A Thesis Report
On
"Top Executive's Characteristics and Firm Performance: Evidence from Listed Manufacturing Companies of Bangladesh"

Submitted by:
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Semester: Spring 2025
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Submitted to:
Department of Business Administration
Faculty of Business Studies
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Submitted For the Partial Fulfillment of the Degree of Master of Business Administration



Sonargaon University (SU)
147/I, Green Road, Tejgaon, Dhaka-1215, Bangladesh.

Date of Submission: April 28, 2025

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Date of Submission: April 28, 2025

Letter of Transmittal

April 28, 2025

Md. Shahbub Alam
Lecturer
Department of Business Administration
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Subject: Submission of the thesis paper on **"Top Executive's Characteristics and Firm Performance: Evidence from Listed Manufacturing Companies of Bangladesh."**

Dear Sir,

This is a great opportunity to me to complete this thesis on "Top Executive's Characteristics and Firm Performance: Evidence from Listed Manufacturing Companies of Bangladesh" as per the mandatory requirement of MBA students. This study has helped me to understand the factors of top executive of manufacturing industries that magnify and affect the performance of manufacturing industries in Bangladesh. This study has developed my soft skill to develop a relationship between dependent and independent variables. I believe that this paper is standard enough to meet its purpose. I request you to take unintentional errors in forgiving manner.

I would like to thank my supervisor Md. Shahbub Alam sir for his great support and direction to complete this paper properly. I welcome your entire query & and take pride in answering them.

Yours Sincerely

…….

Farukul Islam
ID: MBA2402032010
Major: Finance
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Acknowledgement

I would like to express my sincere gratitude to my advisor and mentor Lecturer, Md. Shahbub Alam sir who undertook to act as of my supervisor despite his many other academic and professional commitments. His kind attention, critical reviews, wise advice and scholarly supervision has contributed most in enrichment and completion of this paper timely and in a befitting manner. I would like to thank my senior brothers and classmates who helped me with many information and instructions. At last, I expressed my gratefulness to my other family members and friends who have supported me all the way to my research work. I am truly indebted to the various institutions from where I collected various information related to the study.

I am also taking full responsibility and liability if any kind of loss/ copy right violations arises.

Signature

……..

Farukul Islam
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Certificate of Approval

This is to certify that this project paper on **" Top Executive's Characteristics and Firm Performance: Evidence from Listed Manufacturing Companies of Bangladesh** " submitted for the award of the degree of Master of Business Administration (MBA) from the Department of Business Administration, Sonargaon University (SU), is a record of research carried out by Farukul Islam, Student ID: MBA2402032010, a student of MBA Spring-2025, Department of Business Administration, under my supervision.

This study supports the topic title and fulfills the entire requirements. I supervised him in preparing the overall report to ensure its quality. Here by, I accept the study as the successful completion of the project program. During the program, he was sincere, proactive and attentive to his work.

I wish him every success in life.

Signature

……

Md. Shahbub Alam
Lecturer
Department of Business Administration
Sonargaon University (SU)

Declaration

I hereby declare that this project paper on **"Top Executive's Characteristics and Firm Performance: Evidence from Listed Manufacturing Companies of Bangladesh"** is my own original work under the supervision of Md. Shahbub Alam, Lecturer, Department of Business Administration, Sonargaon University (SU). The resources and information used in this study are authentic. All the sources used or quoted have been indicated and acknowledged by means of completion references and this report was not previously submitted by me for any other purposes.

Signature

…….

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Abstract

The objective of this thesis is to determine the effect of top executives (CEO/MD) characteristics on the firm performance from the listed manufacturing industries perspective of Bangladesh. ROA, ROE and Tobin's Q have been taken as proxy of company performance. On the other hand, characteristics of CEO (age, gender, educational qualification, industry experience, total working experience, current working year, major of study, professional qualifications etc.) of ten years data of 148 listed companies of 148 listed manufacturing industries have been taken as independent variables.

Summary statistics chart shows that average Return on Asset (ROA) is about 11.29%. This statistic also reveals that some of the companies performing better than the average ROA. The average Tobin's Q is 3.16 which is quite good. Average Return on Equity is about 10.03%. Average total service year as CEO in different industry is about 19.02 years that means most of the CEOs have a decent service experience. Again, on an average CEOs have been serving their companies for more than 11 years that means that most of the CEOs have been serving the for a long period and most important factor behind that is most of the companies appoint CEO from their family members and they stay in this post for a long period. It also shows that around 93% of the CEOs are male and native. On the contrary, the rest 7% are female and foreigner. The average age of the CEOs are 39 years. Around 24% of the CEO have ownership in their companies and around 52% of them have family.

In the Pairwise correlations matrix, there is no any value that is more than 0.80 so it can be concluded that there is no any severe multicollinearity problem in this dataset that maybe a matter of concern. The VIF test reveals that all VIF values are less than 10 and all the 1/VIF values are greater than 0.10, so it can be said that there is no any strong multicollinearity problem in this dataset. In our model, for three dependent variables (ROA, ROE, Tobin's Q), three Heteroskedasticity tests have been conducted. As the probability values of all three models are less than 0.05 except ROA, logically the null hypothesis is rejected and that represents that there is no heteroskedasticity problem in our data set.

The outcomes of valuation show that several characteristics of CEO and organization influence the performance of the firm in listed manufacturing industry. Here, ROA is influenced most by

the independent variables and highest number of variables have significant relationship with the ROA. In this study, there are fewer strong relationship between independent variables and Tobin's Q.

From the summary table, it can be derived that the actual signs of most of the variables are similar to the expected signs in the random effect model but there are also some signs that are different from the initial estimation. Some independent variables such as Prev. industry of working, CEO business education, CEO's major, Number of shares, Market Price of share, Net working capital, PE ratio strongly positively influence ROA.

Some of the variables enhance ROE significantly such as CEO total service, Prev. industry of working, CEO's major, CEO's professional degree, Market Price of share and here relationship is positive. Again, firm age, firm size, leverage influences ROE negatively. Several important characteristics of CEO and firms significantly influence Tobin's Q and these variables are CEO total service, CEO's professional degree, PE ratio. Again, some of the variables have significant negative relationship with Tobin's Q and these variables are leverage, cash balance and CEO age.

In this research it has been found that MD family, MD age, MD gender have significant positive impact on firm performance. On the contrary, Previous MD industry, MD professionals, MD nation, MD major, MD academic have significant negative impact on firm performance which is quite unexpected. In my opinion, there might be problem in data that's why I have found inverse relationship between variables. Besides CEO Characteristics, Net working capital and PE ratio, and Number of shares outstanding have significant positive relationship with firm's performance. From the perspective of Bangladesh Firm size has negative impact on firm performance due to high bureaucracy problem. Also, I have found positive relationship between Firm age and Firm performance that might be happened due to the effect of experience, reputation of the firm etc.

Chapter: 01

Introduction

Chapter 01: Introduction

1.1 Background of the Study

CEO, a part of top management of the firm, always influences the decision and day to day operations that move the firm to a different direction and thus provides a different outcome for the organization. Nowadays, relationship between the top executive's characteristics and firm performance has become a burning topic to know for the both types of people such as corporate leaders and academic researchers. As a consequence, lots of researches have been conducted and published around the world to know about the relationship between these two types of variables. Though each of the persons of the top management enhances the firm performance by individual contribution, the CEO is, however, considered as the final individual who can influence the strategic decision-making process more closely than others and it becomes difficult to identify the actual contribution of CEO to that firm.

The press, the media, financial experts, and investors from the private sector, for example, constantly monitor the behavior of CEOs of major corporations since they wield a lot of authority inside the corporate hierarchy. They become intriguing targets for additional research in the academic setting because of this. Particularly interesting is the impact of several CEO-related variables.

In both theory and practice, ownership has been found to be one of the best sources of power in studies. The ownership of the business is a key factor in the agency theory that determines the agent-principal relationship. In contrast to an agency interaction, the CEO who obtains a sizable amount of the company's stock will be an agent-cum-principal officer, giving him a solid foundation to control practically all organizational activities.

Female CEOs often have a beneficial impact on corporate performance, according to the study's empirical findings. It is also demonstrated that the CEO/Chairman duality and CEO experience, expressed as the length of time the candidate has held the post inside the company, have a favorable link with the financial success of the sample firms. The remaining factors provide findings that are either equivocal or inconsequential in terms of the financial success of the organization. The study's findings should be viewed with some caution since endogeneity is a problem that affects the majority of studies on corporate governance.

The majority of research' findings indicated that CEO power had a negative effect. The reason for studying CEO managerial choices has nothing to do with recent changes in governance that led to several CEOs of major corporations like Enron and WorldCom being involved in corporate scandals. This study, however, takes a different tack by focusing on the characteristics that indicate experience. When a CEO is educated, it is a significant source of wisdom. Knowledge is power, so it is assumed that when higher learning and experiences are combined, there is a significant likelihood of gaining a stronger understanding of management competence and, as a result, delivering the company even during the most difficult times. Previous research has demonstrated the significance of CEO education in numerous organizational decisions.

Businesses that choose CEOs with degrees in business leadership, finance, economics, or accounting in particular will do remarkably better. Similar to this, when the CEO obtains a postgraduate degree, such as an MBA, master's, or PhD, stock performance improves. Additionally, the findings show that executives with experience in a similar industry will have a beneficial impact on the operation of the company. Finally, research demonstrates that long-serving CEOs boost business success. Overall, our data show that CEOs' characteristics are important variables that might account for variations in Saudi enterprises' performance. These findings would aid shareholders in choosing the best CEOs to lead the business.

Though, a lot of researches have been conducted in different countries, such type of research paper hardly available in our country. But top management wants to know about the characteristics of CEO that influence the performance of the firm and how the variables influence the outcome of the firm to appoint a proper CEO for the organization. This study can be useful to the top management in such dilemma. This study includes different characteristics of CEO and describes how these characteristics influences the performance of the firm and will also be able to identify the characteristics to appoint a CEO for the firm.

1.2 Origin of the Study

This thesis paper is compulsory requirement for the MBA students of Department of Finance This thesis paper heading “Top Executive’s Characteristics and Firm performance: Evidence from Listed Manufacturing Companies of Bangladesh” is completed under the supervision of

Mohammad Salahuddin Chowdhury, Associate Professor of Department of Finance, University of Dhaka, to know how the Top executive Characteristics influences firm performance.

1.3 Objectives of the Study

The main purpose of this thesis is to determine either top executive's characteristics influence firm performance or not and how they influence firm performance. The specific objectives are as follows:

I. How the top executive's characteristics enhance firms' accounting performance.

II. How the top executive's characteristics enhance firms' market performance.

1.4 Scope of the Study

A study requires investment of sound planning, long time, effort and proper model selection to catch the actual relationship. I have tried my level best to ensure a proper thesis paper but still there may have several limitations such as insufficiency and the unavailability of relevant information about the Top executive of the firms, lack of software knowledge, difficult to find out actual reasons exactly that enhance firm performance.

1.5 Limitations of the Study

The main limitation of the study is the lack of data. I have taken only 148 companies of all listed manufacturing industry in Bangladesh. I have selected the sample companies for my analysis based on random sampling. Besides, I have used only 10 years data in my analysis. If I would use more than 10 years data in my analysis, then there might be the chance of getting different results. There is another limitation of this study that is the use of some qualitative data as independent variables in my analysis. I have used those dummy variable based on my subjective judgement. Another limitation of this study is that many of the companies have less than 10 years data. Also, lack of sufficient time and proper knowledge regarding this topic are the limitations of this study.

Chapter: 02

Literature Review

Chapter 02: Literature Review

Usually, top management of the organization analyzes and evaluates different characteristics of candidates of this post “CEO” before appointing him it that position. The research of Wally and Baum 1994 found that there are some characteristics such as age, education, service experience, achievements, Industry experienced, total working age etc. that affect the hiring decision of the top management because there is a strong positive relationship between these variables and company performance (Wally and Baum 1994). Generally, companies try to appoint the best candidate for each of positions and management tries ensure better performance of the organization. In such situation before appointing manpower in the top position such as CEO, manager etc. top management wants to know the attributes and qualities that make someone different from the others and ensures optimum performance and wants to justify the candidates with these variables.

Chief Executive Officers (CEOs) of each company exercises a lot of power in the company to perform their day-to-day operations and duties that have been assigned to them. The actions of CEOs directly and indirectly influence the organization’s environment, financial statement, investor’s decision and stakeholders of the organization above all the total process of the organizations. As the organization is strongly influenced by the operations and decisions of the CEO, at present the position “CEO” has become the target point of the researchers for further more investigation in the business world and in the academic world also. Specially, the influencing factors and how those factors influence the performance of the organization are the great points of interest to know.

