can invest in what company. The Chinese government has structured the shares of Chinese companies into a range of classifications. The share groups of A shares and B shares are for companies traded on stock exchanges in mainland China. H shares, Red chip and P chip shares are traded on the Hong Kong stock exchange while S Chip and N shares are traded in Singapore and the United States, respectively (Chen, Lee, & Rui, 2001). For this research, of interest are only the A shares traded on stock exchanges in mainland China. A-shares are available predominantly to mainland Chinese investors while foreign investors need to be certified in order to be able to purchase. B shares on the other hand, are predominantly for foreign investors interested in investing in Chinese companies and are available to Chinese investors owning appropriate currency accounts which are USD for the Shanghai stock exchange and HKD for the Shenzhen stock exchange. This research will only focus on the A shares as they make up the significantly larger part of the stock market.

There are two main stock exchanges located in mainland China, namely the Shanghai stock exchange and the Shenzhen stock exchange (SZSE). The Shanghai stock exchange has a market capitalization of 22,744.13 billion RMB as of 2010 (Geretto & Pauluzzo, 2012) and is thus larger in size compared to the SZSE which at the same time point had a market capitalization of 8,641.53 billion RMB (Geretto & Pauluzzo, 2012). Nonetheless, this research will focus on the Shenzhen Stock exchange. This is

because the Shenzhen stock exchange holds a larger number of listed companies when compared to the Shanghai stock exchange with 2179 and 1518, respectively. Moreover, in terms of the composition of companies the Shenzhen stock exchange holds a larger number of private companies compared to the Shanghai stock exchange which consists of a smaller number of larger state-owned companies (Carpenter & Whitelaw, 2017). Lastly, the Shenzhen stock exchange is made up of more companies in Chinas new economy sectors such as information technology and robotics and will continue to play an increasing role going into the future.

This research will focus on A shares of companies that had their IPO in 2010 on the Shenzhen stock exchange and follow these companies from 2010 until 2013 in order to investigate what the relationship between ownership concentration and the long-run firm performance of IPOs in China is.

To assess this relationship multiple measures of ownership concentration and firm performance were used. This research adds to the literature finding conflicting results for the relationship between ownership concentration and accounting and market-based measures of firm performance. While the market-based measure seemed to be positively correlated with ownership concentration this relationship was not statistically significant. A negative significant relationship was found between the accounting based firm performance measure return on assets and ownership concentration measured as the Herfindahl index. These findings support previous findings by Demsetz & Villalonga (2001) and Rowe & Morrow (2009) that including both accounting and market-based measures of firm performance provides a more holistic understanding of a firm. Possible explanations for the conflicting results were outlined together with recommendations for future research in the field. For practitioners, this research findings reinforce the notion that firm performance is weak during the three years following an IPO as for both market and accounting based measures showed a declined performance. Furthermore, for practitioners this research found the market-based measures of firm performance are more strongly affected by industry specifications than the accounting-based ones. This indicates that investor sentiments of industries play a role in the markets valuation of companies and may induce a bias that should be accounted for when evaluating individual companies.

This research examined previous research on the costs created by a misalignment of interests between ownership and management of a company. Following this, measures of firm performance and ownership concentration were explored as well as the relationship between the two identified by previous theoretical and empirical research.

Afterwards the implementation of these variables as well as control variables of year, total assets, industry specification and board independence in a multiple linear regression analysis was done to account for confounding variables and reveal the relationship underneath. Following the reporting of results and interpretation, the main findings and limitations were given including recommendations for further research in the field.

2. LITERATURE REVIEW

2.1 Theoretical Framework

The literature on the relationship between ownership concentration and firm performance is inconclusive. For both a positive relationship and a negative relationship, strong theoretical argument have been made and empirical studies have found varying results. Jensen & Meckling (1976) founded the alignment of interest hypothesis which suggested that as ownership and management were separated, agency costs would arise making insider ownership preferential. Since then agency costs have been a problem of much interest to researchers and businesses alike. To reduce the agency costs described by Jensen & Meckling (1976) shareholders can monitor and control the actions of management.

Shleifer & Vishny (1986) argued that having large minority shareholders can be a solution to a lack of monitoring efforts originating from large shareholders not fulfilling their monitoring duties. Shleifer & Vishny (1997) highlight that ownership concentration addresses the agency problem as large shareholders both have an interest in profit maximization and sufficient control over company assets to have their interests followed by management. By concentrating their investment in a company, shareholders become less dependent on exogenous aligning factors or the will of larger shareholders in ensuring that management acts in their best interest.

David, Hitt, & Tan (2003) argue that ownership concentration gives investors the means to influence management by direct access and potential threats of using their voting rights further underlining the benefits of increased ownership concentration. Stoughton & Zechner (1998) pointed out that in IPOs investors are not homogeneous in the monitoring capabilities and that large shareholders increase the value of IPOs due to their increased ability and motivation to monitor management.

Previous literature in the field indicates that a company's firm performance benefits from the increased monitoring and controlling capabilities of concentrated ownership. This research will explore different measures of firm performance and ownership concentration and the relationships that previous theoretical and empirical research has found

2.2 What is Firm Performance?

"There is no single ideal measure of long-term firm performance." (Bhagat & Black, 2002). Measures of firm performance are commonly grouped into market and accounting-based measures. The relationship between the two kinds of measures is unclear as some studies find a positive relationship (McGuire & Matta, 2003) while others find a negative one (Nelson, 2003) and yet again other ones find none (Hillman,

2005). According to Rowe & Morrow (2009) researchers can make use of both market and accounting based measures resulting in a more reliable measure of firm performance.

In this research both accounting and market based measures will be employed to increase measurement reliability. Following Mavruk et al. (2019) and Chen, Cheung, Stouraitis, Wong (2005) two of the most commonly used performance measures of firm performance will be used which are market to book ratio representing the market based measures and return on assets (ROA) from the accounting based measures.