Previous academic researches show that different characteristics related to the CEO directly and indirectly influence a company’s financial performance and position either in a positive way or it can influence the performance of the organization in negative way. Those studies clarify the relationship between these Chief Executive Officers’ (CEOs) characteristics and firm financial performance and also describes how these variables influences the firm. Previous different researches show that through different individual characteristics such as: CEO age, CEO gender, educational background, Education Level, professional degree, industry experience, total working experiences, number of companies experienced, ownership in the firm etc. variables affect the performance of the firm. In order to measure the financial performance of these companies’ different indicators such as sales revenue, total asset, ROA, ROE, gross profit, net profit, EPS etc.

have also been used here. Brealey, Myers & Allen conducted research on this topic in 2011 and asserted that it is beneficial and necessary to check several characteristics more closely and deeply in relation to firm performance and also said to evaluate if there is any relationship between them. But, other things such as previous experience and knowledge always play a significant role in the decision-making process made by the top managers of the company and it is very common matter that recruiters always try to differentiate the most qualified candidate from the others in the recruitment process for the betterment of the firm.

There are a lot of previous studies that say that CEO characteristics always have an effect on firm financial performance. The research paper of peni conducted in 2014 examined the effect of various characters of CEO on the firm performance also included Return on asset (ROA) and Tobin's to measure the performance of the Chief Executive Officer (CEO) and he found that several vital characteristics of Chief Executive Officer (CEO) strongly enhance the performance of the firm. Again, there are a lot of studies that were conducted basing on single character to know more closely and more accurately about how that variable magnifies the performance and also level of magnitude of the independent variable.

After all, this paper examines the influence of the different characteristics of Chief Executive Officers (CEOs) of Bangladeshi Companies such as age, education, experience, industry experience, professional degree, ownership percentage in the regression model in order to draw a relationship between these variables and performance of firm.

CEO's Educational background and major

Normally, educational background of a person influences that person's decision-making process in a way that he/she practiced. CEO's educational background can be described by dividing it in two ways such as business and non-business background. However, for the CEO post, that person who has business educational background has the possibility to perform well than the non-business background. The CEO with business educational background has the capability to manage a critical situation and the business background help him to move forward easily. Again, there several sectors where CEO with nonbusiness background perform well such as there is high possibility that in engineering and technical sectors, CEO with engineering background has better chance to perform well. But, Warren buffet, one of the most successful people in the business world, claimed educational background of the top executive can't alter the performance of the firm significantly. However, another study that was conducted by Gottesman and Morey (2010) used

Tobin's q to measure the performance of the firm and the study concluded that the business education of the CEOs does not influence the performance of the firm.

Professional degree of CEO

Professional degree is one of the highest levels of education. In this changing business world, top management prefers to have a professional degree. The number of professional degree holder is increasing day by day. Different studies show that, CEO with business related profession degree such as CA, CMA, ACCA, CFA etc. tends to perform better than other. As a result, nowadays corporate leaders are going for to achieve a business-related professional degree.

CEO Education

Education is one of the most significant factors that influences the performance of a firm. The managerial effectiveness and performance of a CEO largely depend on the level and quality of the education. If the CEO has relevant and strong educational background, most probably that person will perform well in the real world. Education is the first factor that is evaluated by top management before appointing a CEO. In business world it is believed that good level of education significantly influences the performance of the firm and a CEO having such good educational qualification can change the total picture of the firm within a few years.

The research paper conducted by Wally and Baum (1994) discloses that formal education is considered as the mirror of CEO's capacity to manage and handle a complex situation of a business to ensure a better outcome. A research paper conducted by Certo in 2003 postulated that a good level of education has significance in raising the managers' prestige and thus make capable them to provide proper decision. A similar study was conducted by Darmadi on the Indonesian firms (2013) to check the influence of the top management's education on the performance and formulated that the educational qualification of the CEO's and top management significantly influences the outcome of that firm than those firms that have CEOs with poor educational background. Another study conducted by Huang (2013) including CEO data of 392 firms between 2005 and 2010 and asserted that firm performance is significantly related with the education of CEO specially related with the Master's degree.

Gender of CEO

Many research papers have been conducted to know whether CEO gender influences the performance of the firm or not. Previous research papers that were conducted on the gender of

CEO shows that female CEOs tend to take less risk than the male CEOs but female CEOs earn more than the male CEOs. The research conducted by Khan & Vieito (2013) on gender and performance found that female CEOs performed better than the male CEOs at that time.

Again, a study by Davydov, Florestedt, Peltomäki & Schön (2017) (research conducted in Sweden) asserted that female investors prefer lower risk than the male investors but often time they earn more than the male investors. This result has a lot of significance in the portfolio management because the portfolio result shows that female's investment return is 1.68% higher than the male investors (Davydov et al. 2017). Again, Khan & Vieito (2013) evaluated the relationship between CEO gender and firm performance by including the data of US companies from 2004-2010 and found same result as Davydov, Florestedt, Peltomäki & Schön (2017).

Ownership of CEO

CEO ownership always plays an important role in the performance of the firm. CEO ownership is a great source of power in both sector theory and practice (Onali et al. 2016; Wu et al. 2011). It is recognized that ownership can reduce agency conflict in a firm and thus can improve the actual performance of the firm. Several prior publications show that the character "CEO ownership" is closely related with corporate decision of a firm. This characteristic encourages the CEOs to make a better decision for the firm and also make them attentive to the firm. When a CEO has greater ownership in the firm, there is high possibility that the firm will perform better than situation having no ownership of CEO. Adams et al. (2005) studied the impact of CEO ownership on firm's performance variability and he found that CEO ownership has positive impact on firm performance now it can be said that greater ownership of CEO leads to the better performance.

CEO Age

There are a lot of studies that includes about CEO age. One of the famous studies in this field that was managed by Hermann & Datta, 2006 says that young CEOs prefer to accept higher risk when the older CEOs prefer less risk in operation and they don't pay any attention to the risky projects. Another study conducted by Hambrick and Mason (1984) suggests that Younger CEOs are used to take higher risk that results in higher or more strategic actions. As Younger CEOs have less real experience compare to the old CEOs, their aggressive strategic decisions may result in wastage of fund and capacity.

The study of Hermann & Datta, 2006 also suggests that in changing business environment the younger CEOs are performing well than the older CEOs. Several recent studies also assert that the younger CEOs can move the organization better in critical situation and in an important business decision. As the business world is changing rapidly, in this changing environment the young CEOs with high level of information processing capability can adjust them rapidly than the old CEOs and can ensure proper decision for the firm and thus they ensure comparatively better performance for the organization (Huang 2013). As a result, nowadays organization prefers young CEO than the old CEO for the firm.

CEO's prior experience in career

Work experience in Career is one of the most important factors that influences the performance of the firm. Greater work experience makes able the person to analyze, understand and find out a better output in a complex situation. Studies show that total work experience influences the CEO's knowledge, skill, perception, thinking capacity and data processing ability positively and can take better strategic decision that moves the organization in a better position (Dearborn & Simon, 1958). But there exists a negative relationship between work experience and risk taken by the CEO that means work experience reduces risk taking tendency because young CEO's prefer higher risk than the old CEOs. However, it can be said that prior work experience of CEO positively influences the performance of the firm.

Prior number of companies experienced

In business world, each of the business organization differs from others from different aspects. Working environment is not same for all the companies. When, CEO has working experience in different companies, it enables the CEO to learn from multi-dimensional aspects. Research conducted by Kokeno and Muturi (2016) discloses that prior number of companies increases top management ability to handle a complex situation more easily.

Chapter: 03

Methodology

Chapter 03: Methodology

3.1 Research type and Research Questions

This study investigates the effect of CEO's characteristics on firm performance so this research can be defined as "Causal Research". Research Questions: The key research question of the study "How do CEO's characteristics influence the firm performance?" Again, this study will also show "which of the CEO's characteristics influence the performance most?"

3.2 Data and source

To investigate the relationship between top executive characteristics and firm performance, top executive's data of 148 listed companies of ten years has been used here. some of the listed companies have been excluded due to unavailability of data. This study includes secondary data that has been collected from financial statements, Company website, website of DSE & CSE and also from google.

3.3 Sample size

This study includes ten years panel data of 148 listed companies of all manufacturing industries of Bangladesh.

3.4 Dependent Variables

In this study, company performance is the dependent variable and three ratios have been taken as proxy of performance and these three variables are as Return on Asset (ROA), Return on Equity and Tobin's.

Table 1: Dependent variables

Serial No.	Indicator/short form	Full form	Measurement
1	ROA	Return on Asset	Earnings before interest & tax / Total asset
2	ROE	Return on Equity	Net profit / Total Shareholder's Equity
3	Tobin's Q	Tobin's Q	Market value of the asset / Book value of the asset

Source: Author's Estimation

3.5 Independent variables

The purpose of the study is to identify how the Top executive characteristics influence the firm performance. It is needed to include several independent variables to know their influence. The independent variables can be described into two categories these are variables of interest and Control variables.

3.5.1 Key variables of Interest

Here the characteristics related characteristics that influence firm performance are the key variables of interest here. In this study variables of interest are CEO age, gender, service year, total service year, academic qualifications, professional degree, major of the study, educational background etc.

Table 2: Key variables of interest

Variable name	1	0	2	3	4
MD Gender	Male	Female			
MD Nation	Native	Foreigner			
Previous MD industry	Served any company of other industry as MD	Didn't served			
MD academic	HSC	SSC	BA	MA	PhD
MD business	Business background	Others			
MD major	Finance or account	Others			
MD professional	Professional degree	No such degree			
MD current service	Current company service year as MD				
MD total service	Total company service in career				
Previous MD	Served as MD in other company	Didn't serve			
Previous MD num comp	Number of companies served as MD				
MD family	Have family	Non			
MD Age	How old is he/she?				
MD Ownership	Portion of company's shares he/she owns				

Source: Author's Estimation

3.5.2 Control variables

However, this study follows many of the prior studies and the purpose of including these control variables is to control for the firm level effect on our regression model and there are many other variables except CEO's characteristics and here I have included some of these variables as control variables such as leverage, total asset, equity, number of outstanding shares, firm age, firm size and capital expenditure etc.

Table 3: Control variables

Control Variables	**Expected Relation with firm's performance**
Firm size (TA)	There is an inverse relationship between firm's performance and firm's size
Firm Age	There is an inverse relationship between firm's performance and firm's age
Num shares outstanding (mn)	There is a positive relationship between firm's performance and number of shares outstanding
Book value share	There is a positive relationship between firm's performance and book value of share
Market Price share	There is a positive relationship between firm's performance and market price of share
Leverage	There is an inverse relationship between firm's performance and firm's leverage
Cash holdings	There is an inverse relationship between firm's performance and firm's cash holdings
NWC	There is a positive relationship between firm's performance and net working capital
PE ratio	There is a positive relationship between firm's performance and price earnings ratio

Source: Author's Estimation

Logarithm and Winsorization: The numeric data that has large interval among them has been used in log format that scientifically reduces the gap and make relevant interval. Except the logged variables, all the variables have been winsorized at 1% level to reduce the outlier problem.

3.6 Econometric Model

To determine the effects of CEO's characteristics on firm performance, I have developed three econometric models. These three models have been described below:

3.6.1 CEO characteristics and ROA

Our first model includes several independent variables such as CEO age, academic qualification, total experience etc. to show their effect on the dependent variable ROA. This model also incorporates several control variables. This model is given below: ROAi,t = α + β. CEO's Characteristicsi,t + γ. Control Variablesi,t + εi,t

ROAi,t = α + β1MD_Gender + β2MD_Nation – β3MD¬¬_Age + β4MD_Current_service + β5MD_Total_service + β6Previous_MD + β7Prev_MD_num_comp + β8Prev_MD_ind + β9MD_academic + β10MD_Business + β11MD_Major + β12MD_Professionals + β13MD_Ownership + β14MD_Family- γ1Firm_size (TA)- γ2Firm_Age + γ3Num_shares_outstanding (mn) + γ4Book_value_share + γ5Market_price_share – γ6Leverage – γ7Cash_holdings + γ8Net_working_capital + γ9PE_ratio + εi,t

Here, i refers to the individual company and t refers to the time period of our panel data. In this regression model, ROA is the indicator of performance of company i at the period of t. In addition, α represents intercept, β and γ represents the coefficient of CEO characteristics and control variables and ε represents error term of the model.

3.6.2 CEO characteristics and ROE

The purpose of our second regression model is to investigate the influence of independent variables and control variables on the dependent variable Return on Equity (ROE). Our second model also incorporates independent and control variables. Here second regression model is: ROEi,t = α + β. CEO's Characteristicsi,t + γ. Control Variablesi,t + εi,t

ROEi,t = α + β1MD_Gender + β2MD_Nation – β3MD¬¬_Age + β4MD_Current_service + β5MD_Total_service + β6Previous_MD + β7Prev_MD_num_comp + β8Prev_MD_ind + β9MD_academic + β10MD_Business + β11MD_Major + β12MD_Professionals + β13MD_Ownership + β14MD_Family- γ1Firm_size (TA)- γ2Firm_Age + γ3Num_shares_outstanding (mn) + γ4Book_value_share + γ5Market_price_share – γ6Leverage – γ7Cash_holdings + γ8Net_working_capital + γ9PE_ratio + εi,t

Here, i refers to the individual company and t refers to the time period of our panel data. In this regression model, ROE is the indicator of performance of company i at the period of t.

In addition, α represents intercept, β and γ represents the coefficient of CEO characteristics and control variables and ε represents error term of the model.

3.6.3 CEO characteristics and Tobin's Q

Another dependent variable is Tobin's Q, it is calculated as the market value of the company divided by the current value of the existing asset of that firm at a particular time period. This ratio justifies either company is overvalued or undervalued.

Tobin's $Q_{i,t} = \alpha + \beta$. CEO's $Characteristics_{i,t} + \gamma$. Control $Variables_{i,t} + \varepsilon_{i,t}$

Tobin's $Q_{i,t} = \alpha + \beta 1MD_Gender + \beta 2MD_Nation - \beta 3MD\neg\neg_Age + \beta 4MD_Current_service + \beta 5MD_Total_service + \beta 6Previous_MD + \beta 7Prev_MD_num_comp + \beta 8Prev_MD_ind + \beta 9MD_academic + \beta 10MD_Business + \beta 11MD_Major + \beta 12MD_Professionals + \beta 13MD_Ownership + \beta 14MD_Family - \gamma 1Firm_size\ (TA) - \gamma 2Firm_Age + \gamma 3Num_shares_outstanding\ (mn) + \gamma 4Book_value_share + \gamma 5Market_price_share - \gamma 6Leverage - \gamma 7Cash_holdings + \gamma 8Net_working_capital + \gamma 9PE_ratio + \varepsilon_{i,t}$

Here, i refers to the individual company and t refers to the time period of our panel data. In this regression model, Tobin's Q is the indicator of performance of company i at the period of t. In addition, α represents intercept, β and γ represents the coefficient of CEO characteristics and control variables and ε represents error term of the model.

3.7 Hypothesis development

In the literature review section, I have described all variables of interest in details. Now in order save space, here I am not describing these variables again in details but I have added here the main reason/ reasons behind the hypothesis.

Academic background: Wally and Baum (1994) described formal education as the mirror of CEO's capacity of managing and handling a complex situation of a business to ensure a better outcome. Basing on this theory, this hypothesis can be derived

H1: CEO's formal educational qualification is positively correlated with firm performance.

Major of study: Undoubtedly Warrant buffet is one of the most successful people in the business world and he believed that educational background of the CEO doesn't enhance firm performance significantly. On the other hand, Gottesman and Morey (2010) conducted a study on this topic and taken Tobin's q to measure the performance of the firm and the study revealed that the business education of the top executive does not influence the performance of the firm in a large scale. So, this hypothesis can be derived:

H2: There is no any significant relationship between educational background and firm performance.

Professional degree of CEO: Professional degree enhances the capacity of the CEO to understand, analyze, elaborate and to find out most appropriate solution that may bring more fruitful outcome for the organization. It is well known that the person who has professional degree is good at specific field. Now can state that CEO with professional degree provides additional value for the firm.

H3: Professional degree enhances firm performance positively.

Ownership of CEO: When a CEO has greater ownership in the firm, there is high possibility that the firm will perform better than situation having no ownership of CEO. Adams et al. (2005) studied the impact of CEO ownership on firm's performance variability and he found that CEO ownership has positive impact on firm performance now it can be said that greater ownership of CEO leads to the better performance. So, there exists a positive relationship between Ownership and firm performance.

H4: There is positive relationship between CEO ownership and the firm performance.

Firm size: Firm size creates new opportunity and enhances the capability to grab new opportunities in order to accelerate the growth of the firm properly. So, it can be derived that

H5: There is positive relationship between firm size and firm performance.

Firm age: The term firm age is related to the total operation year of the firm and normally it can be said higher firm age develops greater ability to operate more efficiently.

H6: Firm age is positively correlated with firm performance.

CEO age: A study conducted by Hambrick and Mason (1984) suggests that Younger CEOs want to take higher risk that results in higher or better performance. The study of Hermann & Datta, 2006 also suggests that in changing business environment the younger CEOs are performing well than the older CEOs. These researches indicate about negative relationship between CEO age and Performance.

H7: CEO age is inversely related with firm performance.

CEO's Total service in career: A study conducted by Hambrick & Mason in 1984 concluded that CEO's total service year significantly enhances company performance by altering the information processing ability, analyzing ability and the ability to understand the real challenges.

H8: CEO's total working experience positively correlated with firm performance.

Number of companies experienced: When, CEO has working experience in different companies, it creates the opportunity to learn from different scopes and enables the CEO to learn from multi-dimensional aspects. Kokeno and Muturi conducted research on this in 2016 reveals that prior number of companies experienced increases top management ability to handle a complex situation more easily. Basing on this study, it can be said:

H9: There is positive relationship between prior number of companies experienced and firm performance.

Number of companies experienced by CEO: According to Zhang (2008), there is a link between post-succession business financial performance and past CEO experience. The performance impact of CEOs with job-related experience is not, however, the article's main focus. Regarding the association between job-specific expertise and post-succession performance, Zhang (2008) mainly offers statistical descriptions.

Elsaid, Wang, and Davidson (2011) discovered that although their stock returns increase, large, publicly traded US companies that hire former CEOs have less return on assets, higher debt ratios, and a higher risk of insolvency for a maximum of three years after the replacement event than companies with other types of succession. The majority of the underwhelming results of previous CEOs are attributed by the authors to the fact that these individuals are employed by failing businesses, which they are consequently unable to turn around.

CEO positions stand out among executive-level positions. They demand for skills that are fundamentally different from those required for lower-level executive positions, such overseeing the company's board of directors or shareholders. The best way to develop these abilities is through work-specific experiences (McCall, 2004).

Chapter: 04

Statistical Analysis

Chapter 04: Statistical Analysis

4.1 Descriptive Statistics

This table shows the general statistics of included variables in terms of mean, standard deviation, minimum value, and maximum value and also counts total variables included in each parameter of statistics. This statistic is prepared basing on the last ten years data of 148 individual companies from listed manufacturing industry of Bangladesh.

Table 4: Summary Statistics

Variables	**Mean**	**Std. Dev.**	**N**	**Min**	**Max**
ROA	.112872	.7427855	1,341	-1.05478	22.74242
ROE	.1002558	.5706591	1,341	-8.32562	5.936592
Tobin's Q	3.169081	8.844187	1,341	-43.9785	138.0143
MD gender	.925816	.2621673	1,348	0	1
MD nation	.9347181	.2471143	1,348	0	1
MD Age	39.01824	26.77304	1,480	0	88
MD current service	11.15	11.86932	1,480	0	49
MD total service	19.02027	16.42183	1,480	0	70
Previous MD	.425	.4945101	1,480	0	1
Prev. MD num comp	2.588514	5.569064	1,480	0	35
Previous MD industry	.1689189	.3748069	1,480	0	1
MD academic	2.629752	.6533802	1,210	1	4
MD business	.3930769	.4886216	1,300	0	1
MD major	.1639222	.3703435	1,336	0	1
MD professional	.1960784	.3971908	1,224	0	1
MD ownership	.2432418	2.186678	1,480	0	51.37
MD family	.5222973	.4996714	1,480	0	1
Firm size	3.302123	.7277574	1,341	.9334873	5.816279
Firm age	1.372029	.2489294	1,348	.4771213	2.033424
Number of Shares	86.05437	246.0098	1,480	-1211	7046.154
Book value per share	59.98675	179.1476	1,480	-1114.545	2430

Market price per share	255.8995	825.4071	1,480	-119.0827	15173.9
Leverage	4.051291	101.5156	1,341	0	3682.936
NWC	.1348414	.8210072	1,340	-10.0524	23.75991
PE ratio	98.85318	735.4083	1,339	-1301.042	22826.92

Source: Author's Estimation

Here, summary statistics chart shows that average Return on Asset (ROA) is about 11.29%. This statistic also reveals that some of the companies performing better than the average ROA. The average Tobin's Q is 3.16 which is quite good. Average Return on Equity is about 10.03%. Average total service year as CEO in different industry is about 19.02 years that means most of the CEOs have a decent service experience.

Again, on an average CEOs have been serving their companies for more than 11 years that means that most of the CEOs have been serving the for a long period and most important factor behind that is most of the companies appoint CEO from their family members and they stay in this post for a long period. Average academic qualifications of a CEO are 2.63 that means on an average CEO have educational qualifications up to bachelor and some of them have educational background up to HSC that means most of CEOs have a poor educational background.

Moreover, 39.30% of CEOs have business related educational background and 61.70% have non business background and 16.39% CEOs had studied Finance and Accounting as major and basing on this it can be said that most the CEOs have non finance educational background. Unfortunately, only 19.60% CEOs have professional degrees. Basing on these statistics it can be said that overall educational background is not very much satisfactory.

The summary statistics also shows that around 93% of the CEOs are male and native. On the contrary, the rest 7% are female and foreigner. The average age of the CEOs are 39 years. Around 24% of the CEO have ownership in their companies and around 52% of them have family.

4.2 Multicollinearity Test

According to the Woolridge (2013), The main purpose of the Multicollinearity Test is to check the correlation among the independent variables in the dataset. I have used two renown methods. Such as:(1) Pearson correlation matrix and (2) Variance Inflation Factor (VIF) test.

Pearson correlation matrix:

A Pearson correlation is a number between -1 and +1 that indicates to which extent 2 variables are linearly related. The Pearson correlation is also known as the "product moment correlation

coefficient" (PMCC) or simply "correlation". Pearson correlations are only suitable for quantitative variables.

Table 5: Pairwise Correlations Matrix

	Md gender	Md nation	Md age	Md curren	Md total s	Previous n	Prev md n	Prev md in	Md acader	Md busine	Md major	Md profes	Md owner	Md family	Firm size (	Firm age	Num share	Book valu	Mkt price	Leverage	NWC	PE ratio
Md gender	1																					
Md nation	-0.0137	1																				
Md age	-0.0265	-0.036	1																			
Md current serv	-0.0437	0.0348	0.4718	1																		
Md total service	0.0002	0.0309	0.6945	0.6396	1																	
Previous md	0.0341	0.0504	0.2887	0.4422	0.3656	1																
Prev md num oc	0.0456	-0.0123	0.1073	0.4033	0.2065	0.5386	1															
Prev md ind	0.0152	-0.0033	0.271	0.2518	0.2148	0.5116	0.0652	1														
Md academic	0.0545	-0.0161	0.0505	-0.079	-0.0263	-0.0198	-0.133	0.0573	1													
Md business	-0.0362	-0.1092	0.097	0.1696	0.1614	0.1771	0.1999	0.1058	-0.0819	1												
Md major	0.0181	-0.1589	-0.0092	0.0385	0.008	0.0585	0.0434	0.0666	-0.0926	0.533	1											
Md professiona	0.0564	-0.2135	-0.144	-0.1351	-0.1427	-0.0705	-0.0111	-0.06	0.1539	-0.0667	0.1263	1										
Md ownership	0.0155	0.0222	0.0934	0.1008	0.0941	0.1389	0.0405	-0.0132	0.037	0.0819	-0.0326	-0.0569	1									
Md family	0.0318	0.0743	0.4878	0.5869	0.4376	0.3998	0.301	0.1632	-0.0647	0.0887	0.0276	-0.144	0.1323	1								
Firm size (TA)	0.0756	-0.1101	-0.0684	-0.0712	-0.1074	-0.0427	0.0356	-0.06	0.0782	-0.0088	-0.0113	0.0351	-0.0183	-0.0384	1							
Firm age	-0.135	-0.0328	0.1491	-0.0049	0.1687	-0.0592	-0.0553	0	0.1572	0.0387	-0.1428	-0.0803	-0.0051	-0.0149	0.0473	1						
Num shares out	0.0415	-0.0363	0.0339	-0.0116	0.0127	0.0118	0.004	0.067	0.0503	-0.0525	-0.018	0.0822	-0.0061	-0.0175	0.006	0.0345	1					
Book value sha	0.0139	-0.0029	0.1905	0.1727	0.1345	0.1262	-0.0013	0.1281	0.056	0.0125	0.0501	-0.0251	-0.0139	0.1222	-0.0174	-0.0641	-0.0525	1				
Mkt price share	0.0537	-0.0029	0.1044	-0.0022	0.0659	0.0065	-0.0463	-0.0012	0.0185	-0.0496	-0.022	-0.0354	-0.0428	-0.0066	0.045	-0.0225	-0.0346	0.4094	1			
Leverage	0.0084	0.0083	0.0345	0.0114	0.0033	-0.0249	-0.0146	-0.0101	-0.0309	-0.0301	-0.016	-0.0146	-0.0062	0.0298	-0.1041	-0.0843	-0.0096	0.0688	0.0458	1		
NWC	-0.0031	-0.0016	0.0379	0.051	-0.0011	-0.0056	0.0274	-0.0084	-0.0647	-0.0098	-0.0288	-0.0413	-0.0275	0.0395	-0.0327	-0.1103	-0.0086	0.0588	0.0049	0.9175	1	
PE ratio	-0.0065	0.0043	0.0165	0.0313	0.0264	0.0434	0.0091	0.0759	0.0391	0.0166	-0.007	-0.0277	0.0245	0.0506	-0.0635	0.0174	-0.0057	0.0061	-0.0032	0.0082	-0.0026	1

Source: Author's Estimation

4.2.1 Results of Pearson Correlation Matrix

The result of Pairwise correlations matrix is shown here for the independent variables that are included in our study. Here, CEO's characteristics are the key variables of interest.