Some problems regarding these measures outlined by Demsetz & Villalonga (2001) are that market to book value is affected by investor sentiment and that the book value fails to include intangible assets. Differences between firms regarding the use of intangible assets is common and the future cash flows of these intangible assets are included in the market's valuation of a company. Some issues regarding accounting measures, particularly in countries with weaker legal frameworks, are that they are subject to the information provided by the owner and processing of the accountant. Demsetz & Villalonga (2001) argue, like Rowe & Morrow (2009), that there are merits to including both market and accounting-based measures of firm performance. This research will follow Chen et al. (2005) in using both accounting and market-based measures of firm performance in the form of ROA and market to book ratio, respectively in order to assess a potential relationship between ownership concentration and firm performance in Chinese companies traded on the SZSE. As companies strive to increase their performance, they may focus on a wide range of factors impacting this. One way for firms to increase their performance is by getting rid of agency costs as outlined by Jensen & Meckling (1976). Ownership concentration is one tool commonly used to achieve this.

2.3 What is Ownership Concentration?

A company's degree of ownership concentration is determined by the distribution characteristics of its shares. The number of shareholders as well as the number of shares held by the largest shareholders determines the characteristics of ownership distribution of a firm. Many different measures of ownership concentration have been used in economic research. Mavruk, Overland, & Sjoegren (2019) give an overview of measures of ownership concentration and their merits and deficiencies. One commonly used method of assessing ownership concentration is by setting thresholds of concentration. Mavruk, Overland, & Sjoegren (2019) highlight that while it is a useful method to gain a rough overview of concentration it has significant shortcomings. As the thresholds are up to the discretion of the researcher, they are often arbitrary or based on the reporting regulations of the investigated markets (Mavruk, Overland, & Sjoegren, 2019). A better method of measuring ownership concentration according to Mavruk, Overland, & Sjoegren (2019) is the percentage of shares owned by the largest shareholder as an increase in ownership held by the largest shareholder is reflected in an increase in ownership concentration providing a more accurate representation of concentration of ownership when compared to the threshold approach (Mavruk, Overland, & Sjoegren, 2019). A problem with the analysis of only the largest shareholder is that it does not include any shareholders besides the largest one and fails to capture the company differences based on the next largest shareholders.

One measure that does differentiate based on the largest shareholders is the sum of five largest owners (Mavruk, Overland, & Sjoegren 2019). By including the five largest shareholders a more representative assessment of ownership concentration is given. The differences between comparing the five largest shareholders and ten largest shareholders tends to be small as the difference in size of the first and last five is substantial. In this research robustness analysis was done which showed the same results for top five and top ten ownership.

Another measurement alternative is the use of the Herfindahl index which is created by adding the squares of all shareholders voting rights (Herfindahl, 1950). This index is commonly computed for the reported shareholders only but gives certain advantages over other measures of ownership concentration. The Herfindahl index is sensitive to both the number of shares owned by the reported shareholders and the distribution among these. As the total percentage of shares held by the reported shareholders increases so does the Herfindahl index. Furthermore, as the values are squared a distribution pattern favoring a smaller number of larger shareholders further increases the Herfindahl index. According to research done by Mavruk, Overland, & Sjoegren (2019) the Herfindahl index is a measure suitable for investigating the effect of ownership concentration on firm performance in the light of decreasing agency costs through alignment of interests between shareholders and management. This research will investigate a potential relationship between ownership concentration and firm performance using the Herfindahl index computed for the five largest shareholders as it gives an accurate representation of the ownership concentration of a company when compared to other measures of ownership concentration. Furthermore, ownership concentration will also be measured as the shares owned by the five largest shareholders. By using both measures, differences may show whether the distribution of shares among the five largest shareholders is of importance.

2.4 What is the Relationship Between Ownership Concentration and Firm Performance?

In their theory of the firm Jensen & Meckling (1976) described the agency problem which highlights a conflict of interest between different parties. The theory is focused on the differences in objectives of shareholders and managers leading to conflicts between them. Since then, much literature has been written on the ways in which shareholders can overcome this problem. The field of corporate governance is focused on the ways in which shareholders can make sure that actions are taken representing their interests (Shleifer & Vishny, 1997). Stoughton

& Zechner (1998) argue that different shareholders have varying monitoring capabilities depending on their size. They argue that large shareholders are preferable for IPOs as the benefits from monitoring are larger for them. Stoughton & Zechner (1998) also argue that the preference for large shareholders is dependent on the benefit to cost ratios for the monitoring activities. Following this, they argue that underpricing should be larger for high benefit to cost monitoring ratios to attract more large shareholders with monitoring capabilities. For the analysis of Chinese IPOs this means that higher levels of ownership concentration should lead to more monitoring activities and better performance in the long run.

RQ: What is the effect of ownership concentration on the long-run firm performance of IPOs in China?

Empirical studies throughout the world have found different results when investigating a potential relationship between ownership concentration and firm performance. In a prominent paper by Demsetz and Lehn (1985) no significant relationship between the ownership concentration and return on equity of companies was found. Since then much research has been carried out investigating these variables in different settings. In their research Morck, Nakamura & Shivdasani (2000) found a positive relationship between managerial ownership and company value for companies in Japan. Further research in Japan was carried out by Hiraki, Inoue, Kuroki & Masuda (2003) who found similar results to Morck et al (2000) for Japanese manufacturing companies. Chen, Guo & Mande (2003) in their research of large Japanese companies found that as ownership concentration increased the alignment of interests between management and shareholders increased as well.