Pearson correlation matrix has been conducted to check the Multicollinearity in the dataset. In this method, the rule of thumb is that if the correlation coefficient value is 0.80 or more than 0.80, it represents that there is multicollinearity problem in the dataset. In the Pairwise correlations matrix (table 4.2), there is no any value that is more than 0.80 so it can be concluded that there is no any severe multicollinearity problem in this dataset that maybe a matter of concern. This table represents different correlations such as positive and negative correlation among the independent variables.

4.2.2 Results of VIF Test

The result of Variance inflation factor (VIF) is presented below to check the correlations among the independent variables where CEO's characteristics (CEO age, total service year, current service year, ownership) are the key variables of interest. Moreover, sales growth rate, capital expenditure, cash holding, net working capital are also included to know their influence on the firm performance.

Table 6: VIF Results

Variable	**VIF**	**1/VIF**
NWC	6.94	0.144048
Leverage	6.92	0.144489
Md total service	2.8	0.35689
Md current service	2.49	0.401551
Previous md	2.39	0.419238
Md age	2.34	0.427525
Md family	1.83	0.545119
Previous md num comp	1.78	0.562557
Previous md industry	1.61	0.620643
Md business	1.59	0.627378
Md major	1.56	0.639177
Book value share	1.3	0.769714
Mkt price share	1.25	0.797429
Firm age	1.19	0.839718
Md professional	1.17	0.853265
Md academic	1.13	0.884197
Md nation	1.11	0.898456
Firm size (TA)	1.1	0.911165
Md ownership	1.07	0.93332
Md gender	1.06	0.944555
Num shares outstanding (Million)	1.03	0.974112
PE ratio	1.02	0.984309
Mean VIF	**2.03**	

Source: Author's Estimation

Here is the Variance Inflation Factor (VIF) table and it shows the test result of correlations among the independent variables. For VIF test, the rule of thumb is that if the correlation values are more than 10 or 1/VIF is less than 0.10 it represents that there is strong multicollinearity problem in that dataset (O'Brien (2007) and Salmerón, García & García 2018). This table reveals that all VIF values are less than 10 and all the 1/VIF values are greater than 0.10, so it can be said that there is no any strong multicollinearity problem in this dataset.

I have conducted VIF tests for all the dependent variables and results for all dependent variables are same. I have added here only one result.

4.3 Results of Heteroskedasticity Test

In this study, Breusch-Pagan test has been used to check the Heteroskedasticity problem in our dataset. Table 7 shows this result of the test conducted. The null hypothesis is (Ho: Constant variance). For the Breusch-Pagan test the rule of thumb is that this null hypothesis will be rejected if probability value is less than 0.05. In our model, for three dependent variables (ROA, ROE, Tobin's Q), three Heteroskedasticity tests have been conducted. As the probability values of all three models are less than 0.05 except ROA, logically the null hypothesis is rejected and that represents that there is no heteroskedasticity problem in our data set. As the probability value of ROA is higher than .05, there remains heteroskedasticity problem. To remove the heteroskedasticity problem I have used robust command in Stata. That's how I have solved heteroskedasticity problem in my data.

Table 7: Results of Breusch-Pagan Test

Breusch-Pagan test for heteroscedasticity Ho: Constant variance		
Dependent variable	chi2(1)	Prob > chi2
ROA	0.14	0.7085
ROE	122.90	0.0000
Tobin's Q	1087.57	0.0000

Source: Author's Estimation

4.4 Effect of Variables of interest and Control variables on ROA

This table 8 shows the relationship between dependent variable (ROA) and independent variables basing on the fixed effect model. The model shows the influence of Variables of interest and control variables on the dependent variable ROA. As a result, it becomes easy to distinguish the effect of control variables and also the effect of variables of interest. This table reveals that including control variables in the regression makes other variables' relationship with ROA significant where that variable shows insignificant relationship with the dependent variable ROA.

Table 8: Effect of Variables of interest and Control variables on ROA

ROA	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Md gender	0.0304125	0.02454	1.24	0.216	-0.0177501	0.0785751
Md nation	-0.0481132	0.024335	-1.98	0.048	-0.0958723	-0.000354
Md age	-0.00018	0.000266	-0.68	0.498	-0.0007015	0.0003414
Md current service	-0.0004782	0.000543	-0.88	0.378	-0.0015429	0.0005865
Md total service	-0.0003017	0.000447	-0.67	0.5	-0.0011791	0.0005757
Previous md	0.0109647	0.016544	0.66	0.508	-0.0215055	0.043435
Previous md num comp	0.0000365	0.001303	0.03	0.978	-0.0025212	0.0025941
Previous md industry	-0.0074951	0.019177	-0.39	0.696	-0.0451314	0.0301411
Md academic	-0.0048194	0.012145	-0.4	0.692	-0.028656	0.0190173
Md business	0.0120282	0.020172	0.6	0.551	-0.0275624	0.0516188
Md major	-0.0112938	0.023249	-0.49	0.627	-0.0569231	0.0343356
Md professional	0.0212468	0.014288	1.49	0.137	-0.0067944	0.049288
Md ownership	0.0105831	0.011085	0.95	0.34	-0.011173	0.0323392
Md family	0.0327798	0.012875	2.55	0.011	0.007512	0.0580477
Firm size (TA)	-0.1184051	0.017588	-6.73	0	-0.1529232	-0.083887
Firm age	0.0645098	0.050015	1.29	0.197	-0.0336493	0.162669
Num shares outstanding	0.0000243	1.12E-05	2.17	0.03	2.33E-06	0.0000464
Book value share	-2.52E-06	2.04E-05	-0.12	0.902	-0.0000426	0.0000376
Mkt price share	7.48E-07	4.22E-06	0.18	0.859	-7.53E-06	9.03E-06
Leverage	0.0056593	9.42E-05	60.05	0	0.0054743	0.0058442

NWC	0.0725772	0.013964	5.2	0	0.0451719	0.0999825
PE ratio	-1.29E-06	3.47E-06	-0.37	0.71	-8.11E-06	5.52E-06
Cons	0.4085015	0.077116	5.3	0	0.257152	0.5598509

Source: Author's Estimation

When we add control variable in our analysis, then we have found that only MD family has significant relationship with firm's performance with same sign as expected. The fixed effect regression model shows that in that case Firm size, Number of shares outstanding, Leverage and Net working capital have significant relationship with firm's performance and all of these variable shows expected sign except Leverage.

Table 9: Effect of variables of interest on ROA

ROA	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf.**	**Interval]**
Md gender	-0.0399694	0.2003125	-0.2	0.842	-0.4330998	0.3531611
Md nation	0.0929139	0.2001507	0.46	0.643	-0.299899	0.4857268
Md age	0.0053295	0.0021426	2.49	0.013	0.0011244	0.0095347
Md current service	0.0055629	0.0044092	1.26	0.207	-0.0030906	0.0142163
Md total service	-0.0026049	0.0036482	-0.71	0.475	-0.0097648	0.004555
Previous md	-0.163765	0.1326497	-1.23	0.217	-0.4241014	0.0965715
Previous md num comp	0.0023264	0.0103867	0.22	0.823	-0.0180583	0.0227111
Previous md industry	-0.4580607	0.154441	-2.97	0.003	-0.7611645	-0.154957
Md academic	0.0085532	0.0999317	0.09	0.932	-0.1875714	0.2046777
Md business	0.0300029	0.1656135	0.18	0.856	-0.2950279	0.3550337
Md major	0.0276252	0.1914868	0.14	0.885	-0.3481842	0.4034345
Md professional	-0.2458613	0.1167163	-2.11	0.035	-0.474927	-0.016796
Md ownership	-0.0539272	0.0909853	-0.59	0.554	-0.2324937	0.1246393
Md family	-0.0522216	0.106091	-0.49	0.623	-0.2604343	0.155991
Cons	0.0222289	0.3811277	0.06	0.954	-0.7257669	0.7702247

Source: Author's Estimation

The fixed effect model shows that without control variable MD age has significant relationship with Firm performance but it shows opposite sign that was expected. Previous MD industry and

MD professionals also have significant relationship (at 5% significance level) but these also possess opposite sign as expected.

4.5 Effect of Variables of interest and Control variables on ROE

This table 10 shows the relationship between dependent variable (ROE) and independent variables basing on the fixed effect model. The model shows the influence of Variables of interest and control variables on the dependent variable ROE. As a result, it becomes easy to distinguish the effect of control variables and also the effect of variables of interest. This table reveals that including control variables in the regression makes other variables' relationship with ROE significant where that variable shows insignificant relationship with the dependent variable ROE.

Table 10: Effect of Variables of interest and Control variables on ROE

ROE	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf.**	**Interval]**
Md gender	0.029911	0.1036685	0.29	0.773	-0.17355	0.233372
Md nation	-0.22155	0.1028	-2.16	0.031	-0.4233114	-0.019798
Md age	0.000513	0.0011224	0.46	0.648	-0.0016899	0.002716
Md current service	0.001277	0.0022917	0.56	0.578	-0.0032212	0.005774
Md total service	0.000489	0.0018886	0.26	0.796	-0.0032176	0.004196
Previous md	-0.06591	0.0698912	-0.94	0.346	-0.2030834	0.071255
Previous md num comp	0.001038	0.0055052	0.19	0.851	-0.0097669	0.011842
Previous md industry	-0.01064	0.0810109	-0.13	0.896	-0.1696337	0.148352
Md academic	-0.06584	0.0513076	-1.28	0.2	-0.1665344	0.034859
Md business	-0.00929	0.0852176	-0.11	0.913	-0.1765405	0.157958
Md major	-0.02886	0.0982158	-0.29	0.769	-0.2216161	0.163903
Md professional	0.019099	0.0603579	0.32	0.752	-0.0993606	0.137558
Md ownership	0.01759	0.0468293	0.38	0.707	-0.0743181	0.109498
Md family	-0.14078	0.0543883	-2.59	0.01	-0.2475204	-0.034034
Firm size (TA)	-0.28239	0.0742992	-3.8	0	-0.428206	-0.136565
Firm age	0.48453	0.2112845	2.29	0.022	0.0698607	0.8992
Num shares outstanding (mn)	3.78E-05	0.0000474	0.8	0.425	-0.0000551	0.000131
Book value share	5.06E-06	0.0000863	0.06	0.953	-0.0001643	0.000174
Mkt price share	6.32E-06	0.0000178	0.35	0.723	-0.0000287	4.13E-05

Leverage	-0.00037	0.0003981	-0.93	0.355	-0.0011498	0.000413
NWC	0.031703	0.058989	0.54	0.591	-0.0840692	0.147476
PE ratio	1.60E-06	0.0000147	0.11	0.913	-0.0000272	3.04E-05
Cons	0.812357	0.3257749	2.49	0.013	0.172987	1.451727

Source: Author's Estimation

When we add control variable in our analysis, then we have found that only MD family and MD Nation have significant relationship with firm's performance (at 5% significant level) but not the same sign as expected. The fixed effect regression model shows that in that case Firm size and Firm age have significant relationship with firm's performance and none of these variable shows expected sign.

Table 11: Effect of variables of interest on ROE

ROE	**Coef.**	**Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
Md gender	0.018145	0.050995	0.36	0.722	-0.0818038	0.118093
Md nation	-0.29789	0.0537296	-5.54	0	-0.4031936	-0.192577
Md age	0.000602	0.0007084	0.85	0.396	-0.0007869	0.00199
Md current service	0.000326	0.001568	0.21	0.835	-0.0027469	0.003399
Md total service	-1.4E-05	0.0012162	-0.01	0.991	-0.0023973	0.00237
Previous md	-0.01738	0.0389646	-0.45	0.656	-0.0937523	0.058986
Previous md num comp	0.003412	0.0030982	1.1	0.271	-0.0026608	0.009484
Previous md industry	0.0267	0.0440069	0.61	0.544	-0.0595518	0.112952
Md academic	0.00324	0.0208045	0.16	0.876	-0.0375365	0.044016
Md business	0.05962	0.0324749	1.84	0.066	-0.0040297	0.12327
Md major	-0.07871	0.0407694	-1.93	0.054	-0.1586181	0.001195
Md professional	0.022715	0.0329233	0.69	0.49	-0.0418134	0.087244
Md ownership	-0.01295	0.0369442	-0.35	0.726	-0.0853595	0.059459
Md family	-0.05826	0.0337988	-1.72	0.085	-0.1245003	0.007989
Cons	0.360264	0.091962	3.92	0	0.1800214	0.540506

Source: Author's Estimation

The Random effect model shows that without control variable MD Nation has significant relationship with Firm performance but it shows opposite sign that was expected. MD major also has significant relationship with firm's performance (at 5% significance level) but these also possess opposite sign as expected.