Other research by La Porta, Lopez-de Silanes, Shleifer & Vishny (1998) in the field has proposed a negative effect of ownership concentration on firm performance as in countries with weaker investor protection controlling shareholders may expropriate value from minority shareholders. This might mean that potential benefits of avoiding agency costs between shareholders and management are partially offset by an increase in inter shareholder agency costs. The political cost hypothesis developed by Watts & Zimmerman (1978) argues that expropriation of value may be less likely in larger firms as they have more attention given to them by politicians and implicit societal contracts. This means that for larger companies the potential mitigating factor may play a lesser role but that similarly monitoring capabilities of shareholders are less important as more monitoring is provided by exogenous factors.

Based on the empirical research done in Japan and the strong theoretical arguments for a positive relationship between ownership concentration and firm performance through a reduction in agency costs this is also expected to hold true for Chinese IPOs. Elements of value expropriation are likely to mitigate this positive relationship as China does not have the strongest minority shareholder protection but overall a positive relationship is still expected. Furthermore, it is expected that overall firm performance will decrease in the years following the IPO as previous research by Jain, & Kini (1994) shows this to be the case and the Chinese economy weakened during the studied period. After accounting for these effects however the relationship between ownership concentration and firm performance is expected to be positive.

H1a: Ownership concentration as measured by the Herfindahl index is positively related to market to book ratio during the three years following IPO.

H1b: Ownership concentration as measured by the largest five shareholders is positively related to market to book ratio during the three years following IPO.

H2a: Ownership concentration as measured by the Herfindahl index is positively related to return on assets during the three years following an IPO.

H2b: Ownership concentration as measured by the largest five shareholders is positively related to return on assets during the three years following an IPO.

3. METHODOLOGY

The initial sample of this research consists of all 126 companies that had their IPO on the Shenzhen stock exchange during 2010 and follows them throughout the years from 2010 until 2013. As all required data was available for any of the companies the final sample consists of 126 companies. All data was obtained from the RESSET financial databases which are created by the joined effort of the Tsinghua university and Peking university to provide academic institutions and investors with quality data for model testing and investment research. The 126 companies belong to a wide range of industries covering areas such as IT, petrochemicals, and machinery.

To answer if ownership concentration is related to long term firm performance of Chinese IPOs it is necessary to select the appropriate measures of ownership concentration and firm performance. Furthermore, to accurately identify a potential relationship, it is necessary to account for variables that influence firm performance. In total six multiple linear regression analyses were carried out to evaluate the effect of two ownership concentration measures on two firm performance measures while controlling for confounding factors. By using a multiple regression analysis, the strength, direction, and significance of the included variables effect on firm performance can be evaluated. In first calculating a reference model including firm performance and control variables and then adding the ownership concentration variable the added value to the strength of the model can be examined.

Ownership concentration is assessed utilizing the Herfindahl index calculated as the sum of the squares of the five largest reported shareholders. To possess monitoring capabilities and incentives a significant investment is needed leading to the shareholdings of the five largest shareholders being the most crucial for alignment of interests between shareholders and management. This measure will incorporate the total percentage

of shares held by the five largest shareholders as well as give more weight to a distribution favoring a smaller number of larger shareholders. A lower value for the Herfindahl index indicates that either the total amount of ownership by the five largest shareholders is lower or that the shares are distributed more equally among them which for both cases means there is a decrease in the incentive and capabilities of a shareholder to be monitoring and controlling management in order to increase firm performance.

In addition to the Herfindahl Index also a simple measure of the cumulative shareholdings of the five largest shareholders will be analyzed. The Herfindahl index and sum of five largest shareholders are calculated based on the same members and are likely to show a similar assessment of ownership concentration. One crucial difference between the two measures is that the Herfindahl index places importance on the distribution of ownership among the five largest shareholders while the sum of five largest shareholders does not.

Firm performance is measured using two separate variables. These variables are market to book ratio from the market-based measures and return on assets (ROA) from the accounting-based measures. The market to book ratio is used to compare a stock's price to its book value and will be calculated as a company's market capitalization divided by their book value. A company's book value is the net asset value which is calculated by subtracting the total amount of liabilities from the total amount of assets owned by a company. A benefit of a market-based measure of firm performance such as market to book value, is that it is based on the markets assessment of a given stock. This means that the measure includes all future cash flows expected by investors. One limitation of this measure is that it is affected by investor sentiment and may react too harshly to news, therefore may not be entirely based on objective facts but include elements of subjectivity. One further issue is that it incorporates cashflows based on intangible assets that are difficult to assess in terms of book value and are often not included. Intangible assets in this case are from things such as company culture or leadership skills which are not included in a company's book value. As companies are heterogenic in their reliance on intangible assets it may induce a bias benefiting companies heavily relying on intangible assets. The benefits of including the assessment of the firm's future make it a crucial assessment metric to determine the long-term firm performance of a company.

The ROA for a given company measures how efficiently a company can employ its assets to produce profits during a period. ROA will be calculated as the net profits divided by total assets. A company's net profits are declared on their profit and loss statement and are calculated by subtracting all operating expenses, interest payments, depreciation, and taxes from the total revenue during a given period.

A benefit of using ROA is that it is based on collected and reported data and is created according the accounting standards and regulations. While this measure is not reliant on investor sentiment it does give the reporting party some amount of discretion on how to represent their finances and may be subject to unethical behavior. Including ROA and market to book ratio gives a more insightful assessment of firm performance as one of the measures is based on the reported numbers of the past while the other is focused towards the future of the company.

To evaluate the effect of the ownership concentration measures on firm performance it is crucial to control for confounding variables. There is a wide range of variables that effect the firm performance of a company making it impossible to account for all. This research includes year, total assets, the ratio of independent board directors to overall number of directors and industry specification as control variables.

The year was included as firm performance is often tied to the performance of the economy. To account for the slowing of growth of the Chinese economy and overall weak performance of the SZSE during the years from 2010 until 2013 it is necessary to include the dimension of time in the analysis. A dummy variable was created for the different years to be able to include the nominal variable in a multiple linear regression. During the dummy variable creation 2010 was selected as the reference year as this was the year of the IPO.