4.6 Effect of Variables of interest and Control variables on Tobin's Q

This table 12 shows the relationship between dependent variable (Tobin's Q) and independent variables basing on the fixed effect model. The model shows the influence of Variables of interest and control variables on the dependent variable Tobin's Q. As a result, it becomes easy to distinguish the effect of control variables and also the effect of variables of interest. This table reveals that including control variables in the regression makes other variables' relationship with Tobin's Q significant where that variable shows insignificant relationship with the dependent variable Tobin's Q.

Table 12: Effect of Variables of interest and Control variables on Tobin's Q

Tobin's Q	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf.**	**Interval]**
Md gender	3.103986	2.655281	1.17	0.243	-2.107301	8.315273
Md nation	-2.065	2.633035	-0.78	0.433	-7.232626	3.102629
Md age	-0.0265	0.028749	-0.92	0.357	-0.0829246	0.029922
Md current service	0.007289	0.0586983	0.12	0.901	-0.1079134	0.122491
Md total service	0.024821	0.0483736	0.51	0.608	-0.0701175	0.11976
Previous md	-0.02642	1.790137	-0.01	0.988	-3.539765	3.486925
Previous md num comp	-0.06908	0.1410065	-0.49	0.624	-0.3458187	0.207663
Previous md industry	0.932626	2.074947	0.45	0.653	-3.13969	5.004942
Md academic	-3.46147	1.314151	-2.63	0.009	-6.040639	-0.882301
Md business	0.856303	2.182694	0.39	0.695	-3.427479	5.140086
Md major	0.300769	2.51562	0.12	0.905	-4.636418	5.237955
Md professional	1.507318	1.545958	0.98	0.33	-1.526799	4.541434

Md ownership	-0.3431	1.199448	-0.29	0.775	-2.697148	2.010955
Md family	-0.83145	1.393058	-0.6	0.551	-3.565482	1.902583
Firm size (TA)	-2.39586	1.903038	-1.26	0.208	-6.130782	1.33907
Firm age	-7.77602	5.411669	-1.44	0.151	-18.39703	2.844988
Num shares outstanding (mn)	-0.0001	0.0012137	-0.09	0.932	-0.0024852	0.002279
Book value share	0.000495	0.0022099	0.22	0.823	-0.0038417	0.004833
Mkt price share	0.000278	0.0004565	0.61	0.542	-0.0006177	0.001174
Leverage	0.003102	0.0101974	0.3	0.761	-0.0169111	0.023116
NWC	-0.72359	1.510896	-0.48	0.632	-3.688888	2.241717
PE ratio	0.001606	0.0003757	4.27	0	0.0008684	0.002343
Cons	30.01995	8.344134	3.6	0	13.64365	46.39625

Source: Author's Estimation

When we add control variable in our analysis, then we have found that only MD academic has significant relationship with firm's performance (significant at 5% significance level) but not the same sign as expected. The fixed effect regression model shows that in that case PE ratio has significant relationship with firm's performance with the same sign as expected.

Table 13: Effect of variables of interest on Tobin's Q

Tobin's Q	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf.**	**Interval]**
Md gender	5.052991	2.651403	1.91	0.057	-0.1506154	10.2566
Md nation	-1.93787	2.649262	-0.73	0.465	-7.137269	3.261539
Md age	-0.02075	0.0283608	-0.73	0.465	-0.076409	0.034912
Md current service	0.009663	0.0583618	0.17	0.869	-0.1048771	0.124203
Md total service	0.018926	0.0482886	0.39	0.695	-0.0758447	0.113697
Previous md	-0.18414	1.755796	-0.1	0.916	-3.630039	3.261763
Previous md num comp	-0.07481	0.1374815	-0.54	0.586	-0.34463	0.195008
Previous md industry	1.07928	2.044233	0.53	0.598	-2.932703	5.091263

Md academic	-3.85545	1.322729	-2.91	0.004	-6.451417	-1.259477
Md business	0.753934	2.192116	0.34	0.731	-3.548283	5.05615
Md major	0.314444	2.534584	0.12	0.901	-4.659894	5.288783
Md professional	0.904199	1.544896	0.59	0.559	-2.127792	3.936189
Md ownership	-0.1816	1.204312	-0.15	0.88	-2.545164	2.181968
Md family	-0.7323	1.404256	-0.52	0.602	-3.48827	2.023674
Cons	10.70871	5.044734	2.12	0.034	0.8079847	20.60943

Source: Author's Estimation

4.7 Results of Hausman Test

This table shows the results of Hausman test of three dependent variables to logically choose one model between Fixed effect (FE) model and Random effect (RE) model and suggested model by this table will be finally presented for the analysis. In this study, Hausman test suggests one model between FE and RE model basing on our dataset. For the Hausman test

H0: Random Effect model is consistent H1: Fixed effect model is consistent

The rule of thumb for the Hausman test is that if the P value of the test is greater 0.05, null hypothesis will be accepted that Random effect model will be consistent and effective there. On the other hand, if P value is less than 0.05, null hypothesis will be rejected and at that case fixed effect model will be effective and consistent for the dataset.

Table 14: Hausman Test to select FE or RE Model with control variables

	Tobin's Q	**ROE**	**ROA**
Chi2 value	43.63	49.75	114.08
P-value	.0007	.0001	.0000
Appropriate Model	Fixed Effect	Fixed Effect	Fixed Effect

Source: Authors Estimation

As all of the P-value of the ROA, ROE, and Tobin's Q are less than .05 (at 5% significance level), we have enough evidence to reject the null hypothesis which indicates that Fixed effect Model is appropriate and effective.

Table 15: Hausman Test to select FE or RE Model without control variables

	Tobin's Q	**ROE**	**ROA**
Chi2 value	34.96	19.07	36.61
P-value	.0015	.1623	.0008
Appropriate Model	Fixed Effect	Random Effect	Fixed Effect

Source: Authors Estimation

As the P-value for Tobin's Q and ROA are less than .05 (at 5% significant level), we have enough evidence to reject the null hypothesis which indicates that Fixed effect Model is appropriate and effective. But in case of ROE, the P-value is higher than .05 (at 5% significant level), we don't have enough evidence to reject the null hypothesis which indicates that Random effect Model is appropriate and effective. So, in case of ROE, to know the relationship between the predicted variable (ROE) and variables of interest along with control variables, Random Effect Model has been used in this study for regression.

Chapter: 05

Findings of the Study

Chapter 05: Findings of the Study

The outcomes of valuation show that several characteristics of CEO and organization influence the performance of the firm in listed manufacturing industry. Here, ROA is influenced most by the independent variables and highest numbers of variables have significant relationship with the ROA. In this study, there are fewer strong relationships between independent variables and Tobin's Q.

Factors influencing ROA: From the summary table, it can be derived that the actual signs of most of the variables are similar to the expected signs in the random effect model but there are also some signs that are different from the initial estimation. Some independent variables such as Prev. industry of working, CEO business education, CEO's major, Number of shares, Market Price of share, Net working capital, PE ratio strongly positively influence ROA. Again, there also some other variables such CEO total service, CEO current service year, educational background enhances ROA positively but here relationship is not significant here. On the contrary, several factors such as Firm age, Firm size strongly negatively influences ROA.

Factors influencing ROE: Here, the actual signs of most of the variables are similar to the expected signs in the random effect model but there are also some signs that are different from the initial estimation. Some of the variables enhance ROE significantly such as CEO total service, Prev. industry of working, CEO's major, CEO's professional degree, Market Price of share and here relationship is positive. Again, firm age, firm size, leverage influences ROE negatively.

Factors influencing Tobin's Q: There are very significant relationship between top executive characteristics and Tobin's Q. Several important characteristics of CEO and firms significantly influence Tobin's Q and these variables are CEO total service, CEO's professional degree, PE ratio. Again, some of the variables have significant negative relationship with Tobin's Q and these variables are leverage, cash balance and CEO age.

Chapter: 06

Conclusions and Implications

Chapter 06: Conclusions and Implications

The purpose of this study is to identify how the characteristics of top management influence firm performance. For this purpose, ROA, ROE, Tobin's q has been taken as proxy to measure the performance of the company. Again, the characteristics of top executive of 148 listed companies of manufacturing industry have been taken as independent variables. Multicollinearity test, heteroscedasticity and autocorrelation test have been conducted and results show that this dataset has heteroscedasticity and autocorrelation problem and robust command has been used to automatically solve this problem.

MD family, MD age, MD gender have significant positive impact on firm performance. On the contrary, Previous MD industry, MD professionals, MD nation, MD major, MD academic have significant negative impact on firm performance which is quite unexpected. In my opinion, there might be problem in data that's why I have found inverse relationship between variables.

From the perspective of Bangladesh Firm size has negative impact on firm performance due to high bureaucracy problem. Also, I have found positive relationship between Firm age and Firm performance that might be happened due to the effect of experience, reputation of the firm etc.
From this study, it has been found that not only the characteristics of the top executives but also some other factors that are highly related to the firm like Firm age, Firm size, Number of shares outstanding, Leverage, cash holdings, Net Working Capital, and Price earnings ratio have severe impact on firm performance. Also, in this study it has been found that some variables possess inverse relationship with firm performance as it was expected. The probable reasons behind this might be due to lack of proper internal control, lack of good governance, lack of proper corporate governance, high bureaucracy within the firms etc. Due to the political pressure on the executives, the top executives can't work independently to improve firm performance. In this case even good characteristics of the top executives don't help to increase firm performance.

Any firm that belongs to listed manufacturing industry should focus on the characteristics of top executive that enhance firm performance positively and should overcome those factors that affect the performance of the firm. Whenever top managements want to appoint new CEO for their firm, it may consider these factors to get the right one as CEO to ensure optimum performance and this

Research paper formulates a path for the top management of the organization to increase firm performance by engaging proper CEO for the organization.

To the best of my knowledge, such type of thesis is for the first time of its kind that reveals the relationship between top executive characteristics and firm performance in the context of listed manufacturing industries of Bangladesh. There are several research papers available on this topic that focus on developed countries but such research is hardly available on Bangladeshi companies. This study reveals the association between CEO's characteristics and performance of the firm and found that there are several characteristics of CEO that glorify firm performance and some characteristics affect firm performance negatively. Top management of the companies should focus on these characteristics that magnify firm performance when it appoints top executive. Investors and shareholders may use this report to evaluate current situation and future prospects of the listed manufacturing firms.

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Appendix

Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	1,341	.112872	.7427855	-1.054782	22.74242
roe	1,341	.1002558	.5706591	-8.325627	5.936592
tobins_q	1,341	3.169081	8.844187	-43.9785	138.0143
md_gender	1,348	.925816	.2621673	0	1
md_nation	1,348	.9347181	.2471143	0	1
md_age	1,480	39.01824	26.77304	0	88
md_current~e	1,480	11.15	11.86932	0	49
md_total_s~e	1,480	19.02027	16.42183	0	70
previous_md	1,480	.425	.4945101	0	1
prev_md_nu~p	1,480	2.588514	5.569064	0	35
prev_md_ind	1,480	.1689189	.3748069	0	1
md_academic	1,210	2.629752	.6533802	1	4
md_business	1,300	.3930769	.4886216	0	1
md_major	1,336	.1639222	.3703435	0	1
md_profess~l	1,224	.1960784	.3971908	0	1
md_ownership	1,480	.2432418	2.186678	0	51.37
md_family	1,480	.5222973	.4996714	0	1
l_firm_siz~a	1,341	3.302123	.7277574	.9334873	5.816279
l_firm_age	1,348	1.372029	.2489294	.4771213	2.033424
num_shares~n	1,480	86.05437	246.0098	-1211	7046.154
book_value~e	1,480	59.98675	179.1476	-1114.545	2430
mkt_price_~e	1,480	255.8995	825.4071	-119.0827	15173.9
leverage	1,341	4.051291	101.5156	0	3682.936
nwc	1,340	.1348414	.8210072	-10.05245	23.75991
pe_ratio	1,339	98.85318	735.4083	-1301.042	22826.92

Heteroskedasticity Test for ROE

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of roe

         chi2(1)      =   122.90
         Prob > chi2  =   0.0000
```

Heteroskedasticity Test for Tobin's Q

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of tobins_q

         chi2(1)      =  1087.57
         Prob > chi2  =   0.0000
```