Another variable that largely impacts firm performance measures is the size of the companies. To assess the size, the natural logarithm of total assets was used as it is focused on the total resources of a firm (Dang, Li, & Yang, 2018). The political cost hypothesis developed by Watts & Zimmerman (1978) argues that larger firms receive more monitoring by exogenous factors which could mean a decreased benefit of ownership concentration.

After accounting for differences between years and company sizes another important factor in determining firm performance is the industry that companies belong to (Schmalensee, 1985). To incorporate industry, the companies were grouped into seven industries according to the specification of the SZSE. This variable was then recoded into 6 dummy variables and the machinery industry was selected as the reference group as it consisted of the largest number of firms.

This research further controls for the share of independent directors on the board of directors as previous research by Lefort & Urzúa, (2008) on Chilean companies showed a connection between ownership concentration and board composition. In their research Lefort & Urzúa, (2008) found that as ownership concentration increases the share of independent directors decreases up until a threshold of approximately 50 percent after which the relationship flips and the share of independent directors increases again. Furthermore, by using simultaneous equation estimation, they found that the share of outside directors is positively related to a firms Tobin's Q.

To identify the strength of the effect the two ownership concentration measures have on firm performance a multiple linear regression analysis (MLR) was performed. MLR is a widely used approach in assessing the strength of effects of a set of independent variables have on a dependent variable.

Furthermore, MLR can indicate the predictive capabilities of the independent variables in determining the dependent variable. Lefort & Urzúa, (2008) employed MLR to identify the relationship between board independence, firm performance, and ownership concentration. Similarly, MLR was used in this study on Chinese IPOs as the focus is on determining the effect ownership concentration has on firm performance measures and whether they can be useful for practitioners in their assessment of companies.

As MLR is very sensitive to outliers it was necessary to first define and then treat outliers. This research identified outliers based on the calculated interquartile ranges. Any outlier that was outside of the 25^{th} and 75^{th} percentile by three interquartile ranges was identified as an extreme outlier and treated to weaken their effect on the regression analysis. Rather than excluding the data points from the study, winsorizing (Dixon, 1960) was used by setting the outliers value to the next closest data point not classified as an outlier. The stricter rule of determining outliers as 1.5 interquartile ranges outside of the 25^{th} and 75^{th} percentile was not used in this study as the manipulation of more data points would have led to a less interpretable outcome and misrepresentation of the studied companies. Over the whole set of 504 cases only market to book value ratio and return on assets had extreme outliers leading to a total of eleven data points being winsorized. Time lagging was not utilized in the creation of the multiple linear regression model as within variable variation for the company's independent variables was low. The variables board independence, total assets, industry specification and ownership concentration all did not vary much for individual companies over the course of the studied years. This means the potential added value of lagging variables would likely not be realized in this study.

The empirical multiple linear regression model used in this study was:

$$PERF_t = \alpha + \beta_1*YEAR_t + \beta_2*IND_t + \beta_3*INDEP_t + \beta_4*ASSET_t + \varepsilon$$

PERF measure of firm performance

YEAR dummy variables for the years

IND dummy variables denoting industry specification

INDEP percentage of independent directors on the board

ASSET natural logarithm of total assets

To this model the ownership concentration variable is then introduced to evaluate their predictive capabilities in determining firm performance. Furthermore, by having first constructed a base model, a potential positive impact of the inclusion of an ownership concentration measure on the model's strength can be evaluated.

$$PERF_t = \alpha + \beta_1*CONC_t + \beta_2*YEAR_t + \beta_3*IND_t + \beta_4*INDEP_t + \beta_5*ASSET_t + \varepsilon$$

CONC measure of ownership concentration.

In total six multiple linear regressions were analyzed. Three regressions models for each measure of firm performance, which included a base model and then two models each introducing one of the two ownership concentration measures.

4. DATA

4.1 Sample Characteristics

The sample consisted of 126 companies that had their IPO on the Shenzhen stock exchange (SZSE) during 2010. Statistical analysis was done on the yearly data of these 126 companies throughout 2010 until 2013 leading to a total sample size of 504 cases. No companies had to be excluded from the sample as data points were available for all the cases and variables. Table 1 shows the samples characteristics and distributional information.

Table 1 Sample characteristics

Variable	Mean	Std. Dev.	Min	Max
ROA	6.36	4.43	-9,78	22.64
Market/book	3.20	1.65	0.80	9.34
Herfindahl 5	0.20	0.12	0.01	0.67
Largest 5	0.62	0.14	0.23	0.89
Log of total assets	21.12	0.59	20.10	22.81
Board independence	0.36	0.04	0.33	0.50

No of observations was 504 for each of the variables.

ROA is shown in the form of percentages, meaning the mean is a ROA of 6.36 percent. Market to book ratio is measured as a ratio showing that the mean market valuation is 3.2 times higher than the respective book value. The sum of largest five owners as well as board independence are showing computed percentages. This means the mean cumulative ownership of the five largest shareholders seen as 0.62 in table 1 is representative of a 62 percent ownership.

Based on the sample characteristics it was found that overall board independence measured as the share of independent directors on a company's board was relatively constant over the set of 126 companies only ranging from 33 percent up to 50 percent. The distributions of the other five variables showed a larger variance for the set of Chinese companies. Based on the specifications of the SZSE the companies were assigned into seven industry groupings as shown in Table 2. The sample shows the prevalence of investment intensive businesses such as machinery and petrochemicals and a weaker representation of the service industry such as IT or finance-oriented firms. This bias is likely due to the Chinese economies focus on manufacturing and providing cheaper production opportunities than competing countries.