Heteroskedasticity Test for ROA

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of roa

         chi2(1)      =     0.14
         Prob > chi2  =   0.7085
```

VIF Test Result

Variable	VIF	1/VIF
nwc	6.94	0.144048
leverage	6.92	0.144489
md_total_s~e	2.80	0.356890
md_current~e	2.49	0.401551
previous_md	2.39	0.419238
md_age	2.34	0.427525
md_family	1.83	0.545119
prev_md_nu~p	1.78	0.562557
prev_md_ind	1.61	0.620643
md_business	1.59	0.627378
md_major	1.56	0.639177
book_value~e	1.30	0.769714
mkt_price_~e	1.25	0.797429
l_firm_age	1.19	0.839718
md_profess~l	1.17	0.853265
md_academic	1.13	0.884197
md_nation	1.11	0.898456
l_firm_siz~a	1.10	0.911165
md_ownership	1.07	0.933320
md_gender	1.06	0.944555
num_shares~n	1.03	0.974112
pe_ratio	1.02	0.984309
Mean VIF	2.03	

Correlation Matrix

	md_gen~r	md_nat~n	md_age	md_cur~e	md_tot~e	previo~d	prev_m~p	prev_m~d	md_aca~c
md_gender	1.0000								
md_nation	-0.0137	1.0000							
md_age	-0.0265	-0.0360	1.0000						
md_current~e	-0.0437	0.0348	0.4718	1.0000					
md_total_s~e	0.0002	0.0309	0.6945	0.6396	1.0000				
previous_md	0.0341	0.0504	0.2887	0.4422	0.3656	1.0000			
prev_md_nu~p	0.0456	-0.0123	0.1073	0.4033	0.2065	0.5386	1.0000		
prev_md_ind	0.0152	-0.0033	0.2710	0.2518	0.2148	0.5116	0.0652	1.0000	
md_academic	0.0545	-0.0161	0.0505	-0.0790	-0.0263	-0.0198	-0.1330	0.0573	1.0000
md_business	-0.0362	-0.1092	0.0970	0.1696	0.1614	0.1771	0.1999	0.1058	-0.0819
md_major	0.0181	-0.1589	-0.0092	0.0385	0.0080	0.0585	0.0434	0.0666	-0.0926
md_profess~l	0.0564	-0.2135	-0.1440	-0.1351	-0.1427	-0.0705	-0.0111	-0.0600	0.1539
md_ownership	0.0155	0.0222	0.0934	0.1008	0.0941	0.1389	0.0405	-0.0132	0.0370
md_family	0.0318	0.0743	0.4878	0.5869	0.4376	0.3998	0.3010	0.1632	-0.0647
l_firm_siz~a	0.0756	-0.1101	-0.0684	-0.0712	-0.1074	-0.0427	0.0356	-0.0600	0.0782
l_firm_age	-0.1350	-0.0328	0.1491	-0.0049	0.1687	-0.0592	-0.0553	0.0000	0.1572
num_shares~n	0.0415	-0.0363	0.0339	-0.0116	0.0127	0.0118	0.0040	0.0670	0.0503
book_value~e	0.0139	-0.0029	0.1905	0.1727	0.1345	0.1262	-0.0013	0.1281	0.0560
mkt_price_~e	0.0537	-0.0029	0.1044	-0.0022	0.0659	0.0065	-0.0463	-0.0012	0.0185
leverage	0.0084	0.0083	0.0345	0.0114	0.0033	-0.0249	-0.0146	-0.0101	-0.0309
nwc	-0.0031	-0.0016	0.0379	0.0510	-0.0011	-0.0056	0.0274	-0.0084	-0.0647
pe_ratio	-0.0065	0.0043	0.0165	0.0313	0.0264	0.0434	0.0091	0.0759	0.0391

	md_bus~s	md_major	md_pro~l	md_own~p	md_fam~y	l_firm~a	l_firm~e	num_sh~n	book_v~e
md_business	1.0000								
md_major	0.5330	1.0000							
md_profess~l	-0.0667	0.1263	1.0000						
md_ownership	0.0819	-0.0326	-0.0569	1.0000					
md_family	0.0887	0.0276	-0.1440	0.1323	1.0000				
l_firm_siz~a	-0.0088	-0.0113	0.0351	-0.0183	-0.0384	1.0000			
l_firm_age	0.0387	-0.1428	-0.0803	-0.0051	-0.0149	0.0473	1.0000		
num_shares~n	-0.0525	-0.0180	0.0822	-0.0061	-0.0175	0.0060	0.0345	1.0000	
book_value~e	0.0125	0.0501	-0.0251	-0.0139	0.1222	-0.0174	-0.0641	-0.0525	1.0000
mkt_price_~e	-0.0496	-0.0220	-0.0354	-0.0428	-0.0066	0.0450	-0.0225	-0.0346	0.4094
leverage	-0.0301	-0.0160	-0.0146	-0.0062	0.0298	-0.1041	-0.0843	-0.0096	0.0688
nwc	-0.0098	-0.0288	-0.0413	-0.0275	0.0395	-0.0327	-0.1103	-0.0086	0.0588
pe_ratio	0.0166	-0.0070	-0.0277	0.0245	0.0506	-0.0635	0.0174	-0.0057	0.0061

	mkt_pr~e	leverage	nwc	pe_ratio
mkt_price_~e	1.0000			
leverage	0.0458	1.0000		
nwc	0.0049	0.9175	1.0000	
pe_ratio	-0.0032	0.0082	-0.0026	1.0000

FE Model of ROA with Control Variable

```
Fixed-effects (within) regression               Number of obs      =       1,039
Group variable: company_id                      Number of groups   =         120

R-sq:                                           Obs per group:
     within  = 0.9860                                         min =           2
     between = 0.7642                                         avg =         8.7
     overall = 0.9557                                         max =          10

                                                F(22,897)          =     2868.22
corr(u_i, Xb)  = -0.1137                        Prob > F           =      0.0000
```

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
md_gender	.0304125	.0245401	1.24	0.216	-.0177501	.0785751
md_nation	-.0481132	.0243345	-1.98	0.048	-.0958723	-.000354
md_age	-.00018	.0002657	-0.68	0.498	-.0007015	.0003414
md_current_service	-.0004782	.0005425	-0.88	0.378	-.0015429	.0005865
md_total_service	-.0003017	.0004471	-0.67	0.500	-.0011791	.0005757
previous_md	.0109647	.0165444	0.66	0.508	-.0215055	.043435
prev_md_num_comp	.0000365	.0013032	0.03	0.978	-.0025212	.0025941
prev_md_ind	-.0074951	.0191766	-0.39	0.696	-.0451314	.0301411
md_academic	-.0048194	.0121454	-0.40	0.692	-.028656	.0190173
md_business	.0120282	.0201724	0.60	0.551	-.0275624	.0516188
md_major	-.0112938	.0232493	-0.49	0.627	-.0569231	.0343356
md_professional	.0212468	.0142877	1.49	0.137	-.0067944	.049288
md_ownership	.0105831	.0110853	0.95	0.340	-.011173	.0323392
md_family	.0327798	.0128746	2.55	0.011	.007512	.0580477
l_firm_sizeta	-.1184051	.0175878	-6.73	0.000	-.1529232	-.083887
l_firm_age	.0645098	.0500145	1.29	0.197	-.0336493	.162669
num_shares_outstandingmn	.0000243	.0000112	2.17	0.030	2.33e-06	.0000464
book_value_share	-2.52e-06	.0000204	-0.12	0.902	-.0000426	.0000376
mkt_price_share	7.48e-07	4.22e-06	0.18	0.859	-7.53e-06	9.03e-06
leverage	.0056593	.0000942	60.05	0.000	.0054743	.0058442
nwc	.0725772	.0139637	5.20	0.000	.0451719	.0999825
pe_ratio	-1.29e-06	3.47e-06	-0.37	0.710	-8.11e-06	5.52e-06
_cons	.4085015	.0771163	5.30	0.000	.257152	.5598509
sigma_u	.1263338					
sigma_e	.08513928					
rho	.68767633	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(119, 897) = 8.14                     Prob > F = 0.0000
```

RE Model of ROA with Control Variable

```
Random-effects GLS regression                   Number of obs     =      1,039
Group variable: company_id                      Number of groups  =        120

R-sq:                                           Obs per group:
     within  = 0.9854                                         min =          2
     between = 0.8750                                         avg =        8.7
     overall = 0.9716                                         max =         10

                                                Wald chi2(22)     =   60043.49
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
```

roa	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
md_gender	.0299212	.0201728	1.48	0.138	-.0096168	.0694592
md_nation	-.0751759	.0202124	-3.72	0.000	-.1147914	-.0355604
md_age	-.0000274	.0002392	-0.11	0.909	-.0004963	.0004415
md_current_service	-.0005029	.0005051	-1.00	0.319	-.0014929	.0004871
md_total_service	-.0001676	.0004047	-0.41	0.679	-.0009607	.0006255
previous_md	.0097805	.0138808	0.70	0.481	-.0174254	.0369865
prev_md_num_comp	.0000265	.0011072	0.02	0.981	-.0021435	.0021966
prev_md_ind	-.0085907	.0161702	-0.53	0.595	-.0402837	.0231022
md_academic	.0069453	.0088895	0.78	0.435	-.0104777	.0243683
md_business	.0292505	.0139993	2.09	0.037	.0018124	.0566885
md_major	-.0326393	.0172265	-1.89	0.058	-.0664027	.001124
md_professional	.0268227	.0119868	2.24	0.025	.003329	.0503164
md_ownership	.0025594	.0106207	0.24	0.810	-.0182568	.0233755
md_family	.0235473	.0115051	2.05	0.041	.0009976	.0460969
l_firm_sizeta	-.0299757	.0089492	-3.35	0.001	-.0475157	-.0124356
l_firm_age	.0201231	.0258206	0.78	0.436	-.0304842	.0707305
num_shares_outstandingmn	.0000182	.0000113	1.61	0.107	-3.90e-06	.0000402
book_value_share	-9.95e-07	.0000198	-0.05	0.960	-.0000398	.0000378
mkt_price_share	1.24e-07	4.12e-06	0.03	0.976	-7.95e-06	8.20e-06
leverage	.0057012	.0000881	64.73	0.000	.0055285	.0058738
nwc	.0734674	.0130214	5.64	0.000	.0479459	.0989889
pe_ratio	-1.21e-06	3.55e-06	-0.34	0.733	-8.16e-06	5.74e-06
_cons	.1607195	.0553638	2.90	0.004	.0522084	.2692305
sigma_u	.07338074					
sigma_e	.08513928					
rho	.42622894	(fraction of variance due to u_i)				

Hausman test result of ROA with control variable

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
md_gender	.0304125	.0299212	.0004913	.0139739
md_nation	-.0481132	-.0751759	.0270627	.0135509
md_age	-.00018	-.0000274	-.0001526	.0001156
md_current~e	-.0004782	-.0005029	.0000247	.0001979
md_total_s~e	-.0003017	-.0001676	-.0001341	.00019
previous_md	.0109647	.0097805	.0011842	.0090022
prev_md_nu~p	.0000365	.0000265	9.95e-06	.0006873
prev_md_ind	-.0074951	-.0085907	.0010956	.0103086
md_academic	-.0048194	.0069453	-.0117647	.0082757
md_business	.0120282	.0292505	-.0172223	.014524
md_major	-.0112938	-.0326393	.0213456	.0156134
md_profess~l	.0212468	.0268227	-.0055759	.0077753
md_ownership	.0105831	.0025594	.0080238	.0031757
md_family	.0327798	.0235473	.0092326	.0057782
l_firm_siz~a	-.1184051	-.0299757	-.0884294	.0151408
l_firm_age	.0645098	.0201231	.0443867	.042834
num_shares~n	.0000243	.0000182	6.18e-06	.
book_value~e	-2.52e-06	-9.95e-07	-1.52e-06	5.10e-06
mkt_price_~e	7.48e-07	1.24e-07	6.24e-07	9.13e-07
leverage	.0056593	.0057012	-.0000419	.0000335
nwc	.0725772	.0734674	-.0008902	.0050425
pe_ratio	-1.29e-06	-1.21e-06	-8.00e-08	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(17) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 114.08
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

FE of ROA without control variable

```
Fixed-effects (within) regression               Number of obs      =       1,040
Group variable: company_id                      Number of groups   =         120

R-sq:                                           Obs per group:
     within  = 0.0328                                         min =           2
     between = 0.0387                                         avg =         8.7
     overall = 0.0006                                         max =          10

                                                F(14,906)          =        2.19
corr(u_i, Xb)  = -0.6246                        Prob > F           =      0.0067
```

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
md_gender	-.0399694	.2003125	-0.20	0.842	-.4330998	.3531611
md_nation	.0929139	.2001507	0.46	0.643	-.299899	.4857268
md_age	.0053295	.0021426	2.49	0.013	.0011244	.0095347
md_current_service	.0055629	.0044092	1.26	0.207	-.0030906	.0142163
md_total_service	-.0026049	.0036482	-0.71	0.475	-.0097648	.004555
previous_md	-.163765	.1326497	-1.23	0.217	-.4241014	.0965715
prev_md_num_comp	.0023264	.0103867	0.22	0.823	-.0180583	.0227111
prev_md_ind	-.4580607	.154441	-2.97	0.003	-.7611645	-.154957
md_academic	.0085532	.0999317	0.09	0.932	-.1875714	.2046777
md_business	.0300029	.1656135	0.18	0.856	-.2950279	.3550337
md_major	.0276252	.1914868	0.14	0.885	-.3481842	.4034345
md_professional	-.2458613	.1167163	-2.11	0.035	-.474927	-.0167956
md_ownership	-.0539272	.0909853	-0.59	0.554	-.2324937	.1246393
md_family	-.0522216	.106091	-0.49	0.623	-.2604343	.155991
_cons	.0222289	.3811277	0.06	0.954	-.7257669	.7702247
sigma_u	.3480034					
sigma_e	.70374196					
rho	.19648669	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(119, 906) = 1.29                     Prob > F = 0.0246
```

RE of ROA without control variable