Table 2 Industry distribution

Industry	Frequency	Percent
Wholesale & Retail	18	14.3
IT	17	13.5
Pharmaceuticals	11	8.7
Metals & non-metals	18	14.3
Machinery	28	22.2
Petrochemicals	21	16.7
Electronics	13	10.3
Total	126	100

To evaluate the relationship between ownership concentration and firm performance multiple linear regression analysis was utilized. Several checks were performed to ensure the assumptions of the multiple linear regression model were met. After winsorizing of outliers, the stem-and-leaf plots and boxplots indicated that the variables included were normally distributed and did not include univariate outliers. The inspection of the normal probability plots of standardized residuals and the scatterplot of standardized residuals against standardized predicted values indicated that the assumption of normality, linearity, and homoscedasticity of residuals were met. Lastly, the correlation matrix reported in table 3 showed that multicollinearity was not an issue. A high correlation was found between the two measures of ownership concentration. Furthermore, a moderately high correlation between the firm performance measures was found. As in each model always only one measure of ownership concentration and firm performance were included multicollinearity did not present an issue to any of the regression models. After treatment of outliers in market to book ratio and ROA none of the assumptions of the multiple linear regression model were found to be violated.

Table 4 reports the results of multiple linear regression analysis of market to book ratio, ROA and two measures of ownership concentration as well as the control variables year, industry, total assets, and board independence. The group of regression analyses on the firm's market to book ratio and ownership concentration measures show that neither of the concentration measures improved the model's strength. The model without inclusion of ownership concentration measures had an R^2 of 0.302, and was significant (p = 0.00), showing that approximately thirty percent of the variation of market to book ratio could be explained by the combination of control variables. Furthermore, in the regressions of market-based measures of firm performance and ownership concentration the dummy variables for year each had a negative correlation which were all statistically significant (p = 0.00). This indicates that each of the years 2011, 2012 and 2013 showed weaker firm performance when compared to the reference year of 2010. From the unstandardized coefficients we can see that from 2012 at B = -2.096 to 2013 with B = -1.515 there was an improvement in firm performance measured as market to book ratio, although it did not reach the level of the reference year 2010.

Industry belonging also was shown to affect a company's market to book ratio. The found correlations for IT B = 1.132 (p = 0.00), Pharmaceuticals B = 0.710 (p = 0.00), Metals B = 0.871 (p = 0.00), and the electronics industry B = 0.828 (p = 0.00) were all significant and showed a strong performance when compared to the reference group machinery. Four out of the seven industries showed statistically significant differences when compared to the reference group machinery. These findings are in line with the previous findings by Schmalensee, R. (1985) that markets differ significantly and should be considered when assessing firm performance.

Table 3 Correlation matrix

Variable	1	2	3	4	5	6
1. Largest 5	1					
2. Herfindahl	0.793 (0.00)	1				
3. Market to Book	0.085 (0.06)	0.015 (0.73)	1			
4. ROA	0.040 (0.34)	-0.050 (.26)	0.522 (0.00)	1		
5. Board Independence	0.290 (0.00)	0.238 (0.00)	0.012 (0.80)	-0.076 (0.09)	1	
6. Total Assets	0.261 (0.00)	0.159 (0.00)	0.079 (0.08)	0.237 (0.00)	0.129 (0.00)	1

Table 4 Multiple linear regression coefficient matrix

	Market-to-book ratio			*ROA*		
Variable	*Control Model*	*Herfindahl*	*Largest 5*	*Control Model*	*Herfindahl*	*Largest 5*
Intercept	-0.243 (0.91)	-0.183 (0.96)	-0.046 (0.98)	-26.19 (0.00) **	-27.84 (0.00) **	-27.53 (0.00) **
Board Independence	0.797 (0.57)	0.723 (0.62)	0.542 (0.71)	-11.157 (0.01) **	-9.158 (0.03) *	-9.427 (0.03) **
Log of Total Assets	0.191 (0.08)	0.188 (0.08)	0.176 (0.11)	1.819 (0.00) **	1.899 (0.00) **	1.920 (0.00) **
Year						
2011	-1.883 (0.00) **	-1.882 (0.00) **	-1.877 (0.00) **	-2.095 (0.00) **	-2.107 (0.00) **	-2.134 (0.00) **
2012	-2.096 (0.00) **	-2.095 (0.00) **	-2.084 (0.00) **	-3.245 (0.00) **	-3.278 (0.00) **	-3.328 (0.00) **
2013	-1.515 (0.00) **	-1.512(0.00) **	-1.492 (0.00) **	-3.506 (0.00) **	-3.591 (0.00) **	-3.662 (0.00) **
Industry						
Wholesale	0.327 (0.12)	0.330 (0.12)	0.322 (0.13)	0.461 (0.46)	0.366 (0.56)	0.492 (0.43)
IT	1.132 (0.00) **	1.140 (0.00) **	1.145 (0.00) **	0.542 (0.39)	0.310 (0.63)	0.454 (0.471)
Pharmaceuticals	0.710 (0.00) **	0.713 (0.00) **	0.705 (0.01) **	0.858 (0.24)	0.791 (0.28)	0.896 (0.22)
Metals	0.871 (0.00) **	0.873 (0.00) **	0.879 (0.00) **	-0.098 (0.87)	-0.158 (0.80)	-0.154 (0.80)
Petrochemicals	0.117 (0.56)	0.122 (0.53)	0.128 (0.52)	0.498 (0.40)	0.343 (0.56)	0.422 (0.48)
Electronics	0.828 (0.00) **	0.849 (0.00) **	0.842 (0.00) **	1.289 (0.06)	1.254 (0.07)	1.333 (0.05) *
Herfindahl		0.120 (0.82)			-3.268 (0.04) *	
Largest Owners			0.317 (0.53)			-2.155 (0.15)
Adj. R^2	.302 (0.00) **	0.301 (0.00) **	0.301 (0.00) **	0.156 (0.00) **	0.162 (0.00) **	0.158 (0.00) **
No. of Observations	504	504	504	504	504	504

The table reports the unstandardized coefficients and p-values for the results of multiple linear regression analyses of firm performance variables on ownership concentration while accounting for the variables board independence, total assets, year, and industry. Market to book ratio is a firm's market value at the end of the year divided by its total book value of equity. ROA is net profit divided by total assets. Board independence is the percentage of independent directors on the board. The total assets are calculated as the natural logarithm of a firm's total assets. Herfindahl is the Herfindahl index calculated as the sum of squares of the percentage of ownership of the five largest shareholders. Largest 5 are the total percentage of shares held by the largest owners. * and ** show the significance of the p-values at the 5 and 1 percent level, respectively.

Based on the insignificance of both the Herfindahl index B = 0.120 (p = 0.82) and the sum of largest five owners B = 0.317 (p = 0.53) in their respective models pertaining to market to book ratio for both hypothesis 1a and hypothesis 1b the null hypothesis could not be rejected. Neither of the variables added strength to the model as can be seen by the R^2 values of 0.301 compared to the control models R^2 of 0.302. In this data set of 126 Chinese companies no significant relationship between the ownership concentration and the market based firm performance measure was found and the inclusion of ownership concentration did not add strength to the regression model.

In Table 4 also the regression models belonging to the accounting-based measure of firm performance ROA can be found. The control model, which did not include either of the ownership concentration measures, showed an R^2 of 0.156 which was significant (p = 0.00). This value is overall considerably lower than the strength of the control model for market to book ratio.

When including ownership concentration measured as the Herfindahl index the strength of the model could be increased to a R^2 of 0.162 which was significant (p = 0.00). The unstandardized correlation coefficient found between the Herfindahl index and ROA was B = -3.268, which was significant (p = 0.04) leading to a rejection of the null hypothesis for hypothesis 2a. This indicates that as ownership concentration measured as the Herfindahl index increased the ROA of the firms in this sample decreased. For hypothesis 2a this means that an opposite relationship to the expected one was found. The found negative relationship could have originated due to expropriation of value of minority shareholders by the controlling parties or self-dealings as the legal protection in China is quite weak. This would be in line with previous findings of research done by La Porta, Lopez-de Silanes, Shleifer & Vishny (1998) which proposed a negative effect of ownership concentration on firm performance in countries with weaker investor protection due to expropriation of value by controlling shareholders. The relationship found between ownership concentration measured as the cumulative shareholdings of the five largest shareholders and ROA was also negative at B = -2.155 but not statistically significant (p = 0.15). This means the null hypothesis for hypothesis 2b could not be rejected.

For the linear regression model focusing on ROA a negative relationship was found with board independence in all three cases. This may be due to a weak ROA incentivizing the ownership of a company to pressure the board into accepting more independent directors. It is unclear whether a more independent board causes a weak ROA or the other way around. Furthermore, for the ROA regressions a negative impact of the dummy variable year was found. In this case differently from the regression models focused on market to book ratio the ROA continued to decrease between each following year so that in 2013 an unstandardized beta of B = -3.506 (p = 0.00) was found. All the negative coefficients for the dummy variable year were statistically significant at the 1 percent level. Finally, a positive and statistically significant impact of total assets on ROA with a coefficient of B = 1.819 (p = 0.00) was identified. Regarding the industry specification only one statistically significant difference was found in the regression model including ROA and the sum of five largest owners in the industry electronics with B = 1.333 (p = 0.05) when compared to the reference group machinery indicating that industry has less impact on accounting-based measures of firm performance.

Overall, the multiple regression analyses found only one statistically significant relationship between ownership concentration and firm performance, which was negative. To check for robustness of the findings, regression analyses were run for each individual year from 2010 to 2013. Only one statistically significant relationship between ownership concentration and firm performance was found (see appendix A for the outcome). This relationship was found based on the data from the year 2012 in the model between ROA and the Herfindahl index. As in this model the overall adjusted R^2 = 0.013 with a p-value of 0.31 the predictive capabilities of the ownership concentration measure are questionable. The individual yearly regression analyses reinforce the findings of a lack of relationship between ownership concentration and firm performance measures.

The consistent negative effects of the dummy variable for year in all six regression models seen in table 3 is in line with the findings of previous research by Jain, & Kini (1994) which showed that during the years following an IPO firm performance according to a range of measures decreases. This was found to be the case due to a range of factors including an introduction of agency costs as management and ownership were split and typically before an IPO the performance of a company is overstated. Based on the found relationship between year and performance the assumption that firm performance in the years following an IPO is weak, was reinforced. As during the time period between December 2010 and December 2013 the SZSE component index fell by approximately 35.5% and China's GDP growth declined from 10.6% to 7.8%, it is clear that the weak performance of the IPOs was partially caused by external factors. It is unclear to what extend the overall weak performance of the studied companies was caused by an overall slowing down economy or the commonly seen weak performance following an IPO.

Both ownership concentration measures showed very similar relationships with a given firm performance measure showing that the measures of ownership concentration seem to produce similar results. The measures of firm performance, however, did not produce similar results for their relationship with ownership concentration and the control variables except year underlining the difference in focus of accounting and market-based measures. The market to book value ratio is a forward-looking measure including investor sentiment and is more strongly affected by the firm's industry while ROA focuses on the previously realized efficiencies.

An IPOs negative effect on ROA may depend on the way that the company chooses to utilize the inflow of money. While some companies use an IPO to repay liabilities others may invest into research and development or expanding the business. Depending

on the way the company utilized the money it may immediately be used to settle debt, quickly return a profit on short term investments, or take time to fully develop. It could be the case that larger degrees of ownership concentration places pressure on management to grow the company so that the money generated through the IPO is used to increase assets rather than paying debts leading to total assets increasing directly while the net income takes time to catch up. The measure of market to book ratio does not have this problem as while the book value of the company is directly affected the markets valuation simultaneously incorporates the increased funds.