```
Random-effects GLS regression                   Number of obs     =      1,040
Group variable: company_id                      Number of groups  =        120

R-sq:                                           Obs per group:
     within  = 0.0053                                         min =          2
     between = 0.0240                                         avg =        8.7
     overall = 0.0071                                         max =         10

                                                Wald chi2(14)     =       7.35
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.9204
```

roa	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
md_gender	.0216764	.0874496	0.25	0.804	-.1497217	.1930746
md_nation	-.1164704	.0933698	-1.25	0.212	-.2994719	.0665311
md_age	.0017918	.0012684	1.41	0.158	-.0006941	.0042777
md_current_service	.0005556	.0028158	0.20	0.844	-.0049633	.0060744
md_total_service	-.0014963	.0021797	-0.69	0.492	-.0057684	.0027759
previous_md	-.0222132	.0692017	-0.32	0.748	-.157846	.1134196
prev_md_num_comp	-.0007017	.0054973	-0.13	0.898	-.0114763	.0100728
prev_md_ind	-.0241349	.0773346	-0.31	0.755	-.1757079	.1274381
md_academic	-.0238859	.0356197	-0.67	0.502	-.0936991	.0459274
md_business	.0042876	.0557146	0.08	0.939	-.1049111	.1134863
md_major	-.0645772	.0697774	-0.93	0.355	-.2013384	.072184
md_professional	.0287978	.0576485	0.50	0.617	-.0841913	.1417869
md_ownership	-.0311726	.068571	-0.45	0.649	-.1655694	.1032242
md_family	.038453	.0599942	0.64	0.522	-.0791334	.1560394
_cons	.2230365	.1582408	1.41	0.159	-.0871098	.5331828
sigma_u	0					
sigma_e	.70374196					
rho	0	(fraction of variance due to u_i)				

Hausman test result of ROA without control variable

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
md_gender	-.0399694	.0216764	-.0616458	.1802156
md_nation	.0929139	-.1164704	.2093843	.1770378
md_age	.0053295	.0017918	.0035377	.0017269
md_current~e	.0055629	.0005556	.0050073	.003393
md_total_s~e	-.0026049	-.0014963	-.0011086	.0029254
previous_md	-.163765	-.0222132	-.1415517	.1131684
prev_md_nu~p	.0023264	-.0007017	.0030281	.0088126
prev_md_ind	-.4580607	-.0241349	-.4339258	.1336839
md_academic	.0085532	-.0238859	.0324391	.093368
md_business	.0300029	.0042876	.0257153	.1559607
md_major	.0276252	-.0645772	.0922024	.1783208
md_profess~l	-.2458613	.0287978	-.2746591	.1014856
md_ownership	-.0539272	-.0311726	-.0227546	.0598025
md_family	-.0522216	.038453	-.0906746	.0874985

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(14) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 36.61
Prob>chi2 = 0.0008

FE of ROE with control variable

```
Fixed-effects (within) regression               Number of obs      =       1,039
Group variable: company_id                      Number of groups   =         120

R-sq:                                           Obs per group:
     within  = 0.0322                                         min =           2
     between = 0.0020                                         avg =         8.7
     overall = 0.0002                                         max =          10

                                                F(22,897)          =        1.36
corr(u_i, Xb)  = -0.7969                        Prob > F           =      0.1271
```

roe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
md_gender	.0299111	.1036685	0.29	0.773	-.17355	.2333722
md_nation	-.2215548	.1028	-2.16	0.031	-.4233114	-.0197983
md_age	.000513	.0011224	0.46	0.648	-.0016899	.0027159
md_current_service	.0012766	.0022917	0.56	0.578	-.0032212	.0057743
md_total_service	.0004891	.0018886	0.26	0.796	-.0032176	.0041957
previous_md	-.065914	.0698912	-0.94	0.346	-.2030834	.0712554
prev_md_num_comp	.0010377	.0055052	0.19	0.851	-.0097669	.0118423
prev_md_ind	-.0106408	.0810109	-0.13	0.896	-.1696337	.1483522
md_academic	-.0658375	.0513076	-1.28	0.200	-.1665344	.0348594
md_business	-.0092914	.0852176	-0.11	0.913	-.1765405	.1579577
md_major	-.0288565	.0982158	-0.29	0.769	-.2216161	.1639031
md_professional	.0190985	.0603579	0.32	0.752	-.0993606	.1375577
md_ownership	.0175897	.0468293	0.38	0.707	-.0743181	.1094975
md_family	-.1407772	.0543883	-2.59	0.010	-.2475204	-.0340341
l_firm_sizeta	-.2823856	.0742992	-3.80	0.000	-.428206	-.1365652
l_firm_age	.4845302	.2112845	2.29	0.022	.0698607	.8991997
num_shares_outstandingmn	.0000378	.0000474	0.80	0.425	-.0000551	.0001308
book_value_share	5.06e-06	.0000863	0.06	0.953	-.0001643	.0001744
mkt_price_share	6.32e-06	.0000178	0.35	0.723	-.0000287	.0000413
leverage	-.0003684	.0003981	-0.93	0.355	-.0011498	.000413
nwc	.0317033	.058989	0.54	0.591	-.0840692	.1474758
pe_ratio	1.60e-06	.0000147	0.11	0.913	-.0000272	.0000304
_cons	.8123569	.3257749	2.49	0.013	.172987	1.451727
sigma_u	.30177406					
sigma_e	.35966762					
rho	.41313911	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(119, 897) = 1.47                     Prob > F = 0.0014
```

RE of ROE with control variable

```
Random-effects GLS regression                   Number of obs     =      1,039
Group variable: company_id                      Number of groups  =        120

R-sq:                                           Obs per group:
     within  = 0.0014                                         min =          2
     between = 0.3959                                         avg =        8.7
     overall = 0.0831                                         max =         10

                                                Wald chi2(22)     =      83.31
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
```

roe	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
md_gender	.0221189	.0474086	0.47	0.641	-.0708002	.115038
md_nation	-.2844719	.0500178	-5.69	0.000	-.3825051	-.1864388
md_age	.0005542	.0006775	0.82	0.413	-.0007737	.0018821
md_current_service	.0008065	.0015137	0.53	0.594	-.0021603	.0037734
md_total_service	-.0003342	.0011746	-0.28	0.776	-.0026363	.0019679
previous_md	.001858	.0368263	0.05	0.960	-.0703204	.0740363
prev_md_num_comp	.0026852	.0029342	0.92	0.360	-.0030657	.0084361
prev_md_ind	.0269043	.0412959	0.65	0.515	-.0540341	.1078427
md_academic	-.0063614	.0194261	-0.33	0.743	-.0444359	.0317131
md_business	.051042	.0300564	1.70	0.089	-.0078675	.1099515
md_major	-.0588897	.0379537	-1.55	0.121	-.1332777	.0154982
md_professional	.0330308	.0308193	1.07	0.284	-.0273738	.0934354
md_ownership	-.0108971	.0359818	-0.30	0.762	-.0814202	.0596259
md_family	-.0521279	.0318549	-1.64	0.102	-.1145623	.0103066
l_firm_sizeta	.0509854	.017244	2.96	0.003	.0171878	.084783
l_firm_age	.15634	.0517208	3.02	0.003	.0549691	.2577109
num_shares_outstandingmn	.0000342	.0000423	0.81	0.419	-.0000487	.0001171
book_value_share	-.0000463	.0000672	-0.69	0.491	-.000178	.0000854
mkt_price_share	3.27e-06	.000014	0.23	0.816	-.0000242	.0000307
leverage	-.0001779	.000269	-0.66	0.508	-.0007051	.0003492
nwc	.0392404	.0386395	1.02	0.310	-.0364917	.1149725
pe_ratio	-2.82e-07	.0000142	-0.02	0.984	-.0000281	.0000275
_cons	-.02838	.1212405	-0.23	0.815	-.2660071	.2092471
sigma_u	.03735987					
sigma_e	.35966762					
rho	.01067449	(fraction of variance due to u_i)				

Hausman test result of ROE with control variable

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
md_gender	.0299111	.0221189	.0077923	.0921932
md_nation	-.2215548	-.2844719	.0629171	.0898112
md_age	.000513	.0005542	-.0000412	.0008949
md_current~e	.0012766	.0008065	.00047	.0017207
md_total_s~e	.0004891	-.0003342	.0008233	.0014789
previous_md	-.065914	.001858	-.067772	.0594021
prev_md_nu~p	.0010377	.0026852	-.0016475	.0046581
prev_md_ind	-.0106408	.0269043	-.037545	.0696952
md_academic	-.0658375	-.0063614	-.0594761	.0474878
md_business	-.0092914	.051042	-.0603334	.0797411
md_major	-.0288565	-.0588897	.0300332	.0905862
md_profess~l	.0190985	.0330308	-.0139323	.0518965
md_ownership	.0175897	-.0108971	.0284868	.0299716
md_family	-.1407772	-.0521279	-.0886494	.0440835
l_firm_siz~a	-.2823856	.0509854	-.333371	.0722704
l_firm_age	.4845302	.15634	.3281902	.2048563
num_shares~n	.0000378	.0000342	3.64e-06	.0000214
book_value~e	5.06e-06	-.0000463	.0000513	.0000541
mkt_price_~e	6.32e-06	3.27e-06	3.05e-06	.000011
leverage	-.0003684	-.0001779	-.0001905	.0002935
nwc	.0317033	.0392404	-.0075371	.0445723
pe_ratio	1.60e-06	-2.82e-07	1.89e-06	3.74e-06

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(18) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 49.75
Prob>chi2 = 0.0001

FE of ROE without control variable

```
Fixed-effects (within) regression               Number of obs      =       1,040
Group variable: company_id                      Number of groups   =         120

R-sq:                                           Obs per group:
     within  = 0.0158                                         min =           2
     between = 0.0342                                         avg =         8.7
     overall = 0.0174                                         max =          10

                                                F(14,906)          =        1.04
corr(u_i, Xb)  = -0.2774                        Prob > F           =      0.4142
```

roe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
md_gender	.0618715	.1027333	0.60	0.547	-.1397514	.2634945
md_nation	-.2093045	.1026503	-2.04	0.042	-.4107646	-.0078445
md_age	.0006579	.0010989	0.60	0.550	-.0014988	.0028145
md_current_service	.0012773	.0022613	0.56	0.572	-.0031608	.0057153
md_total_service	.0002421	.001871	0.13	0.897	-.0034299	.0039142
previous_md	-.0551002	.0680314	-0.81	0.418	-.1886178	.0784173
prev_md_num_comp	.000229	.005327	0.04	0.966	-.0102256	.0106837
prev_md_ind	-.0181361	.0792074	-0.23	0.819	-.1735875	.1373152
md_academic	-.0673825	.0512515	-1.31	0.189	-.1679679	.033203
md_business	-.0284277	.0849374	-0.33	0.738	-.1951247	.1382693
md_major	-.0062982	.0982069	-0.06	0.949	-.1990377	.1864414
md_professional	.0201804	.0598597	0.34	0.736	-.0972994	.1376602
md_ownership	.0080723	.0466632	0.17	0.863	-.0835082	.0996529
md_family	-.1372824	.0544104	-2.52	0.012	-.2440674	-.0304974
_cons	.5018283	.1954671	2.57	0.010	.1182072	.8854493
sigma_u	.17303115					
sigma_e	.36092477					
rho	.18688246	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(119, 906) = 1.56                     Prob > F = 0.0003
```

RE of ROE without control variable

```
Random-effects GLS regression                   Number of obs     =      1,040
Group variable: company_id                      Number of groups  =        120

R-sq:                                           Obs per group:
     within  = 0.0051                                         min =          2
     between = 0.2339                                         avg =        8.7
     overall = 0.0596                                         max =         10