5. CONCLUSION

The focus of this study was to investigate a potential relationship between ownership concentration and long run firm performance in the setting of Chinese IPOs. Based on previous research by Shleifer & Vishny (1997) and David, Hitt, & Tan (2003) it was assumed that by increasing ownership concentration agency costs outlined by Jensen & Meckling (1976) could be reduced positively affecting firm performance. Empirical research in the field produced conflicting results. Demsetz and Lehn (1985) found no significant relationship while later research in Japan by Chen, Guo & Mande (2003) identified a positive relationship. Overall a positive relationship between the ownership concentration measures and accounting as well as market-based performance measures was assumed.

Based on the statistical analysis of this study only one statistically significant but negative relationship between ownership concentration and firm performance was found. Overall, no clear relationship between ownership concentration measures and firm performance could be identified based on the sample of Chinese IPOs. This means that out of the four investigated relationships only one significant relationship was found which led to a rejection of the null hypothesis for hypothesis 2a. The found relationship however was contradictory to the assumed relationship based on prior research. The null hypothesis for hypotheses 1a, 1b and 2b could not be rejected.

This study had some limitations which may have affected these findings. One previously mentioned limitation was that the negative statistically significant relationship between board independence and ROA may represent the effect that a weak ROA has on board structure. Owners of a company may take a weak ROA as a reason to push for more board independence and try to increase performance. As this study was not able to investigate the change in board structure according to ROA of companies over a much longer period it is impossible to say which variable affects the other. Another limitation of this research was that within company variances of the variables was low. This means that ownership concentration, total assets, industry specification and board independence stayed mostly constant over the course of the studied time frame, making it harder to analyze if differences are due to the studied variables or other differences between companies. Lastly the use of total assets in assessing the size of a company may be pragmatically useful but in theory incorporating the intangible assets not reflected on the balance sheet would lead to a more accurate representation of firm resources.

To gain a more accurate understanding on the effects of ownership concentration on firm performance post IPO, especially when focusing on accounting based measures, it may be interesting for future research to include the way in which the money generated through the IPO is utilized. Including the change of total assets that occurred due to the IPO could give an indication if weak performance in the period after the IPO is due to the return on investment taking longer.

Furthermore, it might be beneficial for future research in the field to focus on ownership identity as different investors have heterogenic interests. The effect of high ownership concentration caused by retained managerial ownership are likely to differ compared to institutional or market-based investments. By controlling for the identity of the owner, a clearer understanding of the effect of concentration of ownership could be seen as the differences between type of ownership would be accounted for. Jain & Kini (1994) found that the amount of retained ownership by a company's management following an IPO positively affects firm performance as agency costs are avoided compared to companies where management retains less ownership. The amount of retained managerial ownership was also previously found to positively affect firm performance in studies in Japan by Morck, Nakamura & Shivdasani (2000) and Hiraki, Inoue, Kuroki & Masuda (2003).

For practitioners in the field of investment analysis, especially for those with an interest in long term investments in IPOs in countries with weak minority shareholder protection, this study found that they cannot rely on ownership concentration to identify long-term firm performance. Furthermore this research found that when assessing IPOs to invest in, it is important for practitioners to consider both market and accounting based firm performance measures to gain a more holistic view of a firm as they are different in focus.

In this study the dummy variable for year showed a negative correlation with both firm performance measures indicating a weak performance in the years following the IPO. This could have been due to the often-observed weak long-term performance of IPOs (Jain, & Kini, 1994) or an overall weakening Chinese economy. Based on the data found by this study and previous work by Jain, & Kini (1994) it may be unwise for practitioners to invest in companies that recently had their IPO when looking for firm performance increases in the following three years. Furthermore, for practitioners the finding of the importance of industry specification being larger for market-based measures than accounting based ones may be interesting to considers as it can help them avoid industry bias and enable them to better evaluate individual companies.

REFERENCES

Banzhaf, J. F. I. (1964). Weighted voting doesn't work: A mathematical analysis. Rutgers Law Review, 19, 317–343.

Bhagat, S., & Black, B. (2002). The non-correlation between board independence and long-term firm performance. Journal of Corporation Law, 27, 231–273.

Bolton, P., & Von Thadden, E.-L. (1998). Blocks, liquidity, and corporate control. The Journal of Finance, 53(1), 1–25.

Carney, M., & Gedajlovic, E. (2002). The coupling of ownership and control and the allocation of financial resources: evidence from Hong Kong. Journal of Management Studies, 39(1), 123–146.

Carpenter, J. N., & Whitelaw, R. F. (2017). The development of China's stock market and stakes for the global economy. Annual Review of Financial Economics, 9(1), 233–257.

Chen, Z., Cheung, Y. L., Stouraitis, A., & Wong, A. W. (2005). Ownership concentration, firm performance, and dividend policy in Hong Kong. Pacific Basin Finance Journal, 13(4), 431–449.

Chen, C. R., Guo, W., & Mande, V. (2003). Managerial ownership and firm valuation: Evidence from Japanese firms. Pacific Basin Finance Journal, 11(3), 267–283.

Chen, G. M., Lee, B.-S., & Rui, O. (2001). Foreign ownership restrictions and market segmentation in Chinas stock. Journal of Financial Research, 24(1), 133–155.

Cheng, H., Jia, R., Li, D., & Li, H. (2019). The rise of robots in China. Journal of Economic Perspectives, 33(2), 71–88.

Claessens, S., Djankov, S., & Lang, L. H. (2000). The separation of ownership and control in East Asian corporations. Journal of Financial Economics, 58(1-2), 81–112.

Claessens, S., & Fan, J. P. H. (2002). Corporate governance in Asia: a survey. International Review of Finance, 3(2), 71–103.

Coase R and Wang N. (2012). How China became capitalist. New York: Palgrave Macmillan.

Coffee, J. C. (1991). Liquidity versus control: The institutional investor as corporate monitor. Columbia Law Review, 91(6), 1277–1368.