                                                Wald chi2(14)     =      47.34
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
```

roe	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
md_gender	.0181445	.050995	0.36	0.722	-.0818038	.1180929
md_nation	-.2978854	.0537296	-5.54	0.000	-.4031936	-.1925772
md_age	.0006016	.0007084	0.85	0.396	-.0007869	.00199
md_current_service	.0003263	.001568	0.21	0.835	-.0027469	.0033994
md_total_service	-.0000136	.0012162	-0.01	0.991	-.0023973	.0023701
previous_md	-.0173832	.0389646	-0.45	0.656	-.0937523	.0589859
prev_md_num_comp	.0034117	.0030982	1.10	0.271	-.0026608	.0094842
prev_md_ind	.0267003	.0440069	0.61	0.544	-.0595518	.1129523
md_academic	.0032397	.0208045	0.16	0.876	-.0375365	.0440158
md_business	.05962	.0324749	1.84	0.066	-.0040297	.1232696
md_major	-.0787117	.0407694	-1.93	0.054	-.1586181	.0011948
md_professional	.0227151	.0329233	0.69	0.490	-.0418134	.0872437
md_ownership	-.0129502	.0369442	-0.35	0.726	-.0853595	.0594591
md_family	-.0582559	.0337988	-1.72	0.085	-.1245003	.0079885
_cons	.3602637	.091962	3.92	0.000	.1800214	.5405059
sigma_u	.07558866					
sigma_e	.36092477					
rho	.04201818	(fraction of variance due to u_i)				

Hausman test result of ROE without control variable

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
md_gender	.0618715	.0181445	.043727	.0891832
md_nation	-.2093045	-.2978854	.0885809	.0874655
md_age	.0006579	.0006016	.0000563	.0008401
md_current~e	.0012773	.0003263	.000951	.0016295
md_total_s~e	.0002421	-.0000136	.0002557	.0014218
previous_md	-.0551002	-.0173832	-.037717	.0557677
prev_md_nu~p	.000229	.0034117	-.0031827	.0043333
prev_md_ind	-.0181361	.0267003	-.0448364	.0658575
md_academic	-.0673825	.0032397	-.0706221	.0468389
md_business	-.0284277	.05962	-.0880477	.0784841
md_major	-.0062982	-.0787117	.0724135	.0893446
md_profess~l	.0201804	.0227151	-.0025347	.0499924
md_ownership	.0080723	-.0129502	.0210225	.0285058
md_family	-.1372824	-.0582559	-.0790265	.0426395

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(14) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 19.07
Prob>chi2 = 0.1623

FE of Tobin's Q with control variable

```
Fixed-effects (within) regression               Number of obs      =     1,039
Group variable: company_id                      Number of groups   =       120

R-sq:                                           Obs per group:
     within  = 0.0487                                         min =         2
     between = 0.0028                                         avg =       8.7
     overall = 0.0045                                         max =        10

                                                F(22,897)          =      2.09
corr(u_i, Xb)  = -0.6323                        Prob > F           =    0.0025
```

tobins_q	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
md_gender	3.103986	2.655281	1.17	0.243	-2.107301	8.315273
md_nation	-2.064998	2.633035	-0.78	0.433	-7.232626	3.102629
md_age	-.0265014	.028749	-0.92	0.357	-.0829246	.0299218
md_current_service	.0072886	.0586983	0.12	0.901	-.1079134	.1224906
md_total_service	.024821	.0483736	0.51	0.608	-.0701175	.1197595
previous_md	-.0264197	1.790137	-0.01	0.988	-3.539765	3.486925
prev_md_num_comp	-.0690777	.1410065	-0.49	0.624	-.3458187	.2076633
prev_md_ind	.9326263	2.074947	0.45	0.653	-3.13969	5.004942
md_academic	-3.46147	1.314151	-2.63	0.009	-6.040639	-.8823014
md_business	.8563033	2.182694	0.39	0.695	-3.427479	5.140086
md_major	.3007688	2.51562	0.12	0.905	-4.636418	5.237955
md_professional	1.507318	1.545958	0.98	0.330	-1.526799	4.541434
md_ownership	-.3430963	1.199448	-0.29	0.775	-2.697148	2.010955
md_family	-.8314496	1.393058	-0.60	0.551	-3.565482	1.902583
l_firm_sizeta	-2.395856	1.903038	-1.26	0.208	-6.130782	1.33907
l_firm_age	-7.77602	5.411669	-1.44	0.151	-18.39703	2.844988
num_shares_outstandingmn	-.0001033	.0012137	-0.09	0.932	-.0024852	.0022786
book_value_share	.0004954	.0022099	0.22	0.823	-.0038417	.0048326
mkt_price_share	.0002783	.0004565	0.61	0.542	-.0006177	.0011743
leverage	.0031023	.0101974	0.30	0.761	-.0169111	.0231158
nwc	-.7235853	1.510896	-0.48	0.632	-3.688888	2.241717
pe_ratio	.0016058	.0003757	4.27	0.000	.0008684	.0023432
_cons	30.01995	8.344134	3.60	0.000	13.64365	46.39625
sigma_u	5.5489551					
sigma_e	9.2122334					
rho	.26622799	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(119, 897) = 1.60                     Prob > F = 0.0001
```

RE of Tobin's Q with control variable

```
Random-effects GLS regression                   Number of obs     =      1,039
Group variable: company_id                      Number of groups  =        120

R-sq:                                           Obs per group:
     within  = 0.0203                                         min =          2
     between = 0.1736                                         avg =        8.7
     overall = 0.0436                                         max =         10

                                                Wald chi2(22)     =      40.97
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0083
```

tobins_q	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
md_gender	.9789899	1.284552	0.76	0.446	-1.538686	3.496666
md_nation	-.8232313	1.347249	-0.61	0.541	-3.463792	1.817329
md_age	.0041288	.0180295	0.23	0.819	-.0312084	.039466
md_current_service	.0231893	.0402044	0.58	0.564	-.05561	.1019885
md_total_service	-.0217413	.0312052	-0.70	0.486	-.0829024	.0394198
previous_md	2.155805	.9832621	2.19	0.028	.2286463	4.082963
prev_md_num_comp	-.1062477	.0784034	-1.36	0.175	-.2599156	.0474202
prev_md_ind	-3.049003	1.107918	-2.75	0.006	-5.220483	-.8775232
md_academic	-.5006735	.5264168	-0.95	0.342	-1.532431	.5310844
md_business	1.221675	.8141358	1.50	0.133	-.3740021	2.817352
md_major	-.062063	1.028807	-0.06	0.952	-2.078488	1.954362
md_professional	.9138058	.8276118	1.10	0.270	-.7082835	2.535895
md_ownership	-1.330139	.9418566	-1.41	0.158	-3.176143	.5158664
md_family	.6811263	.8503102	0.80	0.423	-.985451	2.347704
l_firm_sizeta	-.227261	.4693414	-0.48	0.628	-1.147153	.6926313
l_firm_age	.5611641	1.402472	0.40	0.689	-2.187631	3.309959
num_shares_outstandingmn	-.00068	.0010945	-0.62	0.534	-.0028252	.0014653
book_value_share	.0002556	.0017591	0.15	0.884	-.0031922	.0037034
mkt_price_share	.00004	.0003665	0.11	0.913	-.0006784	.0007583
leverage	.0051161	.0071196	0.72	0.472	-.0088381	.0190703
nwc	-.8869984	1.027293	-0.86	0.388	-2.900456	1.126459
pe_ratio	.0017221	.0003643	4.73	0.000	.0010081	.0024362
_cons	3.19452	3.282563	0.97	0.330	-3.239184	9.628225
sigma_u	1.5998303					
sigma_e	9.2122334					
rho	.02927613	(fraction of variance due to u_i)				

Hausman test result of Tobin's Q with control variable

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
md_gender	3.103986	.9789899	2.124996	2.323885
md_nation	-2.064998	-.8232313	-1.241767	2.262254
md_age	-.0265014	.0041288	-.0306302	.0223929
md_current~e	.0072886	.0231893	-.0159007	.0427679
md_total_s~e	.024821	-.0217413	.0465623	.0369626
previous_md	-.0264197	2.155805	-2.182224	1.495923
prev_md_nu~p	-.0690777	-.1062477	.03717	.1171995
prev_md_ind	.9326263	-3.049003	3.981629	1.754401
md_academic	-3.46147	-.5006735	-2.960796	1.204109
md_business	.8563033	1.221675	-.3653715	2.025176
md_major	.3007688	-.062063	.3628318	2.295626
md_profess~l	1.507318	.9138058	.5935121	1.305774
md_ownership	-.3430963	-1.330139	.9870422	.7426859
md_family	-.8314496	.6811263	-1.512576	1.103441
l_firm_siz~a	-2.395856	-.227261	-2.168595	1.844254
l_firm_age	-7.77602	.5611641	-8.337184	5.226781
num_shares~n	-.0001033	-.00068	.0005767	.0005244
book_value~e	.0004954	.0002556	.0002398	.0013376
mkt_price_~e	.0002783	.00004	.0002383	.0002722
leverage	.0031023	.0051161	-.0020137	.0073005
nwc	-.7235853	-.8869984	.1634131	1.107915
pe_ratio	.0016058	.0017221	-.0001163	.0000919

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(18) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 43.63
Prob>chi2 = 0.0007

FE of Tobin's Q without control variable

```
Fixed-effects (within) regression               Number of obs      =       1,040
Group variable: company_id                      Number of groups   =         120

R-sq:                                           Obs per group:
     within  = 0.0176                                         min =           2
     between = 0.0053                                         avg =         8.7
     overall = 0.0005                                         max =          10

                                                F(14,906)          =        1.16
corr(u_i, Xb)  = -0.5456                        Prob > F           =      0.3000
```

tobins_q	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
md_gender	5.052991	2.651403	1.91	0.057	-.1506154	10.2566
md_nation	-1.937865	2.649262	-0.73	0.465	-7.137269	3.261539
md_age	-.0207484	.0283608	-0.73	0.465	-.076409	.0349121
md_current_service	.0096629	.0583618	0.17	0.869	-.1048771	.1242028
md_total_service	.0189259	.0482886	0.39	0.695	-.0758447	.1136965
previous_md	-.1841377	1.755796	-0.10	0.916	-3.630039	3.261763
prev_md_num_comp	-.0748108	.1374815	-0.54	0.586	-.34463	.1950083
prev_md_ind	1.07928	2.044233	0.53	0.598	-2.932703	5.091263
md_academic	-3.855447	1.322729	-2.91	0.004	-6.451417	-1.259477
md_business	.7539336	2.192116	0.34	0.731	-3.548283	5.05615
md_major	.3144443	2.534584	0.12	0.901	-4.659894	5.288783
md_professional	.9041987	1.544896	0.59	0.559	-2.127792	3.936189
md_ownership	-.1815979	1.204312	-0.15	0.880	-2.545164	2.181968
md_family	-.7322977	1.404256	-0.52	0.602	-3.48827	2.023674
_cons	10.70871	5.044734	2.12	0.034	.8079847	20.60943
sigma_u	4.8388743					
sigma_e	9.3149644					
rho	.2125069	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(119, 906) = 1.54                     Prob > F = 0.0004
```

RE of Tobin's Q without control variable

```
Random-effects GLS regression                   Number of obs     =      1,040
Group variable: company_id                      Number of groups  =        120

R-sq:                                           Obs per group:
     within  = 0.0001                                         min =          2
     between = 0.1512                                         avg =        8.7
     overall = 0.0203                                         max =         10

                                                Wald chi2(14)     =      16.69
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.2730
```

tobins_q	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
md_gender	.7951648	1.257854	0.63	0.527	-1.670184	3.260513
md_nation	-.8139293	1.332304	-0.61	0.541	-3.425197	1.797339
md_age	.0011952	.0177747	0.07	0.946	-.0336426	.036033
md_current_service	.0168028	.0394089	0.43	0.670	-.0604372	.0940427
md_total_service	-.014724	.0305316	-0.48	0.630	-.0745649	.0451168
previous_md	2.169176	.9742649	2.23	0.026	.2596519	4.0787
prev_md_num_comp	-.1144551	.0774507	-1.48	0.139	-.2662557	.0373455
prev_md_ind	-2.810695	1.095833	-2.56	0.010	-4.958488	-.662902
md_academic	-.3402032	.5125045	-0.66	0.507	-1.344694	.6642872
md_business	1.263864	.800574	1.58	0.114	-.305232	2.83296
md_major	-.0945431	1.004274	-0.09	0.925	-2.062883	1.873797
md_professional	.8035616	.8188426	0.98	0.326	-.8013403	2.408464
md_ownership	-1.230565	.9405083	-1.31	0.191	-3.073927	.6127973
md_family	.8972142	.8452777	1.06	0.288	-.7594996	2.553928
_cons	2.891462	2.270902	1.27	0.203	-1.559424	7.342348
sigma_u	1.4534445					
sigma_e	9.3149644					
rho	.02376773	(fraction of variance due to u_i)				

Hausman test result of Tobin's Q without control variable

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
md_gender	5.052991	.7951648	4.257827	2.33404
md_nation	-1.937865	-.8139293	-1.123936	2.289881
md_age	-.0207484	.0011952	-.0219437	.0220997
md_current~e	.0096629	.0168028	-.0071399	.0430469
md_total_s~e	.0189259	-.014724	.0336499	.0374114
previous_md	-.1841377	2.169176	-2.353314	1.460695
prev_md_nu~p	-.0748108	-.1144551	.0396443	.1135894
prev_md_ind	1.07928	-2.810695	3.889975	1.7257
md_academic	-3.855447	-.3402032	-3.515244	1.219406
md_business	.7539336	1.263864	-.5099306	2.0407
md_major	.3144443	-.0945431	.4089874	2.327133
md_profess~l	.9041987	.8035616	.1006371	1.310038
md_ownership	-.1815979	-1.230565	1.048967	.7522051
md_family	-.7322977	.8972142	-1.629512	1.121356

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(14) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 34.96
Prob>chi2 = 0.0015