David, P., Hitt, M. A., & Tan, W. L. (2003). The benefits and costs of large block ownership before and during the East Asian crisis. 63rd Annual Meeting of the Academy of Management, Seattle, USA.

Dang, C., (Frank) Li, Z., & Yang, C. (2018). Measuring firm size in empirical corporate finance. Journal of Banking and Finance, 86, 159–176.

Demsetz, H., & Lehn, K. (1985). The structure of corporate ownership: causes and consequences. Journal of Political Economy, 93, 1155-1177.

Demsetz, H., & Villalonga, B. (2001). Ownership structure and corporate performance. Journal of Corporate Finance, 7(3), 209–233.

Denis, D. K., & McConnell, J. J. (2003). International corporate governance. The Journal of Financial and Quantitative Analysis, 38(1), 1–36.

Edwards, J. S., Eggert, W., & Weichenrieder, A. J. (2009). Corporate governance and pay for performance: Evidence from Germany. Economics of Governance, 10(1), 1–26.

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. Journal of Law and Economics, 26(2), 301–325.

Florackis, C. (2008). Agency costs and corporate governance mechanisms: Evidence for UK firms. International Journal of Managerial Finance, 4(1), 37–59.

Gaur, S. S., Bathula, H., & Singh, D. (2015). Ownership concentration, board characteristics and firm performance: A contingency framework. Management Decision, 53(5), 911–931.

Geretto, E., & Pauluzzo, R. (2012). Stock exchange markets in China: Structure and main problems. Transition Studies Review, 19(1), 89–106.

Gillan, S. L. (2006). Recent developments in corporate governance: An overview. Journal of Corporate Finance, 12(3), 381–402.

Guest, P. M. (2009). The impact of board size on firm performance: Evidence from the UK. European Journal of Finance, 15(4), 385–404.

Herfindahl, O. C. (1950). Concentration in the steel industry [Doctoral dissertation]. New York.

Hillman, A. J. (2005). Politicians on the board of directors: Do connections affect the bottom line? Journal of Management, 31(3), 464–481.

Hiraki, T., Inoue, H., Ito, A., Kuroki, F., & Masuda, H. (2003). Corporate governance and firm value in Japan: Evidence from 1985 to 1998. Pacific-Basin Finance Journal, 11(3), 239–265.

Jain, B. A., & Kini, O. (1994). The post-issue operating performance of IPO firms. The Journal of Finance, 49(5), 1699–1726.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305–360.

La Porta,R., Lopez-De-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. The Journal of Finance, 54(2), 471517.

La Porta, R, Lopez-de Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. Journal of Political Economy, 106(6), 1113–1155

Lefort, F., & Urzúa, F. (2008). Board independence, firm performance and ownership concentration: Evidence from Chile. Journal of Business Research, 61(6), 615–622.

Mavruk, T., Overland, C., & Sjoegren, S. (2019). Keeping it real or keeping it simple? Ownership concentration measures compared. European Financial Management, 1–48.

McGuire, J., & Matta, E. (2003). CEO stock options: The silent dimension of ownership. Academy of Management Journal, 46(2), 255–265.

Morck, R., Nakamura, M., & Shivdasani, A. (2000). Banks, ownership structure, and firm value in Japan. Journal of Business, 73(4), 539–567.

Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation. An empirical analysis. Journal of Financial Economics, 20(C), 293–315.

Nelson, T. (2003). The persistence of founder influence: management, ownership, and performance effects at initial public offering. Strategic Management Journal, 24(8), 707–724.

Qian, Y. (2000). The process of China's market transition (1978-1998): The evolutionary, historical, and comparative perspectives. Journal of Institutional and Theoretical Economics, 156, 151–171.

RESSET/DB. (2020). Retrieved 6 May 2020, from http://www.resset.cn/endb

Rowe, W. G., & Morrow, J. L. (2009). A note on the dimensionality of the firm financial performance construct using accounting, market, and subjective measures. Canadian Journal of Administrative Sciences, 16(1), 58–71.

Schmalensee, R. (1985). Do markets differ much? American Economic Review, 75(3), 341–351.

Shleifer, A., Djankov, S., LaPorta, R., & Lopez-de-Silanes, F. (2008). The law and economics of self-dealing. Journal of Financial Economics, 88(3), 430-465.

Shleifer, A., & Vishny, R. (1986). Large shareholders and corporate control. Journal of Political Economy, 94(3), 461–488.

Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. Journal of Finance, 52(2), 737–783.

Stoughton, N. M., & Zechner, J. (1998). IPO-mechanisms, monitoring and ownership structure. Journal of Financial Economics, 49(1), 45–77.

Walsh, J. P., & Seward, J. K. (1990). On the efficiency of internal and external corporate control mechanisms. The Academy of Management Review, 15(3), 421–458.

Wang, C. (2005). Ownership and operating performance of Chinese IPOs. Journal of Banking and Finance, 29(7), 1835–1856.

Watts, R. L., & Zimmerman, J. L. (1978). Towards a positive theory of the determination of accounting standards. Accounting Review, 53, 112–134.

W. J. Dixon (1960). Simplified Estimation from Censored Normal Samples, The Annals of Mathematical Statistics, 31, 385–391.

Appendix A – Regression Model including ROA and the Herfindahl Index for the Year 2012

Variable	ROA & Herfindahl
Intercept	-17.379 (0.21)
Board Independence	-7.519 (0.39)
Log of Total Assets	1.244 (0.06)
Industry	
Wholesale	0.950 (0.46)
IT	0.133 (0.92) **
Pharmaceuticals	0.953 (0.53) **
Metals	0.055 (0.97) **
Petrochemicals	0.488 (0.69)
Electronics	1.214 (0.39) **
Herfindahl	-6.488 (0.04)
Largest Owners	
Adj. R^2	0.013 (0.31)
No. of Observations	126